Mr. Ken Mallary
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ENVIRONMENTAL

Subject:

Response to NC DEQ Comments
Semi-Annual Post-Removal Action Groundwater Monitoring Reports – April and October 2015
Former Virginia-Carolina Chemical Company Winston-Salem Site
Winston-Salem, Forsyth County, North Carolina

Date:
September 19, 2016

Contact:
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Our ref:
B0085732

ARCADIS G&M of North Carolina, Inc.

Dear Mr. Mallary:

On behalf of ExxonMobil Environmental Services Company (EMES), this letter provides responses to comments received from the North Carolina Department of Environmental Quality (NCDEQ) (dated February 8, 2016) on the following documents pertaining to the Former Virginia-Carolina Chemical Company Winston-Salem Site (Site) located in Winston-Salem, Forsyth County, North Carolina:

- *Semi-Annual Post-Removal Action Groundwater Monitoring Report – April 2015;* and
- *Semi-Annual Post-Removal Action Groundwater Monitoring Report – October 2015.*

Comments are provided in bold typeface followed by the response in standard typeface. PDF attachments are provided on a CD enclosed with this comment response, which will serve as Addendum No. 1 to each of the above-referenced Semi-Annual Reports.

Groundwater Sampling Activities

Comment #1: Please supplement this section with an appendix containing field notes, equipment calibration logs, groundwater elevation measurements, groundwater well sampling forms including chemical parameter stabilization criteria, etc. documenting the April and October 2015 groundwater sampling events.

Response #1:

Field notes, including equipment calibration logs and groundwater elevation measurements (depth-to-water (DTW)) are included as **Attachment 1** (April 2015) and **Attachment 2** (October 2015). Incremental chemical parameter stabilization data and sample collection details are included in the field notes. In addition, it was discovered that specific conductance and ORP measurements for WS-MW-06 recorded in field notes from the Post-Removal Action Baseline Groundwater Monitoring event in October 2014 were mis-tabulated. These parameters were reported on Table 3 – Historical Groundwater Field Parameters and Analytical Results of the April 2015 and October 2015 Semi-Annual Post-Removal Action Groundwater Monitoring Reports. These tables have therefore been revised to reflect the values recorded in the October 2014 field notes and are included with the attached field notes from the April 2015 and October 2015 reports.

Comment #2: The last sentence of the second paragraph of this section indicates that the groundwater samples were submitted to the laboratory for analysis of arsenic and lead content (total and dissolved) by US EPA SW-846 Method 6020. Groundwater samples were submitted to the laboratory for analysis of arsenic and lead content (total and dissolved) by US EPA SW-846 Method 6010 for the post-removal action baseline groundwater monitoring event in October 2014. However, as is stated in the third paragraph of Section 2.4 – *Sampling and Analysis* of the *Post-Removal Action Baseline Groundwater Monitoring Report* (January 2015, ARCADIS), "the sample collected from monitoring well WS-MW-08 required dilution to run arsenic and lead analysis due to matrix interference. The dilutions resulted in arsenic reporting limits above North Carolina Administrative Code (NCAC) 2L groundwater standards (2L standards). Therefore, the WS-MW-08 groundwater sample was also analyzed for arsenic and lead (total and dissolved) via USEPA Method SW-846 6020 in an attempt to eliminate the matrix interference and obtain lower reporting limits." Please revise this section to include a thorough discussion of the two US EPA laboratory methods (US EPA SW-846 Method 6010 and US EPA SW-846 Method 6020) including the rationale and justification for the change in laboratory analysis methods for determining arsenic and lead content (total and dissolved) from the October 2014 baseline groundwater monitoring event to the April and October 2015 semi-annual groundwater monitoring events.

Response #2:

The method for analysis of arsenic and lead at VCC Winston-Salem and other VCC sites has been under evaluation by EMES and Arcadis since 2014. The preferred method has evolved over time, as information has been gained from various monitoring activities at sites within North Carolina and the southeast.

In multiple cases, groundwater samples collected from VCC sites in 2014 which were analyzed for arsenic and lead via USEPA SW-846 method 6010C yielded matrix interferences that required dilution of the samples, resulting in reporting limits as high as 100 micrograms per liter (µg/L) for arsenic. Reporting limits of this magnitude are not effective to monitor site groundwater conditions, given that the maximum contaminant level (MCL) for arsenic is 10 µg/L. Method 6010C is well known for routine interferences that may be due to overlap of emission wavelengths by two or more elements such that the instrument cannot resolve the spectral interference. Therefore, in an e-mail to USEPA dated December 12, 2014 (i.e., after the October 2014 Baseline Sampling event at Winston-Salem), Arcadis proposed the use of Method 6020A to analyze groundwater samples for both arsenic and lead in order to eliminate potential matrix interferences encountered when analyzing samples via Method 6010C. USEPA approved this proposed change in method in an e-mail dated February 25, 2015, while NC DEQ approved the proposed change in an e-mail dated March 2, 2015. USEPA and NC DEQ e-mail approvals are provided for reference as **Attachment 3**. Therefore, groundwater samples collected from the VCC Winston-Salem site during the April 2015 and October 2015 semi-annual events were analyzed via Method 6020A. In addition, groundwater samples collected during the 2015 sampling events were analyzed via USEPA SW-846 Method 7062, the rationale of which is described in Response #3 below.

Comment #3: Please supplement the third paragraph of this section with a thorough discussion of USEPA SW-846 Method 7062, including the rationale and the justification for its use.

Response #3:

The integration of Method 7062 into the sampling program at VCC Winston-Salem was based upon evolving knowledge from activities performed at other VCC sites in the region. In 2014, as part of a remedial design, chemical speciation analyses were performed to identify the forms of arsenic present in groundwater samples from the VCC Gurley Site (Selma, North Carolina) that previously had positive detections of arsenic via USEPA Methods 6010C and 6020A.. However, the speciation analyses revealed the absence of arsenic in these groundwater samples. This prompted further investigation of samples using USEPA SW-846 Methods 6010C, 6020A, and 7062.

As mentioned in Response #2 above, routine interferences are well known for USEPA Method 6010C. Similar interferences have also been documented for samples analyzed for arsenic via Method 6020A. In some cases, previously identified interferences are corrected for as part of the laboratory's operating procedure. For Method 6010C, interferences include overlap of emission wavelengths by two or more elements such that the instrument cannot resolve the spectral interference. In other words, if two elements are present in a sample and have the same emission wavelength then it is likely that one element will be identified (the element for which the instrument is calibrated) and the result will be inaccurate and biased high. In the case of Method 6020A, arsenic is unique because it has only one known stable isotope (^{75}As) and therefore any artifacts or other elements with the same mass to charge (m/z) ratio will be quantified as arsenic in the inductively coupled plasma mass spectrometry (ICP-MS).

In the course of investigating the differences in arsenic results reported via Methods 6010C/6020A and the speciation analyses, Arcadis concluded that certain rare earth elements (REEs) (including lanthanum,

neodymium and samarium) can interfere with the quantification of arsenic leading to results that are biased high. Lanthanum causes an interference in the quantification of arsenic because of its emission at 189 nanometers (nm); the same emission line used in USEPA Method 6010C to quantify arsenic. Other elements, including neodymium and samarium, have the same m/z ratio as arsenic and thus interfere with the quantification of arsenic by USEPA Method 6020A.

In evaluating potential interferences caused by REEs on arsenic quantification, Arcadis had extensive discussions with chemists from the various laboratories contracted to perform the analyses. After these discussions, it was determined that USEPA SW-846 Method 7062 was the most appropriate method for quantifying arsenic in the event that REEs may be present in samples. Method 7062 is a hydride generation atomic absorption spectroscopy method. Hydride-generation was the standard method used for arsenic analyses prior to the advent of the 6000-series methods. This method involves the conversion of arsenic in the sample to arsine gas that is swept from the sample and into a heated quartz cell on the flame atomic absorption burner. Arsenic is then quantified by atomic absorption spectrophotometry. Potential interfering elements (such as REEs) are not an issue for this method because they do not volatilize and, thus, remain in the aqueous sample.

A comparison of groundwater results using the arsenic analytical methods described above at the Gurley Pesticide Burial Site was presented to USEPA in a memo from Arcadis to USEPA dated September 9, 2014(**Attachment 4)**. Further, between 2014 and 2015, comparative analyses of groundwater samples was performed via 6000-series methods and Method 7062 at 11 VCC sites located across North Carolina, South Carolina, and Georgia. As a result of these comparative analyses and after discussions with NCDEQ and USEPA, EMES proposed in a letter to USEPA dated May 2, 2016 that all future surface water and groundwater samples be analyzed in accordance with USEPA Method 7062 (**Attachment 5**). This analytical method, unlike USEPA Methods 6010C and 6020A, is not subject to interferences in the detection of arsenic due to the way in which the samples are prepared. This change in the analytical method will allow for a more accurate determination of arsenic concentrations in samples and, while interferences have only been noted at a few sites, promote consistency in the characterization of arsenic concentrations at VCC sites moving forward. USEPA's approval of this change is documented in an email from Remedial Project Manager Mr. Ken Mallary dated May 23, 2016 (**Attachment 6**).

Comment #4: Please revise the fourth paragraph of this section to include a thorough discussion of the modified USEPA SW-846 Method 6020 utilized by the laboratory to correct for rare earth element (REE) interference in the analysis of arsenic content.

Response #4:

The modified USEPA SW-846 Method 6020 analysis was performed as a comparative analysis to provide further insight into whether REE interferences were playing a role in results obtained via 6000-series methods. For this analysis, TestAmerica Laboratories, Inc. of Nashville, Tennessee performed analyses to determine the positive interferences by REEs such as neodymium and samarium on arsenic reported by the instrument at a mass-to-charge ratio (m/z) of 75. Both neodymium and samarium have isotopes with an atomic mass of 150, and form doubly-charged (+2) species in the mass spectrometer, resulting in

an m/z of 75 (identical to arsenic); this causes an interference in the accurate quantification of arsenic when these elements are present even at relatively low concentrations. These REEs, however, are also detected by the mass spectrometer at other mass-to-charge ratios, and the other m/z detections can be used to develop a relationship between the concentration of the REE and the signal detected at an m/z of 75. An equation was then derived to calculate the correction to minimize the interference of these REEs in the accurate quantification of arsenic using Method 6020. This correction can only be considered an estimate, however, and as noted in the reply to Comment #3, USEPA Method 7062 provides the most accurate quantification of arsenic concentrations in samples, and has therefore been proposed as the sole method to be used for future arsenic quantification in groundwater samples collected at VCC sites.

Groundwater Sampling Results

Comment #5: Please supplement this section with an appendix containing the laboratory analytical results for the April and October 2015 groundwater sampling events.

Response #5:

The groundwater analytical results for the April 2015 and October 2015 groundwater sampling events are included as **Attachment 7** and **Attachment 8,** respectively.

Data Validation

Comment #6: Please supplement this section with an appendix containing the data validation report of laboratory analytical results from the April and October 2015 groundwater sampling events.

Response #6:

The data validation reports for the April 2015 and October 2015 groundwater sampling events have been included in PDF format as **Attachment 9** and **Attachment 10,** respectively.

Comment #7: The second paragraph of this section summarizes the possibility of interference by rare earth elements (REEs) leading to false positive results for arsenic. Please supplement both *Semi-Annual Post-Removal Action Groundwater Monitoring Reports – April and October 2015* with a work plan that provides a definitive rationale and methodology for determining the most appropriate defensible laboratory analysis method for accurate analysis of groundwater samples for all Potential Constituents of Concern (PCOCs), including arsenic, lead and REE content, at this site.

Response #7:

The investigations outlined in Responses #2 and #3 above describe the rationale for accurately quantifying arsenic concentrations in groundwater at the VCC Winston-Salem Site. Going forward, it has

been proposed and accepted that all groundwater samples be analyzed for arsenic in accordance with USEPA Method 7062. The analytical method used to quantify lead concentrations in groundwater (Method 6020A) is not subject to interferences from REEs and, as such, no change to the analytical method for lead analysis is being proposed.

At present, a USEPA-approved method for the detection of REEs does not exist, nor is there a regulatory limit in soil or groundwater to which a detected concentration can be compared. Therefore, the quantification of REE concentrations in future groundwater samples is not recommended at this time. This was discussed with NC DEQ in a conference call on March 8, 2016. NC DEQ acknowledged the lack of an approved analytical method and regulatory standards for REEs and suggested that arsenic/lead data along with other pertinent information (i.e., groundwater field parameters, site geology, etc.) be used to demonstrate where REE impacts may be present and that the appropriate use restrictions are in place prior to petitioning for site closure. EMES understand that NC DEQ may require additional information in order to obtain closure for sites where REEs may be present at concentrations above background levels. Further discussion on this was provided in a letter dated July 12, 2016 from Mr. William Anckner (Arcadis) to Mr. Harry Zinn (NC DEQ) (**Attachment 11**). Please also note that in accordance with the Removal Action Completion Report (Arcadis, Revised June 2011), land use restrictions will be placed on the site properties which prevents the future use of groundwater for consumptive use.

Comment #8: The possibility of an interference by rare earth elements (REEs) leading to false positive results for arsenic raises two issues that must be addressed going forward:

- **Incomplete background and site characterization**

  The presence of REEs raises the issue of whether the REEs are naturally-occurring or were introduced to the site by deposition of pyrite ores containing REEs during site operation. If not naturally-occurring, the addition of REEs to the list of Constituents of Concern (COCs) must be evaluated. There is currently inadequate characterization of both the background and site conditions in order to evaluate the presence of REEs. Furthermore, the possibility of an interference by REEs leading to false positive results for arsenic brings into question the accuracy of all the site characterization data collected to date.

- **Incomplete risk evaluation**

  The presence of REEs further raises the issue of site risk evaluation. Site risk to human health and the environment must be evaluated in order to develop appropriate cleanup standards for all COCs and facilitate appropriate risk-based remedial decisions. To date, only site risk from arsenic and lead contamination has been considered.

Please supplement the *Semi-Annual Post-Removal Action Groundwater Monitoring Reports – April and October 2015* with a work plan and schedule for resolving the aforementioned issues regarding site characterization and risk evaluation.

Response #8:

As mentioned in Response #7 above, REEs do not have an USEPA-approved method for detection, nor is there a regulatory standard to which a detected concentration can be compared. Without established standards and analytical methods, it is not possible to incorporate REEs into a risk evaluation. As stated above in Response #7, EMES will consider arsenic/lead data along with other pertinent information (i.e., groundwater field parameters, site geology, etc.) to demonstrate where REE impacts may be present and that the appropriate use restrictions are in place prior to petitioning for site closure. In addition, land use restrictions will be placed on the site properties which prevents the future use of groundwater for consumptive use.

If you have any additional comments or questions, please contact Bruce Frink (813.973.8580) or myself at 303-471-3926.

Sincerely,

Arcadis G&M of North Carolina, Inc.

Anna Hagemeister
Senior Environmental Engineer

Copies:
David Mattison, NCDEQ
Bruce Frink, ExxonMobil

Enclosures:

Attachments

1. Field Notes – April 2015
   Table 3 – Historical Groundwater Field Parameters and Analytical Results (Semi-Annual Post-Removal Action Groundwater Monitoring Report – April 2015)
2. Field Notes – October 2015
   Table 3 – Historical Groundwater Field Parameters and Analytical Results (Semi-Annual Post-Removal Action Groundwater Monitoring Report – October 2015)
3. E-mail from Ken Mallary (USEPA) to Corrie Chwalek (Arcadis) – February 4, 2015
   E-mail from David Mattison (NC DEQ) to Matt Pelton (Arcadis) – March 2, 2015
4. Memo from William Anckner (Arcadis) to Randy Bryant (USEPA) – September 9, 2014
5. Letter from Corrie Chwalek (Arcadis) to Ken Mallary (USEPA) – May 2, 2016
6. Email from Ken Mallary (USEPA) to Corrie Chwalek (Arcadis) – May 23, 2016
7. Groundwater Laboratory Analytical Report – April 2015
8. Groundwater Laboratory Analytical Report – October 2015

9 ExxonMobil VCC Winston Salem Data Review - April 2015
10 ExxonMobil VCC Winston Salem Data Review - October 2015
11 Letter from William Anckner (Arcadis) to Harry Zinn (NC DEQ) – July 12, 2016

ATTACHMENT 1

Field Notes – April 2015

Table 3 – Historical Groundwater Field Parameters and Analytical Results (Semi-Annual Post-Removal Action Groundwater Monitoring Report – April 2015)

Location: Winston-Salem, NC Date: 4-20-15
Project / Client: Semi Annual GW / XOM

Monday April 20, 2015
Weather: cloudy 70°F - Showers.

0630 Left Apex for the Site.
0830 Arrived on site. Begin going through OIM's Binder, Review JSA's, fill out work permit.

0945 Jackie of Arcadis informed Bwc that wells need to be analyzed for As 7062 Dissolved and total as well as As, Pb Method 6020.

Begin full DTW Round:

Time	WellID	DTW	DTB
1010	WS-MW-07	11.90	~~28.50~~ 31.50
1015	WS-MW-2R	25.55	~~38.30~~ 41.35
1021	WS-MW-05	21.00	31.35
1023	WS-MW-06	32.11	43.13
1028	WS-MW-09	38.60	48.30
1032	WS-MW-01	Dry	45.15
1038	WS-MW-08	37.30	48.35

Location: Winston Salem, NC Date: 4-20-15
Project / Client: Semi Annual GW / XOM
WS-MW-107

Begin calibration of YSI 556 to the following

Was Reading	Adjusted to
pH = 7.10	N/A
pH = 4.15	N/A
pH = 10.02	N/A
SpCond = 1.222 ms/cm	1.413 ms/cm
ORP = 234 mv	N/A
DO = 108.8% Sat	100% Sat

Checked the Hanna Turbidimeter to:

0 ntu
15 ntu
100 ntu
750 ntu
} checked out

1200 Deconned Bladder Pump
1210 Set up on WS-MW-07
Static DTW = 11.90
DTB = 31.50

Placed deconned Bladder Pump to 25.0' below TOC.

Location: Winston-Salem, NC Date: 4-20-15
Project / Client: Semi Annual GW / XOM
WS-MW-07

1212 Begin pumping WS-MW-07 @ 200 ml/min.

Time	Temp (°C)	Spc Cond (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turb (ntu)	DTW (ft)	FR (ml/min)
1215	16.04	1.337	1.08	4.92	103	202	12.40	200
1220	15.72	1.333	1.11	4.88	99	123	12.35	200
1225	15.81	1.338	1.07	4.88	99	118	12.35	200
1230	16.09	1.337	0.98	4.83	98	78	12.35	200
1235	16.09	1.337	0.96	4.85	98	45	12.35	200
1240	16.12	1.335	0.93	4.85	99	32	12.35	200
1245	16.24	1.333	0.92	4.83	99	21	12.35	200
1250	16.28	1.330	0.85	4.82	100	17	12.35	200
1255	16.40	1.327	0.75	4.81	101	15	12.35	200
1300	16.68	1.321	0.73	4.81	101	14	12.35	200
1305	16.60	1.319	0.72	4.80	102	8	12.35	200

1310 Collect WS-MW-07 and filled the following:

2- Total As, Pb (6020), As (7062)
* 2- Dissolved As, Pb (6020), Diss As (7062)

* Field filtered using 0.45 micron in line filter and

Location: Winston Salem, NC Date: 4-20-15
Project / Client: Semi Annual GW / XOM
WS-MW-2R / WS-QA0C-DUP-01

Removed 3.0 gallons prior to collecting sample
Characteristics: Clear & Colorless

Deconned Pump.

1325 Set up on WS-MW-2R
Static DTW = 25.55
DTB = 41.35
Placed deconned pump with new bladder to 36.0' below TOC
1335 Begin pumping WS-MW-2R @ 150 ml/min

Time	Temp (°C)	Spc Cond (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turb (ntu)	DTW (ft)	FR (ml/min)
1345	17.01	0.370	6.10	4.89	169	275	25.95	150
1350	16.45	0.363	5.71	4.81	180	209	25.95	150
1355	16.36	0.361	5.58	4.80	185	191	26.05	150
1400	16.39	0.360	5.56	4.78	189	155	26.10	150
1405	16.29	0.356	5.45	4.79	194	121	26.10	150
1410	16.21	0.355	5.44	4.79	198	85	26.10	150
1415	16.49	0.353	5.40	4.79	201	43	26.10	150
1420	16.38	0.352	5.37	4.79	204	17	26.10	150
1425	16.37	0.350	5.34	4.78	207	8	26.10	150
1430	16.43	0.352	5.35	4.78	209	8	26.10	150

Location: Winston Salem, NC Date: 4-20-15

Project / Client: Semi Annual GW / XOM

WS-MW-2R / WS-QAQC-DUP-01

1435 Collected WS-MW-2R and Blind Duplicate MIR WS-QAQC-DUP-01 and filled

4-250ml HNO_3 As Pb Total As (7062)

* 4-250ml HNO_3 Diss As Pb, Dis As (7062)

* Field filtered using 0.45 micron filter.

Removed 3.0 gallons of water prior to collecting sample.

Characteristics: Clear & Colorless

1530 Deconned Pump

1540 Set up on WS-MW-05

Static DTW = 21.00

DTB = 31.35

1545 Placed deconned bladder pump to 26.0' below TOC.

Begin pumping WS-MW-05 @ 200ml/min using bladder pump

Location: Winston Salem, NC Date: 4-20-15

Project / Client: Semi Annual GW / XOM

WS-MW-05

WS-MW-05

Time	Temp	Spc (mS/cm)	DO	pH	ORP	Turb	DTW	FR
1550	16.20	0.259	6.10	4.46	185	329	21.15	200
1555	15.92	0.259	6.10	4.40	206	246	21.20	250
1600	15.91	0.259	5.95	4.38	213	121	21.20	250
1605	15.83	0.259	5.93	4.35	223	72	21.20	250
1610	15.82	0.259	5.81	4.33	231	28	21.20	250
1615	15.79	0.259	5.77	4.32	238	19	21.20	250
1620	15.76	0.259	5.77	4.30	245	15	21.20	250
1625	15.78	0.259	5.70	4.30	248	15	21.20	250

1630 Collected WS-MW-05 and filled:

2-250ml HNO_3 Total As Pb 6020 Total As 7062

* 2-250ml HNO_3 Diss As Pb 6020 Diss As 7062

* Field filtered using 0.45 micron in line filter

Characteristics: Clear & Colorless

Removed 4.0 gallons of water prior to collecting sample.

Deconned pump.

1645 Set up on WS-MW-06

Location: Winston Salem, NC Date: 4-20-15

Project / Client: Semi Annual GW / Xom

WS-MW-06

WS-MW-06

Static DTW = 32.11

DTB = 43.13

Placed decomned bladder pump to 38.0' below TOC.

1700 Begin pumping WS-MW-06 @ 150ml/min

Time	Temp	Spcond (mS/cm)	DO	pH	ORP	Turb	FR	DTW
1705	16.55	0.266	5.62	4.58	272	72	200	32.20
1710	16.54	0.262	5.51	4.60	274	62	200	32.20
1715	16.50	0.260	5.48	4.61	274	44	200	32.20
1720	16.37	0.258	5.34	4.63	276	28	200	32.20
1725	16.35	0.257	5.26	4.63	277	17	200	32.20
1730	16.28	0.258	5.37	4.62	278	16	200	32.20
1735	16.29	0.258	5.25	4.62	280	15	200	32.20

1740 Collected WS-MW-06 and filled the following

2-250 ml HNO_3 Total As Pb (6020) Total As (7062)

* 2-250 ml HNO_3 Diss As Pb (6020), Diss As (7062)

* Field filtered using 0.45 micron filter.

Location: Winston-Salem, NC Date: 4-20-15

Project / Client: Semi Annual GW / Xom

Removed 3.0 gallons of water prior to collecting sample.

Characteristics: Clear & Colorless

1805 After clean up, BWL off site.

1830 BWL at hotel.

Tuesday April 21, 2015

Weather: Clear 70°F

0700 Left the hotel for site.

0730 Arrived on site. Checked in with WM. Placed purge water in drum.

0745 Begin calibration of YSI 556 and Turbidimeter.

Location Winston-Salem, NC Date 4-21-15

Project / Client Semi Annual GW / Xom

Y/SI Calibration

Y/SI Calibration

Was Reading	Adjusted to
pH = 7.05	N/A
pH = 4.12	N/A
pH = 9.97	N/A
SpecCond = 1.410 ms/cm	N/A
ORP = 245 mV	N/A
DO = 107% Sat	100%

Hanna Turbidimeter

0 ntu
15 ntu
100 ntu
750 ntu

Checked out.

0800 Set up on WS-MW-09

Static DTW = 38.60

DTB = 48.30

0808 Placed decomed bladder pump to 42.0' below TOC.

0810 Begin pumping WS-MW-09 @ 200 ml/min

Location Winston-Salem, NC Date 4-21-15

Project / Client Semi Annual GW / Xom

WS-MW-09 / WS-MW-09(MS) / WS-MW-09(MSD)

WS-MW-09

Time	Temp °C	SpecCond mS/cm	DO mg/L	pH	ORP mV	Turb ntu	FR ml/min	DTW
0815	14.18	0.332	7.00	4.75	233	139	200	38.85
0820	14.29	0.336	6.74	4.73	246	125	200	38.85
0825	14.34	0.340	6.59	4.68	252	45	200	38.85
0830	14.32	0.342	6.70	4.67	256	18	200	38.85
0835	14.34	0.343	6.60	4.69	258	12	200	38.90
0840	14.36	0.344	6.49	4.65	261	5	200	38.90
0845	14.34	0.344	6.48	4.68	264	3	200	38.90

0850 Collected WS-MW-09 and Matrix Spike

0850 WS-MW-09 (MS) and matrix spike Duplicate

0850 WS-MW-09 (MSD) and Filled:

6-250ml HNO_3 Total As Pb 6020 Total As (7062)

* 6-250ml HNO_3 Diss As, Pb 6020 Diss As (7062)

* Field filtered using 0.45 micron filter.

Removed 3.0 gallons of water prior to collecting sample.

Characteristics: Clear + Colorless

Location Winston-Salem, NC Date 4-21-15

Project & Client Semi Annual GW/X ray

WS-MW-08

Deconned Pump

0920 Set up on WS-MW-08

Static DTW = 37.30

DTB = 48.35

Placed deconned bladder pump to 43.0' below Top of casing.

0945 Begin pumping WS-MW-08 @ 200 ml/min using bladder pump

Time	Temp	Spcond (mS/cm)	DO	pH	ORP	Turb	FR	DTW
0950	16.42	1.345	0.69	4.72	292	235	200	37.40
0955	16.41	1.346	0.49	4.70	293	202	200	37.40
1000	16.48	1.346	0.52	4.68	293	157	200	37.45
1005	16.56	1.342	0.43	4.66	294	124	200	37.45
1010	16.64	1.333	0.42	4.66	293	111	200	37.45
1015	16.61	1.320	0.38	4.66	292	101	200	37.45
1020	16.81	1.321	0.38	4.66	292	64	200	37.45
1025	16.92	1.317	0.37	4.63	291	40	200	37.45
1030	16.95	1.310	0.35	4.63	290	28	200	37.45
1035	16.71	1.304	0.33	4.64	288	21	200	37.45
1040	16.81	1.280	0.31	4.63	288	23	200	37.45
1045	16.77	1.278	0.33	4.63	287	19	200	37.45

Location Winston-Salem, NC Date 4-21-15

Project & Client Semi Annual GW/X ray

WS-MW-08

1050 collected WS-MW-08 and filled:

2-250ml HNO_3 Total As Pb 6020 Total As 7062

* 2-250ml HNO_3 Diss As Pb 6020 Diss As 7062

* Field filtered using 0.45 micron filter for dissolved parameters

Removed 4.5 gallons of water prior to collection of sample.

Characteristics: Clear & Colorless

1120 Collected WS-QAQC-EB-01 by pouring laboratory supplied DI water over a deconned pump and filled 2-250ml HNO_3 Total As, Pb, Total As (7062)

Haz Mat on site and removed one drum of purge water

1140 After clear up, BWL off site.

1340 To Pine to drop off equipment.

1430 Begin preparing coolers for shipment.

1600 BWL to FedEx to drop off samples

1700 Copy field notes.

Table 3
Historical Groundwater Field Parameters and Analytical Results
Semi-Annual Post-Removal Action Groundwater Monitoring Report
VCC - Winston-Salem, North Carolina

Location ID: Date Collected: Sample Name:	MCL	Units	WS-MW-2R 10/20/14 WS-MW-2R	WS-MW-2R 04/20/15 WS-MW-2R	WS-MW-05 10/21/14 WS-MW-05	WS-MW-05 04/20/15 WS-MW-05	WS-MW-06 10/20/14 WS-MW-06	WS-MW-06 04/20/15 WS-MW-06
Arsenic (Total)								
Method 6010	10	µg/L	10.0 U [10.0 U]	NA	7.20 J	NA	10.0 U	NA
Method 6020	10	µg/L	NA	3.70 [2.70]	NA	3.98	NA	1.01 J
Method 6020 corrected for REE	10	µg/L	NA	NA	NA	NA	NA	NA
Method 7062	10	µg/L	NA	1.00 U [1.00 U]	NA	1.00 U	NA	1.00 U
Arsenic (Dissolved)								
Method 6010	10	µg/L	10.0 U [10.0 U]	NA	8.40 J	NA	10.0 U	NA
Method 6020	10	µg/L	NA	4.17 UB [3.44 UB]	NA	5.91 UB	NA	2.41 UB
Method 6020 corrected for REE	10	µg/L	NA	NA	NA	NA	NA	NA
Method 7062	10	µg/L	NA	1.00 U [1.00 U]	NA	1.00 U	NA	1.00 U
Lead (Total)								
Method 6010	15	µg/L	**11.7 J [61.8 J]**	NA	2.70 J	NA	11.1 J	NA
Method 6020	15	µg/L	NA	12.5 J [11.0 J]	NA	2.25 J	NA	**35.4 J**
Lead (Dissolved)								
Method 6010	15	µg/L	**5.70 J [40.3 J]**	NA	2.90 J	NA	6.00 J	NA
Method 6020	15	µg/L	NA	10.3 [8.91]	NA	1.91 J	NA	**31.7**
Field Parameters								
Dissolved Oxygen	- -	mg/L	5.32	5.35	6.26	5.7	4.79	5.25
ORP	- -	mV	270	209	242	248	176	280
pH	- -	SU	4.96	4.78	4.92	4.3	4.3	4.62
Specific Conductance	- -	mS/cm	0.307	0.352	0.224	0.259	0.245	0.258
Temperature	- -	°C	16.87	16.43	16.5	15.78	16.65	16.29
Turbidity	- -	NTU	16	8	22	15	43	15

Notes on last page

Table 3
Historical Groundwater Field Parameters and Analytical Results
Semi-Annual Post-Removal Action Groundwater Monitoring Report
VCC - Winston-Salem, North Carolina

Location ID: Date Collected: Sample Name:	MCL	Units	WS-MW-07 10/20/14 WS-MW-07	WS-MW-07 04/20/15 WS-MW-07	WS-MW-08 10/21/14 WS-MW-08	WS-MW-08 04/21/15 WS-MW-08	WS-MW-09 10/21/14 WS-MW-09	WS-MW-09 04/21/15 WS-MW-09
Arsenic (Total)								
Method 6010	10	µg/L	**16.0**	NA	100 U	NA	**27.5**	NA
Method 6020	10	µg/L	NA	8.52	**52.3**	**60.9**	NA	**24.5**
Method 6020 corrected for REE	10	µg/L	NA	NA	NA	7.55	NA	2.54
Method 7062	10	µg/L	NA	1.00 U	NA	1.00 U	NA	1.00 U
Arsenic (Dissolved)								
Method 6010	10	µg/L	**11.7**	NA	100 U	NA	**26.2**	NA
Method 6020	10	µg/L	NA	7.62 UB	**50.3**	**79.1**	NA	**28.4**
Method 6020 corrected for REE	10	µg/L	NA	NA	NA	5.83	NA	1.91 J
Method 7062	10	µg/L	NA	1.00 U	NA	1.00 U	NA	1.00 U
Lead (Total)								
Method 6010	15	µg/L	5.00 UJ	NA	**23.4 J**	NA	7.00 J	NA
Method 6020	15	µg/L	NA	1.16 J	NA	4.92 J	NA	0.647 J
Lead (Dissolved)								
Method 6010	15	µg/L	3.40 J	NA	**21.7 J**	NA	6.10 J	NA
Method 6020	15	µg/L	NA	1.10 J	NA	5.93	NA	0.948 J
Field Parameters								
Dissolved Oxygen	- -	mg/L	1.78	0.72	0.18	0.33	7.38	6.48
ORP	- -	mV	224	102	145	287	241	264
pH	- -	SU	4.91	4.8	4.84	4.63	4.82	4.68
Specific Conductance	- -	mS/cm	1.162	1.319	1.12	1.278	0.305	0.344
Temperature	- -	°C	16.22	16.6	16.44	16.77	15.01	14.34
Turbidity	- -	NTU	17	8	32	19	14	3

Notes on last page

Table 3
Historical Groundwater Field Parameters and Analytical Results
Semi-Annual Post-Removal Action Groundwater Monitoring Report
VCC- Winston-Salem, North Carolina

Notes:
Bold and shaded values exceed the MCL.
Duplicate sample concentrations are in brackets.
°C = degrees centigrade
ug/L = micrograms per liter
mg/L = milligrams per liter
mS/cm = millisiemens per centimeter
mV = millivolts
NTU = Nephelometric Turbidity Units
S.U. = Standard Unit
REE = Rare Earth Elements
NA = Not analyzed
B - Compound was found in the blank and sample.
U - The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
J - The analyte was positively identified; however, the associated numerical value is an estimated concentration only
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level

ATTACHMENT 2

Field Notes – October 2015

Table 3 – Historical Groundwater Field Parameters and Analytical Results (Semi-Annual Post-Removal Action Groundwater Monitoring Report – October 2015)

Location Winston-Salem, NC Date 10-19-15

Project / Client Semi-Annual GW / XOM

DTW Round

Monday October 19, 2015

Weather: Clear + Cool 60°F

0530 Left Apex, NC for the site.

0730 Arrived on site. Went over HAS Plan + OIM's Binder.

Begin Full DTW Round

Time	WellID	DTW	DTB
0756	WS-MW-07	13.35	31.50
0800	WS-MW-2R	27.15	41.35
0803	WS-MW-05	22.10	31.35
0806	WS-MW-06	32.92	43.13
0811	WS-MW-09	39.20	48.30
0815	WS-MW-01	Dry	45.15
0820	WS-MW-08	38.10	48.35

0900 Begin calibration of YSI 556 to the following parameters

Was Reading	Adjusted to
pH= 6.98	N/A
pH= 4.01	N/A
pH= 10.10	N/A
Spcond= 1.368 mS/cm	1.413

Location Winston-Salem, NC Date 10-19-15

Project / Client Semi Annual GW / XOM

WS-MW-107

Was Reading	Adjusted to
ORP= 243mv	N/A
DO= 111% Sat	100% Sat

0920 Checked the Hach Turbimeter to:

10 ntu
20 ntu
100 ntu
800 ntu
} Checked out

Deconned Bladder Pump @ 0930

0935 Set up on WS-MW-07

Static DTW= 13.35

DTB= 31.50

0940 Placed deconned Bladder pump to 25.0' below TOC.

0942 Begin pumping WS-MW-07 @ 200ml/min using deconned Bladder pump.

Time	°C Temp	mS/cm Spcond	mg/L DO	pH	ORP	Turb	FR	DTW
0950	13.11	1.234	2.40	4.67	304	237	200	13.80
0955	14.29	1.245	1.20	4.64	295	166	200	14.00
1000	14.15	1.255	0.80	4.63	288	142	150	13.80
1005	14.15	1.251	0.70	4.62	296	81	150	13.78

Winston-Salem, NC 10-19-15
Semi Annual GW/X OM
WS-MW-07

WS-MW-07

Time	Temp °C	Sp Cond mS/cm	DO	pH	ORP	Turb	FR	DTW
1010	14.11	1.246	0.64	4.62	296	52	150	13.75
1015	14.17	1.241	0.62	4.62	288	47	150	13.75
1020	14.19	1.237	0.58	4.62	284	26	150	13.75
1025	14.21	1.235	0.55	4.62	280	16	150	13.75
1030	14.22	1.229	0.50	4.62	272	15	150	13.75
1035	14.24	1.229	0.50	4.62	271	14	150	13.75
1040	14.23	1.229	0.50	4.62	272	14	150	13.75

1045 Collected WS-MW-07 and filled the following containers:
1-250ml HNO_3 As, Pb 6010
1-250mL HNO_3 As 7062
* 1-250ml HNO_3 Diss As, Pb 6010
* 1-250mL HNO_3 Diss As 7062

* Field filtered using 0.45 micron in line filter. Removed 2.5 gallons of water prior to collection. Characteristics: clear & colorless

1115 Completed WS-MW-07 and decomm'd pump

Winston-Salem, NC 10-19-15
Semi Annual GW/X OM
WS-MW-2R / WS-QAQC-DUP-01

1120 Set up on WS-MW-2R
Static DTW = 27.15
DTB = 41.35

1126 Placed decomm'd bladder pump to 36.0' below TOC.

1128 Begin pumping WS-MW-2R with bladder pump @ 150 ml/min

Time	Temp °C	Sp Cond mS/cm	DO mg/L	pH	ORP mV	Turb NTU	FR	DTW
1135	14.59	0.311	5.13	4.70	288	260	150	27.60
1140	14.66	0.306	4.78	4.66	289	228	150	27.60
1145	14.71	0.304	4.72	4.64	290	184	150	27.60
1150	14.78	0.303	4.63	4.63	289	155	150	27.60
1155	14.81	0.302	4.60	4.63	289	119	150	27.60
1200	14.80	0.302	4.57	4.62	288	84	150	27.60
1205	14.81	0.302	4.58	4.62	287	68	150	27.60
1210	14.84	0.302	4.56	4.62	286	55	150	27.60
1215	14.83	0.302	4.56	4.62	286	44	150	27.60
1220	14.86	0.302	4.55	4.61	285	26	150	27.60
1225	15.00	0.302	4.55	4.61	283	23	150	27.60
1230	15.13	0.302	4.58	4.61	282	19	150	27.60
1235	15.14	0.302	4.56	4.61	282	14	150	27.60

Location Winston-Salem, NC Date 10-19-15

Project / Client Semi Annual GW / X ons

WS-MW-2R / WS-QAQC-DUP-01

1240 Collected WS-MW-2R and Blind Duplicate

NIR WS-QAQC-DUP-01 and filled:

2-250ml HNO_3 As Pb 6010

2-250ml HNO_3 As 7062

* 2-250ml HNO_3 Diss As, Pb 6010

* 2-250ml HNO_3 Diss As 7062

* Field filtered using 0.45 micron in line filter.

Removed 2.5 gallons of water prior to collecting sample.

Characteristics: Clear & Colorless.

1300 Completed WS-MW-2R.

1310 Set up on WS-MW-05

Static DTW = 22.10

DTB = 31.35

1320 Placed dronned bladder pump to 26.0' below TOC.

1327 Begin pumping WS-MW-05 @ 250ml/min using bladder pump.

Location Winston-Salem, NC Date 10-19-15

Project / Client Semi Annual GW / X ons

WS-MW-05 (MS) (MSD)

WS-MW-05

Time	Temp °C	Spcond mS/cm	DO mg/L	pH	ORP mv	Turb ntu	FR	DTW
1335	16.69	0.210	5.24	3.95	255	288	250	22.20
1340	16.68	0.211	4.91	3.92	264	159	250	22.20
1345	16.60	0.212	4.92	3.93	266	81	250	22.20
1350	16.63	0.213	4.82	3.92	276	54	250	22.23
1355	16.64	0.214	4.77	3.91	274	33	250	22.23
1400	16.55	0.216	4.77	3.88	277	33	250	22.23
1405	16.49	0.217	4.79	3.93	281	24	250	22.23
1410	16.46	0.217	4.73	3.94	281	18	250	22.23

1415 Collected WS-MW-05 and matrix spike

1415 WS-MW-05 (MS) and matrix spike duplicate

1415 WS-MW-05 (MSD) and filled:

3-250ml HNO_3 As, Pb 6010

3-250ml HNO_3 As 7062

* 3-250ml HNO_3 Diss As, Pb 6010

* 3-250ml HNO_3 Diss As 7062

* Field filtered using 0.45 micron in line filter.

Removed 3.5 gallons of water prior to collection.

Characteristics: Clear & Colorless.

Winston Salem, NC 10-19-15
Semi Annual GW/Xom
WS-MW-06

1440 Completed WS-MW-05.

1445 Set up on WS-MW-06
Static DTW = 32.97
DTB = 43.13

Placed Deconned pump to 38.0' below TOC

1452 Begin pumping WS-MW-06 @ 150ml/min using bladder pump.

Time	°C Temp	ms/cm SpecCond	mg/L DO	pH	ORP	Turb	FR	DTW
1500	17.37	0.229	4.92	4.27	287	165	140	32.95
1505	16.92	0.226	4.45	4.27	306	114	140	32.95
1510	16.87	0.226	4.43	4.28	307	105	140	32.95
1515	16.91	0.224	4.42	4.30	316	75	140	32.95
1520	16.89	0.223	4.44	4.31	316	75	140	32.95
1525	16.90	0.222	4.39	4.33	311	60	140	32.95
1530	17.05	0.221	4.35	4.34	305	50	140	32.95
1535	16.97	0.222	4.28	4.34	292	37	140	32.95
1540	17.12	0.222	4.29	4.34	286	34	140	32.95
1545	17.01	0.222	4.28	4.34	282	28	140	32.95
1550	17.21	0.222	4.21	4.34	278	26	140	32.95
1555	17.08	0.223	4.26	4.35	271	20	140	32.95
1600	17.10	0.222	4.25	4.35	275	20	140	32.95

Winston-Salem, NC 10-19-15
Semi-Annual GW/Xom
WS-MW-06

1600 Collected WS-MW-06 and filled:
1-~~2~~-250ml HNO3 As, Pb 6010
1-250ml HNO3 As 7062
* 1-250ml HNO3 Diss As Pb 6010
* 1-250ml HNO3 Diss As 7062.

* Field filtered using 0.45 micron in line filter.
Removed 2.5 gallons of water prior to collecting sample.

Characteristics: Clear & Colorless.

1630 Begin cleanup for the day
Went over to Waste Management to drop off drum and place collected GW into drum.

1700 BWL offsite.
1730 Arrived @ hotel.

Location Winston-Salem, NC Date 10-20-15

Project / Client Semi Annual GW/SOM

Tuesday October 20, 2015
Weather: Clear 60°F

0730 Left the hotel for site.

0800 Checked in with Waste Management to access two on site wells. Went over Health & Safety issues for the day.

0815 Begin calibration of YSI 556 to the following:

Was Ready	Adjusted to
pH= 6.95	N/A
pH= 10.05	N/A
pH= 3.98	N/A
Spcond= 1,417	N/A
DO= 99.8%	N/A
ORP= 248mv	N/A

Checked the Hach turbidimeter to:

10 ntu
20
100
800

checked out

Location Winston-Salem, NC Date 10-20-15

Project / Client Semi Annual GW/SOM
WS-MW-09

0830 Setup on WS-MW-09
Static DTW= 39.20
DTB= 48.30

0835 Placed disconnect bladder pump to 43.0' below TOC.

0840 Begin pumping WS-MW-09 @ 200 ml/min using bladder pump.

Time	Temp (°C)	Spcond (ms/cm)	DO (mg/L)	pH	ORP (mv)	Turb	FR	DTW
0845	12.85	0.289	6.39	4.35	314	323	200	39.30
0850	13.22	0.289	6.03	4.33	309	199	200	39.35
0855	13.76	0.289	5.81	4.32	335	107	200	39.35
0900	13.81	0.291	5.77	4.32	330	63	200	39.40
0905	13.88	0.295	5.65	4.32	306	41	200	39.40
0910	13.89	0.298	5.67	4.32	297	32	200	39.40
0915	13.97	0.300	5.64	4.32	287	11	200	39.40
0920	13.97	0.300	5.59	4.31	288	9	200	39.40

0925 collected WS-MW-09 and filled:
1-250ml HNO_3 As Pb 6010
1-250ml HNO_3 As 7062
* 1-250 ml HNO_3 Diss As Pb 6010
* 1-250ml HNO_3 Diss As 7062

Winston Salem, NC 10-20-15
Semi Annual GW / Xom
WS-MW-09

* Field Filtered using 0.45 micron in line Filter

Removed 2.5 gallons prior to collecting sample.
Characteristics: Clear & Colorless

0955 Set up on WS-MW-08
Static DTW = 38.10
DTB = 48.35

1000 Placed deconned Bladder pump to 43.0' below TOC.

1005 Begin pumping WS-MW-08 @ 200ml/min using bladder pump.

Time	Temp °C	Spcond mscm	DO mg/L	pH	ORP mV	Turb	FR	DTW
1010	16.08	1.075	1.62	4.41	249	717	200	38.10
1015	15.96	1.078	0.87	4.42	241	517	200	38.10
1020	16.01	1.079	0.62	4.42	237	256	200	38.10
1025	16.07	1.079	0.57	4.41	236	195	200	38.10
1030	16.02	1.078	0.48	4.40	239	108	200	38.10
1035	16.26	1.074	0.42	4.38	237	58	200	38.10

Winston-Salem, NC 10-20-15
Semi Annual GW / Xom
WS-MW-08

WS-MW-08

Time	Temp °C	Spcond mS/cm	DO mg/L	pH	ORP mV	Turb ntu	FR	DTW
1040	16.27	1.072	0.42	4.37	234	40	200	38.10
1045	16.22	1.071	0.40	4.37	234	42	200	38.10
1050	16.28	1.069	0.39	4.37	232	40	200	38.10
1055	16.39	1.064	0.38	4.36	232	31	200	38.10
1100	16.31	1.063	0.37	4.37	231	25	200	38.10
1105	16.23	1.057	0.37	4.36	230	22	200	38.10
1110	16.36	1.054	0.37	4.36	229	18	200	38.10

1115 Collected WS-MW-08 and Filled:
1-250ml HNO_3 As, Pb 6010
1-250ml HNO_3 ~~Diss~~ As 7062
* 1-250ml HNO_3 Diss As Pb 6010
* 1-250ml HNO_3 Diss As 7062

* Field Filtered using 0.45 micron in line Filter
Removed 4.0 gallons prior to collecting sample.
Characteristics: Clear & Colorless.

1140 Deconned pump Bladder.

Location Winston-Salem, NC Date 10-20-15

Project / Client Semi Annual GW/XOM

WS- QAQC-EB-01

1145 Collected WS-QAQC-EB-01 by pouring laboratory supplied DI water over a decomed bladder and filled:
1-250ml HNO_3 As Pb 6010
1-250 ml HNO_3 As 7062.

1200 Completed clean up and sealed drum.
1215 BWL performing cover inspection.
1245 Hazmat on site to pick up the 1-55 gallon drum generated from onsite purge water.

1300 BWL and Hazmat off site
1500 BWL at home to prepare samples for shipment to FedEx.
1545 BWL to FedEx to drop off samples.
1630 Made copies of field notes and submitted to team.

Location Date

Project / Client

Table 3
Historical Groundwater Field Parameters and Analytical Results
Semi-Annual Post-Removal Action Groundwater Monitoring Report
VCC - Winston-Salem, North Carolina

Location ID: Date Collected: Sample Name:	MCL	Units	WS-MW-2R 10/20/14 WS-MW-2R	WS-MW-2R 04/20/15 WS-MW-2R	WS-MW-2R 10/19/15 WS-MW-2R	WS-MW-05 10/21/14 WS-MW-05	WS-MW-05 04/20/15 WS-MW-05	WS-MW-05 10/19/15 WS-MW-05
Arsenic (Total)								
Method 6010	10	ug/L	10.0 U [10.0 U]	NA	NA	7.20 J	NA	NA
Method 6020	10	ug/L	NA	3.70 [2.70]	3.50 [2.25]	NA	3.98	3.73
Method 6020 corrected for REE	10	ug/L	NA	NA	0.88 J [0.983 J]	NA	NA	1.57 J
Method 7062	10	ug/L	NA	1.00 U [1.00 U]	1.00 U [1.00 U]	NA	1.00 U	1.00 U
Arsenic (Dissolved)								
Method 6010	10	ug/L	10.0 U [10.0 U]	NA	NA	8.40 J	NA	NA
Method 6020	10	ug/L	NA	4.17 UB [3.44 UB]	1.71 J [2.02]	NA	5.91 UB	4.96
Method 6020 corrected for REE	10	ug/L	NA	NA	0.859 J [0.929 J]	NA	NA	1.06 J
Method 7062	10	ug/L	NA	1.00 U [1.00 U]	1.00 U [1.00 U]	NA	1.00 U	1.00 U
Lead (Total)								
Method 6010	15	ug/L	**11.7 J [61.8 J]**	NA	NA	2.70 J	NA	NA
Method 6020	15	ug/L	NA	12.5 J [11.0 J]	**15.8 [16.1]**	NA	2.25 J	2.02
Lead (Dissolved)								
Method 6010	15	ug/L	**5.70 J [40.3 J]**	NA	NA	2.90 J	NA	NA
Method 6020	15	ug/L	NA	10.3 [8.91]	10.8 [10.9]	NA	1.91 J	1.25 J
Field Parameters								
Dissolved Oxygen	- -	ug/L	5,320	5,350	4,560	6,260	5,700	4,730
ORP	- -	mV	270	209	282	242	248	281
pH	- -	SU	4.96	4.78	4.61	4.92	4.3	3.94
Specific Conductance	- -	mS/cm	0.307	0.352	0.302	0.224	0.259	0.217
Temperature	- -	°C	16.87	16.43	15.14	16.5	15.78	16.46
Turbidity	- -	NTU	16	8	14	22	15	18

Notes on last page

Table 3
Historical Groundwater Field Parameters and Analytical Results
Semi-Annual Post-Removal Action Groundwater Monitoring Report
VCC - Winston-Salem, North Carolina

Location ID: Date Collected: Sample Name:	MCL	Units	WS-MW-06 10/20/14 WS-MW-06	WS-MW-06 04/20/15 WS-MW-06	WS-MW-06 10/19/15 WS-MW-06	WS-MW-07 10/20/14 WS-MW-07	WS-MW-07 04/20/15 WS-MW-07	WS-MW-07 10/19/15 WS-MW-07
Arsenic (Total)								
Method 6010	10	ug/L	10.0 U	NA	NA	**16.0**	NA	NA
Method 6020	10	ug/L	NA	1.01 J	1.75 J	NA	8.52	4.74
Method 6020 corrected for REE	10	ug/L	NA	NA	0.533 J	NA	NA	1.85 J
Method 7062	10	ug/L	NA	1.00 U	1.00 U	NA	1.00 U	1.00 U
Arsenic (Dissolved)								
Method 6010	10	ug/L	10.0 U	NA	NA	**11.7**	NA	NA
Method 6020	10	ug/L	NA	2.41 UB	0.963 J	NA	7.62 UB	3.36
Method 6020 corrected for REE	10	ug/L	NA	NA	2 U	NA	NA	1.49 J
Method 7062	10	ug/L	NA	1.00 U	1.00 U	NA	1.00 U	1.00 U
Lead (Total)								
Method 6010	15	ug/L	11.1 J	NA	NA	5.00 UJ	NA	NA
Method 6020	15	ug/L	NA	**35.4 J**	**45.8**	NA	1.16 J	0.651 J
Lead (Dissolved)								
Method 6010	15	ug/L	6.00 J	NA	NA	3.40 J	NA	NA
Method 6020	15	ug/L	NA	**31.7**	**31.5**	NA	1.10 J	0.655 J
Field Parameters								
Dissolved Oxygen	- -	ug/L	4,790	5,250	4,250	1,780	720	500
ORP	- -	mV	176	280	275	224	102	272
pH	- -	SU	4.3	4.62	4.35	4.91	4.8	4.62
Specific Conductance	- -	mS/cm	0.245	0.258	0.222	1.162	1.319	1.229
Temperature	- -	°C	16.65	16.29	17.1	16.22	16.6	14.23
Turbidity	- -	NTU	43	15	20	17	8	14

Notes on last page

Table 3
Historical Groundwater Field Parameters and Analytical Results
Semi-Annual Post-Removal Action Groundwater Monitoring Report
VCC - Winston-Salem, North Carolina

Location ID: Date Collected: Sample Name:	MCL	Units	WS-MW-08 10/21/14 WS-MW-08	WS-MW-08 04/21/15 WS-MW-08	WS-MW-08 10/20/15 WS-MW-08	WS-MW-09 10/21/14 WS-MW-09	WS-MW-09 04/21/15 WS-MW-09	WS-MW-09 10/20/15 WS-MW-09
Arsenic (Total)								
Method 6010	10	ug/L	100 U	NA	NA	**27.5**	NA	NA
Method 6020	10	ug/L	**52.3**	**60.9**	**20.4**	NA	**24.5**	9.71 J
Method 6020 corrected for REE	10	ug/L	NA	7.55	8.13	NA	2.54	4.25
Method 7062	10	ug/L	NA	1.00 U	1.00 U	NA	1.00 U	1.00 U
Arsenic (Dissolved)								
Method 6010	10	ug/L	100 U	NA	NA	**26.2**	NA	NA
Method 6020	10	ug/L	**50.3**	**79.1**	**12.9**	NA	**28.4**	9.04
Method 6020 corrected for REE	10	ug/L	NA	5.83	5.57	NA	1.91 J	3.7
Method 7062	10	ug/L	NA	1.00 U	1.00 U	NA	1.00 U	1.00 U
Lead (Total)								
Method 6010	15	ug/L	**23.4 J**	NA	NA	7.00 J	NA	NA
Method 6020	15	ug/L	NA	4.92 J	3.82	NA	0.647 J	0.374 J
Lead (Dissolved)								
Method 6010	15	ug/L	**21.7 J**	NA	NA	6.10 J	NA	NA
Method 6020	15	ug/L	NA	5.93	2.69	NA	0.948 J	0.227 J
Field Parameters								
Dissolved Oxygen	- -	ug/L	180	330	370	7,380	6,480	5,590
ORP	- -	mV	145	287	229	241	264	288
pH	- -	SU	4.84	4.63	4.36	4.82	4.68	4.31
Specific Conductance	- -	mS/cm	1.12	1.278	1.054	0.305	0.344	0.3
Temperature	- -	°C	16.44	16.77	16.26	15.01	14.34	13.97
Turbidity	- -	NTU	32	19	18	14	3	9

Notes on last page

Table 3

Historical Groundwater Field Parameters and Analytical Results
Semi-Annual Post-Removal Action Groundwater Monitoring Report
VCC - Winston-Salem, North Carolina

Notes:
Bold and shaded values exceed the MCL.
Duplicate sample concentrations are in brackets.
°C = degrees centigrade
ug/L = micrograms per liter
mg/L = milligrams per liter
mS/cm = millisiemens per centimeter
mV = millivolts
NTU = Nephelometric Turbidity Units
S.U. = Standard Unit
REE = Rare Earth Elements
NA = Not analyzed
B - Compound was found in the blank and sample.
U - The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
J - The analyte was positively identified; however, the associated numerical value is an estimated concentration only
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level

ATTACHMENT 3

E-mail from Ken Mallary (USEPA) to Corrie Chwalek (Arcadis) – February 4, 2015

E-mail from David Mattison (NC DEQ) to Matt Pelton (Arcadis) – March 2, 2015

Roddy, Jackie

From: Mallary, Ken <Mallary.Ken@epa.gov>
Sent: Wednesday, February 04, 2015 11:27 AM
To: Chwalek, Corrie
Cc: Mallary, Ken
Subject: RE: VCC groundwater samples 6010 vs 6020

Corrie - I'm not sure if I responded to you back in December because I was still discussing the issue with folks at EPA. I just spoke with Nardina Turner, the Region 4 sample coordinator, and she said the Region typically uses Method 6010 as a scan, and prefers Method 6020 over 6010. She said the lab(s) will continue to have interferences with Method 6020, particularly for analytes such as the REE.

On the issue of using Method 7062, OSC Terry Tanner will be providing ARCADIS with a response in the very near future.

In a nutshell, Nardina said using Methods 6020 and 7062 are acceptable for the analysis of groundwater samples at the VCC sites.

Contact me if you have any questions.

Ken Mallary
404-562-8802

From: Chwalek, Corrie [mailto:Corrie.Chwalek@arcadis-us.com]
Sent: Wednesday, February 04, 2015 10:46 AM
To: Mallary, Ken
Subject: RE: VCC groundwater samples 6010 vs 6020

Good morning. Do you recall if you sent a response to this email below? If you did, can you please resend it? I can't find it in my files.

Thanks,
Corrie

Corrie Chwalek, P.E. (AL, GA, NC, SC, VA) | Principal Environmental Engineer
corrie.chwalek@arcadis-us.com

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Professional Registration/ PE-AL, 33103-E | PE-NC, 29387 | PE-SC, 24430 | PE-GA, 30585 | PE-VA, 46067

Be green, leave it on the screen.

From: Mallary, Ken [mailto:Mallary.Ken@epa.gov]
Sent: Friday, December 12, 2014 2:59 PM
To: Chwalek, Corrie
Subject: Re: VCC groundwater samples 6010 vs 6020

Hey Corrie - I'll get back to you on this early next week. Have a great weekend! Ken

Sent from my iPhone

On Dec 12, 2014, at 11:22 AM, "Chwalek, Corrie" <Corrie.Chwalek@arcadis-us.com> wrote:

> Ken,
> Good morning. I hope you are doing well.
>
> As you know, we typically run groundwater samples from the VCC sites for arsenic and lead via USEPA Method 6010. In the past year or so, we've have had sample interferences on some of the VCC sites causing the samples to be diluted which then puts the detection level of arsenic and lead above the MCL. A detection level of 100 ug/L for arsenic does not help to characterize site groundwater when the MCL is 10 ug/L.
>
> USEPA Method 6020 is able to remove the interferences and thereby eliminate the dilutions. The lab is then able to report arsenic and lead results at much lower detections levels – even below the MCL. Please let me know if you concur with changing the groundwater analysis on the VCC sites to Method 6020.
>
> **This concurrence would be separate from the addition of Method 7062 analysis that is currently pending review by USEPA.
>
> Thanks,
> Corrie

Corrie Chwalek, P.E. (AL, GA, NC, SC, VA) | Principal Environmental Engineer
corrie.chwalek@arcadis-us.com

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Professional Registration/ PE-AL, 33103-E | PE-NC, 29387 | PE-SC, 24430 | PE-GA, 30585 | PE-VA, 46067

Be green, leave it on the screen.

Pelton, Matthew

From: Mattison, David <david.mattison@ncdenr.gov>
Sent: Monday, March 02, 2015 8:39 AM
To: Pelton, Matthew
Cc: White, Kirstyn; Chwalek, Corrie
Subject: RE: Groundwater Analysis Method for VCC Groundwater Samples

Matt,

The NC DENR Superfund Section approves of the change to US EPA Method 6020 for the laboratory analysis of groundwater samples for arsenic and lead content. Please feel free to contact me if you have any questions or comments.

Thanks,
Dave

David B. Mattison
Environmental Engineer
NC DENR Superfund Section

NCDENR

~~~~~~
Physical Address:
Cubicle 3104F
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Green Square Complex
217 W Jones Street
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Mailing Address:
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Office Phone/Fax: (919) 707-8336
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david.mattison@ncdenr.gov
~~~~~~

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties unless the content is exempt by statute or other regulation.

From: Pelton, Matthew [mailto:Matthew.Pelton@arcadis-us.com]
Sent: Thursday, February 26, 2015 9:06 PM
To: Mattison, David
Cc: White, Kirstyn; Chwalek, Corrie
Subject: Groundwater Analysis Method for VCC Groundwater Samples

Greetings Dave, hope you are doing well. I had a question on VCC sites in North Carolina I wanted to run by you. As you know, we typically run groundwater samples from the VCC sites for arsenic and lead via USEPA Method 6010. In the past

year or so, we've had sample interferences on some of the VCC sites causing the samples to be diluted which then puts the detection limit of arsenic and lead above the MCL and may prevent adequate groundwater characterization.

USEPA Method 6020 is often able to remove the interferences and thereby eliminate the dilutions. The lab is then able to report arsenic and lead results at much lower detections levels, often below the MCL. We've therefore been switching to the use of Method 6020 for groundwater sample analyses at VCC sites in other states in the southeast. Ken Mallary with EPA has approved this method change for VCC sites and we'd like to make a similar switch for VCC sites in North Carolina. Please let me know if you concur with changing the groundwater analysis on the VCC sites in NC to Method 6020.

Thanks Dave, please let me know if you have any questions.

Matt

Matthew T. Pelton, P.E. (NC, GA, SC) | Principal Environmental Engineer | matthew.pelton@arcadis-us.com

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ARCADIS, Imagine the result
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ATTACHMENT 4

Memo from William Anckner (Arcadis) to Randy Bryant (USEPA) – September 9, 2014

ARCADIS G&M of North Carolina, Inc.
801 Corporate Center Drive
Suite 300
Raleigh
North Carolina 27607
Tel 919 854 1282
Fax 919 854 5448

MEMO

To:
Mr. Randy Bryant
Remedial Project Manager
USEPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Copies:
Harry Zinn, NCDENR
Bruce Frink, EMES
Jeff Gillow, ARCADIS

ARCADIS G&M of North Carolina, Inc.

NC Engineering License # C-1869
NC Surveying License # C-1869

From:
William Anckner

Date:
September 9, 2014

ARCADIS Project No.:
B0085707

Subject:
Gurley Pesticide Burial Site, Selma, NC
Request to Remove Arsenic as a Constituent of Concern

On July 9, 2014, representatives from ExxonMobil Environmental Services Company (EMES) and ARCADIS U.S., Inc. (ARCADIS) met with you and others at the United States Environmental Protection Agency's (USEPA's) office in Atlanta, Georgia to discuss the Gurley Pesticide Burial Site located in Selma, Johnston County, North Carolina (the Site). During the meeting, ARCADIS presented analytical results that indicate that arsenic previously reported in groundwater samples collected from the Site were false positive results caused by interferences associated with certain rare earth elements (REEs) present in the samples. The purpose of this memorandum is to summarize recent sampling activities that were performed supporting this conclusion and to request that arsenic be removed as a constituent of concern (COC) from the Record of Decision (ROD) for the Site.

Background

The Gurley Pesticide Burial Site is located in Selma, Johnston County, North Carolina. The Site is the location of both a former phosphate fertilizer manufacturing plant and an agricultural chemical distribution facility. Operations associated with these former uses of the property resulted in specific environmental impacts as detailed in the *Remedial Investigation Report* (ARCADIS [formerly Blasland, Bouck & Lee, Inc.], September 2005). COCs attributed to the former fertilizer manufacturing plant include arsenic and lead. In 2006, a Record of Decision (ROD) was issued for the Site that required remedial actions to

address both soil and groundwater (USEPA, 2006). The soil remedy specified the excavation and off-site disposal of soils containing lead from former source areas; this work was completed in 2010. The groundwater remedy specified the installation of a permeable reactive barrier (PRB).

Arsenic Evaluation – Routine Analyses

During the PRB design process, ARCADIS collected groundwater samples from the Site and performed bench studies to evaluate reactive media for use in the PRB. As part of these bench studies, samples were analyzed for arsenic via USEPA SW-846 Methods 6010C and 6020A. Both of these methods produced measurable results for arsenic above the MCL. All analyses performed via Methods 6010C and 6020A were completed by TestAmerica Laboratories, Inc. (TA) at their Nashville, Tennessee and/or Savannah, Georgia laboratories.

Method 6010C employs inductively coupled plasma-atomic emission spectroscopy (ICP-AES) and relies upon the photon emission wavelength for individual elements (as generated in the argon plasma) for element identification and quantification. Method 6020A employs inductively couple plasma-mass spectrometry (ICP-MS) and relies upon the mass to charge ratio (m/z) for element identification and quantification. Both of these methods do not provide information about the chemical speciation of arsenic in a sample, but rather they report “total arsenic” or the sum of all species [As(III) and As(V)]. Routine interferences are well known for both of these methods, and are corrected for as part of the laboratory’s operating procedures. In the case of Method 6010C, these interferences include overlap of emission wavelengths by two or more elements such that the instrument cannot resolve the spectral interference. In other words, if two elements are present in a sample and have the same emission wavelength then it is likely that one element will be identified (the element for which the instrument is calibrated) and the result will be inaccurate and biased high. In the case of Method 6020A, arsenic is unique because it has only one known stable isotope (^{75}As) and therefore any artifacts or other elements with the same m/z ratio will be quantified as arsenic in the ICP-MS. For instance, chloride in groundwater may combine with argon atoms to form $^{40}Ar^{35}Cl^{+}$ which has a m/z ratio of 75, identical to arsenic. A collision reaction cell (CRC) or dynamic reaction cell (DRC) may be used to eliminate this interference, sometimes referred to as an “isobaric” interference, because it is the result of the formation of an artifact in the instrument that creates an identical m/z ratio as that of the target analyte (in this case arsenic).

Arsenic Evaluation – Specialized Analyses

As part of the laboratory bench testing, and to better evaluate the effectiveness of the reactive media, information about the chemical speciation of arsenic was required. This is a specialized analysis and is routinely performed by Applied Speciation and Consulting, LLC (ASC) in Bothell, Washington.

The determination of the chemical speciation of arsenic in a sample, as performed by ASC, involves separation of the individual species of arsenic [As(III) and As(V)] using ion-chromatography (IC) followed

by ICP-CRC-MS. A pH-buffered solution of ethylenediaminetriacetic acid (EDTA) is used as a preservative (the EDTA complexes the individual arsenic species and prevents them from changing chemical form prior to analysis). The arsenic-EDTA complexes are separated on the IC, and then quantified individually. In addition to As(III) and As(V), other forms of arsenic can also be quantified including organic forms such as monomethylarsenite (MMA) and dimethylarsenite (DMA). The IC-ICP-CRC-MS method is not an EPA method; however, use of this method to perform arsenic speciation analyses is widely accepted.

ARCADIS submitted samples to ASC for arsenic speciation analyses on April 23, 2014. Five water samples were submitted from the laboratory bench tests and were comprised of groundwater from AMW-11S and -12S. Two of those samples include aliquots retained from monitoring wells on February 7, 2014; and the remaining three samples were collected as part of the laboratory bench tests. Although all samples were preserved appropriately (i.e., stabilized with chemical preservative and refrigerated at 4°C), the original samples collected from AMW-11S and AMW-12S had been stored for some time prior to analysis (3 months). ASC did not detect individual arsenic species in any of the samples above the method detection limit of 1 µg/L. Following receipt of these results, ARCADIS contacted ASC and presented analytical results reported by others (TA) for these samples analyzed via Method 6020A. The analytical results for total arsenic reported by TA were significantly higher and, as such, the low levels (< 1 ppb) of individual arsenic species reported by ASC were unexpected. A comparative summary of arsenic concentrations as quantified by TA and ASC is provided below in Table 1; and the analytical data packages are provided in Attachment A [#490-47805-1 (TA results), #490-51645-1 (ASC results)].

Table 1 – Comparative Analytical Results for Arsenic in Groundwater Samples collected February 7, 2014

Groundwater Sample ID	TA (Method 6020A)/1	ASC (IC-ICP-CRC-MS)/2
AMW-11S	20	<1
AMW-12S	171	<1

Notes:
All results are reported in micrograms per liter.
/1 – Samples analyzed approximately 1 month following sample collection.
/2 – Samples analyzed approximately 3 months following sample collection.

ASC investigated the lack of arsenic in these samples further and performed additional analyses at their laboratory. A letter from ASC dated May 15, 2014 (Attachment B) describes the additional analyses performed as well as their results. Using an advanced ICP-MS instrument outfitted with a triple-quadrupole (ICP-QQQ-MS), ASC was able to run the samples using multiple acquisition modes, including a “standard” helium collision cell acquisition mode (similar to those run by TA using standard ICP-MS instruments via Method 6020A), as well as alternate acquisition modes. Based on the results, ASC

determined that certain REEs were present in the samples (specifically $^{150}Nd^{2+}$ and $^{150}Sm^{2+}$). These REEs have a m/z ratio of 75, which is identical to the m/z ratio for the only known stable isotope for arsenic, and therefore interfere with quantification of arsenic causing false positive results via Method 6020A. ASC reproduced these false-positive results by operating their mass spectrometer in the same way as TA, and also confirmed the presence of select REEs (e.g., Nd and Sm) by ICP-MS via positive identification of singly-charged Nd and Sm isotopes.

Arsenic Evaluation – Comparison of Results Obtained by Multiple Methods

As a result of the findings reported by ASC (above), fresh groundwater samples were collected from the Site and reanalyzed for both total and dissolved arsenic using the previously described methods to evaluate the effect of sample storage on the analytical results. As discussed above, the groundwater samples previously analyzed by ASC were stored for approximately 3 months prior to analysis.

Groundwater samples were collected from AMW-11S and AMW-12S on June 10, 2014. Samples were submitted to both ASC and TA for arsenic analyses using the methods described above. In addition, samples were also submitted to a third laboratory, ALS Life Sciences (ALS), for arsenic analyses via USEPA Clean Water Act (CWA) Method 1632A. Table 2 provides an overview of the analytical methods, preservatives, and minimum detection limits for each laboratory. Appropriate preservation methods were used for each analysis (sample containers filled with preservative were provided by each laboratory prior to the field sampling event) and all samples were generally analyzed within one week of sample collection. To maintain consistency between laboratories, all samples were preserved using nitric acid following discussions with each laboratory. All analyses were performed on an expedited basis.

USEPA CWA Method 1632 involves hydride-generation atomic absorption spectroscopy. Hydride-generation was the standard method used for arsenic analyses prior to the advent of the 6000-series methods. This method involves the conversion of arsenic in the sample to arsine gas that is swept from the sample and into a heated quartz cell on the flame atomic absorption burner. Arsenic is then quantified by atomic absorption spectrophotometry. Potentially interfering elements (such as REEs) are not an issue for this method because they do not volatilize and, thus, remain in the aqueous sample. Method 1632 provides information about the individual species of arsenic in the sample by volatilizing the arsenic onto a glass trap packed with a porous polymer, and then thermally-desorbing the volatile species in the order of increasing boiling point from the column into an inert gas stream that carries them into the flame of an atomic absorption spectrophotometer for detection. ALS used USEPA Method 3005A as a preparation step (acid digestion) to be consistent with the way the other methods were run on this round of samples. Typically, samples analyzed via Method 1632 are prepared using hydrochloric acid as a preservative. However, because the samples were not analyzed for individual arsenic species (and to be consistent with the preservatives used in samples analyzed by other analytical methods) nitric acid was used to preserve these samples prior to analysis. Therefore the method was designated as “1632A Modified.”

Table 2 – Confirmatory Arsenic Analyses performed on Groundwater Samples Collected from AMW-11S and AMW-12 on June 10, 2014

Method ID	Analytical Laboratory	Method Description	Preservative	Minimum Detection Limit
USEPA 6010C	TA – Nashville	ICP-AES	Nitric acid	23 – 50 mg/L
USEPA 6020A	TA – Nashville	ICP-MS	Nitric acid	1.30 mg/L
USEPA 1632A Modified	ALS, Kelso, WA	Hydride generation atomic absorption spectroscopy (Arsenic Speciation) with USEPA Method 3005A preparation	Nitric acid	0.03 mg/L
ICP-QQQ-MS	ASC, Bothell, WA	ICP-QQQ-MS	Nitric acid	0.045 mg/L

As part of these analyses, ASC performed an analysis of multiple metals (including arsenic and lead) and REEs using an ICP-QQQ-MS. The instrument was calibrated for the individual REEs using commercially-available standard reagents (there is not a specific USEPA method for REE analyses, therefore the instrument was calibrated according to ASC's standard quality control methods). Matrix spikes were performed on each sample to verify detection of arsenic. A semi-quantitative elemental analysis was also run on the samples using the ICP-QQQ-MS in order to evaluate the presence of a range of trace elements to further evaluate the presence of potential interfering elements.

Analytical results for samples collected on June 10, 2014 are reported below in Table 3; and the analytical data packages are provided in Attachment C [#490-55171-1 (TA results), #490-55502-1 (ASC results), #K1405847 (ALS)].

Table 3 – Comparative Analytical Results for Arsenic in Groundwater Samples Collected June 10, 2014

Monitoring Well ID	Arsenic Method 6010C	Arsenic Method 6020	Arsenic by ICP-QQQ-MS	Arsenic Method 1632A Modified
AMW-11S (total)	27.8	15.4	0.12 J	0.04 J
AMW-11S (dissolved)	22.4	13.9	0.11 J	0.11 J
AMW-12S (total)	188 J	72	0.38 J	0.15 J
AMW-12S (dissolved)	196	74.4	0.58 J	0.12 J

Notes:
All results are reported in micrograms per liter.
J – Detected concentration is estimated and is above the detection limit but below the reporting limit.

Table 3 shows that Methods 6010C and 6020A both report significant concentrations of arsenic varying from 13.9 mg/L to 196 mg/L. However, arsenic concentrations for the same samples reported using the ICP-QQQ-MS method and Method 1632A were below 1 µg/L. These results confirmed the earlier findings by ASC. Additionally, ASC also positively identified certain REEs in the samples including lanthanum, neodymium and samarium. Analytical data packages that identify REEs detected in the samples are provided in Attachment C. Lanthanum causes an interference in the quantification of arsenic because of its emission at 189 nanometers (nm); the same emission line used in USEPA Method 6010C to quantify arsenic. Neodymium and samarium have the same m/z ratio as arsenic and thus interfere with the quantification of arsenic by USEPA Method 6020A. The differences in results as reported by Methods 6010C and 6020A are related to interferences caused by different REEs. Although not widely known, interferences posed by certain REEs on the quantification of arsenic have previously been documented in 2006 (Gunderson, 2006). However, this finding is not corrected for in commercial analytical laboratories using Methods 6010C and 6020A, including TA.

In evaluating potential interferences caused by select REEs on arsenic quantification, ARCADIS had extensive discussions with chemists from the various laboratories contracted to perform the analyses. After discussions with ALS Environmental (ALS) (the laboratory contracted to perform the arsenic analyses via Method 1632A), it was determined that USEPA SW-846 Method 7062 may be a more appropriate method than Method 1632A. Method 7062, like Method 1632A, is also a hydride generation atomic absorption spectroscopy method but it does not provide speciation information (the method does not involve the use of a glass trap). Voluntary testing was performed by ALS via Method 7062 and the

results were reportedly very similar to Method 1632A. The arsenic results for Method 7062 were all less than the reporting limit (0.4 µg/L) except for AMW-12S (total) where the result was 0.4 µg/L (estimated).

Evaluation of Additional Monitoring Well Locations

Given that the arsenic results reported in samples collected from AMW-11S and -12S appeared to be false positives, an additional groundwater monitoring event was completed to evaluate if similar interferences may be affecting results reported in samples collected at other locations. Six locations were selected for this additional groundwater monitoring event to capture a range of locations and previously documented arsenic concentrations across the Site (Figure 1). The monitoring wells selected included AMW-3S, -5S, -7S, -10S, -13S and -16S. Groundwater samples were collected on June 25, 2014 for both total and dissolved arsenic, and preserved appropriately for analysis via the following methods: USEPA Method 6010C, USEPA Method 6020A, and USEPA Method 7062. The results of these analyses are provided in Table 4; and the analytical data packages are provided in Attachment D [#490-56483-1 (TA results), #K1406574 (ALS)]. All analyses were performed on an expedited basis.

Table 4 – Comparative Analytical Results for Arsenic in Groundwater Samples Collected June 25, 2014

Monitoring Well ID	Arsenic Method 6010C[/2]	Arsenic Method 6020A	Arsenic Method 7062
AMW-4S	121 J	Not analyzed	0.3 J
AMW-4S[/1]	<200	41.1	0.9 J
AMW-5S	102 J	35.3	<1
AMW-5S[/1]	144 J	38.6	<1
AMW-7S	<20	1.64 J	1.2
AMW-7S[/1]	<20	1.63 J	0.9 J
AMW-10S	192 J	63.8	<1
AMW-10S[/1]	161 J	74.7	<1
AMW-13S	259	93.1	<1
AMW-13S[/1]	294	121	<1
AMW-16S	<200	21	<1
AMW-16S[/1]	<200	18	<1

Notes:
All results are reported in micrograms per liter.
J – Detected concentration is estimated and is above the detection limit but below the reporting limit.
/1 Samples were filtered in the field using a 0.45mm filter.
/2 Samples analyzed via Method 6010C required significant dilutions; elevated reporting limits or estimated concentrations are based on the presence of the rare earth element, yttrium, in the groundwater samples which is also used by the laboratory as an internal standard.

As expected, the results reported for arsenic via Methods 6010C and 6020A produced a range of concentrations similar to the results reported previously at those locations. However, for the results reported via Method 7062, the maximum positive detection of arsenic was 1.2 mg/L (AMW-7S); arsenic results for all other samples were below the reporting limit of 1 mg/L.

Quality Assurance Evaluation

Laboratory analytical data were validated by ARCADIS in accordance with USEPA National Functional Guidelines of October 2004. Data validation entails a review of the quality control (QC) data and the raw data to verify that the laboratory was operating within required limits, the analytical results are correctly transcribed from the instrument read outs, and which, if any, environmental samples are related to any deficient QC samples. The objective of the data validation is to identify any questionable or invalid laboratory measurements and to determine if the quality is sufficient to meet the data quality objectives.

Overall, the data quality was within the guidelines specified by the individual laboratory methods, subject to certain minor qualifications. This analytical data set had an overall usability of 100%. The data validation summary report is provided as Attachment E.

Conclusions

Arsenic concentrations previously reported in groundwater samples collected at the Site appear to be false positive results based on the presence of REEs. Certain REEs (including lanthanum, neodymium and samarium) have been positively identified in select samples collected at the Site. These REEs interfere with the detection of arsenic via USEPA SW-846 Methods 6010C and 6020A yielding results that are biased high. Lanthanum causes an interference in the quantification of arsenic because of its emission at 189 nanometers (nm); the same emission line used in USEPA Method 6010C to quantify arsenic. Other elements, including neodymium and samarium, have the same m/z ratio as arsenic and thus interfere with the quantification of arsenic by USEPA Method 6020A.

Over the last several months, arsenic analyses were completed using both standard (USEPA SW846 1632A and 7062) and non-standard (IC-ICP-QQQ-MS) methods free of interferences from REEs. Results demonstrate that arsenic concentrations were consistently below the MCL at AMW-11S and -12S; and were also below the MCL at other locations closer to former source areas where some of the highest arsenic concentrations were suspected.

Given the documentation presented herein EMES respectfully requests the ROD be amended to;

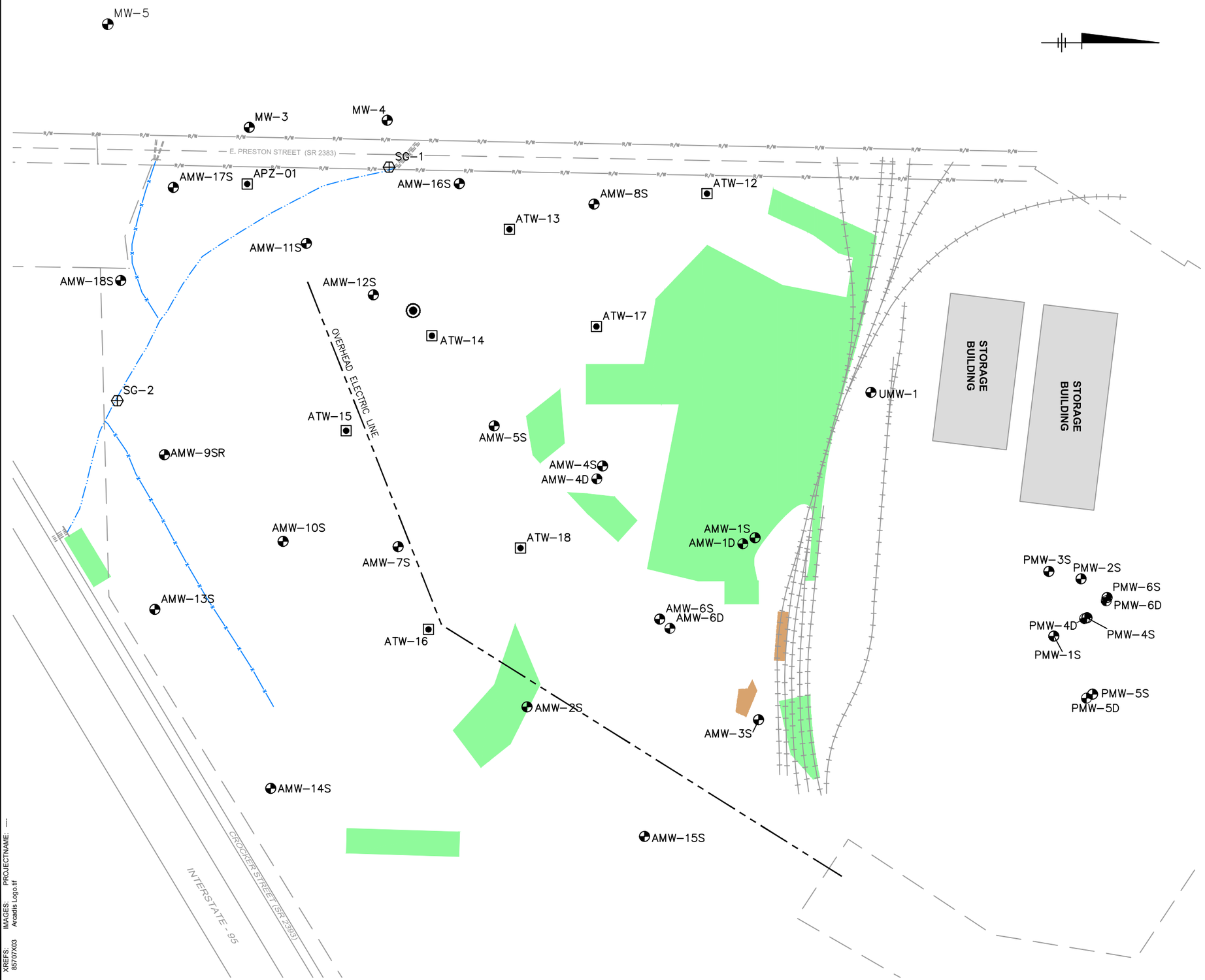
1) Remove arsenic as a contaminant of concern given the documented concentrations are below the MCL; and

2) Allow EMES to evaluate and employ a wider range of remedial methods for lead to meet the remedial objectives.

References

Gunderson, K. 2006. Problems with Arsenic Detection: When NIOSH and EPA Methods Fail. American Industrial Hygiene Association (AIHA). https://www.aiha.org/aihce06/handouts/po122gunderson.pdf; accessed July 28, 2014.

Figures



LEGEND:

- MONITORING WELL LOCATION
- SHALLOW ZONE PIEZOMETER LOCATION
- STAFF GAUGE LOCATION
- 2008 LIMITS OF EXCAVATION
- 2010 LIMITS OF EXCAVATION
- TRACER STUDY PILOT TEST AREA
- CENTERLINE (BAWDY SWAMP CREEK)
- DITCH CENTERLINE
- PL NOT SURVEYED (GIS)
- RAILROAD TRACKS
- RIGHT-OF-WAY LINE
- STORM DRAINAGE

NOTES:

1. BASE MAP PROVIDED BY TAYLOR WISEMAN & TAYLOR, CARY, NORTH CAROLINA REGISTERED LAND SURVEYOR, NOVEMBER 7, 2011.
2. BASE MAP REFERENCED FROM CONTESTOGA-ROVERS ASSOCIATES 1995 REPORT. LOCATIONS OF MONITORING WELLS INSTALLED BEFORE 2009 PROVIDED BY L. DENNIS LEE, P. A., PROFESSIONAL LAND SURVEYOR, NOVEMBER 2003.
3. SURVEY LOCATION PROVIDED IN NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83 DATUM.

0 200' 400'
GRAPHIC SCALE

EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
GURLEY PESTICIDE BURIAL SITE
SELMA, NORTH CAROLINA

SITE PLAN

ARCADIS

FIGURE
1

CITY: Syracuse GROUP: EnvCAD DB: R.Bassett P.Lister, A.Schilling PM: J.Purvis TM: W.Aancker LYR:ON=*;OFF=*REF*
G:\ENVCAD\Raleigh\ACT\B0085707\141000\0085707B01.dwg LAYOUT: 1 SAVED: 8/25/2014 11:49 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/25/2014 11:51 AM BY: ELLIS, LEKOREY
XREFS: 85707X03 IMAGES: Arcadis Logo.tif PROJECTNAME: ----

ATTACHMENT 5

Letter from Corrie Chwalek (Arcadis) to Ken Mallary (USEPA) – May 2, 2016

Mr. Ken Mallary
USEPA Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303

Arcadis U.S., Inc.
801 Corporate Center Drive
Suite 300
Raleigh
North Carolina 27607
Tel 919 854 1282
Fax 919 854 5448
www.arcadis.com

ENVIRONMENT

Subject:
Proposed Changes to the Analytical Method for Detecting Arsenic in Surface Water/Groundwater Samples,
Virginia Carolina Chemical Corporation Sites

Date:
May 2, 2016

Contact:
Corrie Chwalek

Phone:
919.415.2286

Email:
Corrie.Chwalek
@arcadis.com

Our ref:
ExxonMobil

Dear Mr. Mallary:

As you are aware, ExxonMobil Environmental Services Company (EMES) has proactively and cooperatively been working with both the United States Environmental Protection Agency (USEPA) and affected State regulatory agencies to investigate and remediate a number of former phosphate fertilizer plants owned or operated by the Virginia-Carolina Chemical Corporation (VCC) since 2001. As part of these activities, groundwater and surface water samples have been collected and analyzed for specific metals including arsenic. In 2014, it was determined that certain elements may interfere with the accurate quantification of arsenic. These interferences have only been observed at a few VCC sites and were most recently discussed with you by telephone during a conversation with Arcadis U.S., Inc. on March 8, 2016.

At this time, EMES proposes that all future surface water and groundwater samples be analyzed in accordance with USEPA Method 7062. This analytical method, unlike USEPA Methods 6010C and 6020A, is not subject to interferences in the detection of arsenic due to the way in which the samples are prepared. This change in the analytical method will allow for a more accurate determination of arsenic concentrations in samples and, while interferences have only been noted at a few sites, promote consistency in the characterization of arsenic concentrations at VCC sites moving forward.

EMES appreciates your consideration of this request and looks forward to your response in the near future. If you have any questions or would like to discuss please let me know.

Sincerely,

Arcadis U.S., Inc.

Corinda Chwalek

Corinda Chwalek
Principal Engineer

Copies:
Terry Tanner, USEPA
Randy Bryant, USEPA
Charles Williams, SCDHEC
Brian Espy, ADEM
Tim Young, ADEM
David Mattison, NCDEQ
Harry Zinn, NCDEQ
Jordan English, TDEC
Bruce Frink, EMES
Caleb Fontenot, AECOM

ATTACHMENT 6

Email from Ken Mallary (USEPA) to Corrie Chwalek (Arcadis) – May 23, 2016

From:	Mallary, Ken
To:	Chwalek, Corrie
Cc:	Bruce Frink
Subject:	RE: Proposed Change to Analytical Method at VCC Sites
Date:	Monday, May 23, 2016 3:33:06 PM
Attachments:	image001.png

Hey Corrie - sorry for not responding sooner to your email dated May 2 requesting a change to the analytical methods used at the VCC sites.

EPA staff have discussed this issue at length, and acknowledge the possibility of arsenic interference by rare earth elements (REE) although the presence of REEs at VCC sites has not been assessed, and the interferences have only been observed at several sites. In addition, at the sites where the potential interferences have been observed, the difference in the method 6010C and 7062 analytical results have not been uniformly consistent. Nevertheless, 7062 is an EPA-approved analytical method.

Based on the information provided, EPA approves the request to change analytical methods used at the VCC sites from method 6010C to 7062.

Please note - the views expressed in this email represent the views of EPA staff members, and may not represent the views of state personnel involved with this issue.

Please let me know if you have any questions.

Ken Mallary
404-562-8802

From: Chwalek, Corrie [mailto:Corrie.Chwalek@arcadis.com]
Sent: Monday, May 23, 2016 1:56 PM
To: Mallary, Ken <Mallary.Ken@epa.gov>
Subject: RE: Proposed Change to Analytical Method at VCC Sites

Good afternoon. Just following up on the request to change the analytical method for arsenic in gw to 7062. Let me know if you have any questions. FYI – I traded emails with Kayse Jarman from DHEC. She said she misread the 5/2/16 letter and would be issuing a revised letter for Blacksburg today – we had already sampled for 7062 a few years back and the results were comparable.

Thanks,
Corrie

Corrie Chwalek PE | Principal Environmental Engineer |
corrie.chwalek@arcadis.com
Arcadis | Arcadis G&M of North Carolina, Inc.
801 Corporate Center Drive, Suite 300 | Raleigh NC | 27607 | USA
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Professional Engineer / PE-AL, 33103-E | PE-NC, 29387 | PE-SC, 24430 | PE-GA. 3-585 | PE-VA. 46067

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Be green, leave it on the screen.

From: Chwalek, Corrie
Sent: Monday, May 2, 2016 12:24 PM
To: Mallary, Ken <Mallary.Ken@epa.gov>
Cc: Tanner, Terry <Tanner.Terry@epa.gov>; Bryant, Randolph <Bryant.Randy@epa.gov>; Charles Williams (williacj@dhec.sc.gov) <williacj@dhec.sc.gov>; Jarman, Kayse <jarmankb@dhec.sc.gov>; Espy, Brian C <BEspy@adem.state.al.us>; 'TAY@adem.state.al.us' <TAY@adem.state.al.us>; 'Mattison, David' <david.mattison@ncdenr.gov>; 'Zinn, Harry' <harry.zinn@ncdenr.gov>; 'Jodan English (jordan.english@tn.gov)' <jordan.english@tn.gov>; Frink, Bruce R <bruce.r.frink@exxonmobil.com>; NORMAN NOVICK (nnovick@rouxinc.com) <nnovick@rouxinc.com>; NELLIS WILLHITE II - ExxonMobil Environmental Services Company (nellis.g.willhite@exxonmobil.com) <nellis.g.willhite@exxonmobil.com>; Anckner, William <William.Anckner@arcadis.com>; Gillow, Jeff <Jeff.Gillow@arcadis.com>; Pelton, Matthew <Matthew.Pelton@arcadis.com>; Fontenot, Caleb (Caleb.Fontenot@aecom.com) <Caleb.Fontenot@aecom.com>
Subject: Proposed Change to Analytical Method at VCC Sites

Good afternoon. Attached please find a letter requesting a change in analytical methods used for future groundwater and surface water samples collected at the former Virginia-Carolina Chemical Corporation Sites. Please let me know if you would also like a hard copy of this letter for your files.

Thanks,
Corrie

Corrie Chwalek PE | Principal Environmental Engineer |
corrie.chwalek@arcadis.com
Arcadis | Arcadis G&M of North Carolina, Inc.
801 Corporate Center Drive, Suite 300 | Raleigh NC | 27607 | USA
T. +1 919 415 2286 | M. + 1 919 523 9150

Professional Engineer / PE-AL, 33103-E | PE-NC, 29387 | PE-SC, 24430 | PE-GA. 3-585 | PE-VA. 46067

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ATTACHMENT 7

Groundwater Laboratory Analytical Report – April 2015

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-77045-1
Client Project/Site: VCC Winston Salem

For:
ARCADIS U.S., Inc.
801 Corporate Center Drive
Suite 300
Raleigh, North Carolina 27607-5073

Attn: Matt Pelton

Authorized for release by:
5/13/2015 11:11:13 AM

Heather Wagner, Project Manager I
(615)301-5763
heather.wagner@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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.

Table of Contents

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Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-77045-1	WS-MW-07	Ground Water	04/20/15 13:10	04/22/15 08:30
490-77045-2	WS-MW-2R	Ground Water	04/20/15 14:35	04/22/15 08:30
490-77045-3	WS-MW-05	Ground Water	04/20/15 16:30	04/22/15 08:30
490-77045-4	WS-MW-06	Ground Water	04/20/15 17:40	04/22/15 08:30
490-77045-5	WS-QAQC-DUP-01	Ground Water	04/20/15 01:00	04/22/15 08:30
490-77045-6	WS-MW-09	Ground Water	04/21/15 08:50	04/22/15 08:30
490-77045-7	WS-MW-08	Ground Water	04/21/15 10:50	04/22/15 08:30
490-77045-8	WS-QAQC-EB-01	Ground Water	04/21/15 11:20	04/22/15 08:30

Job ID: 490-77045-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-77045-1

Comments
No additional comments.

Receipt
The samples were received on 4/22/2015 8:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice.
The temperature of the cooler at receipt was 2.7º C.

Metals
Method(s) 6020: The method blank for batch 243168 contained Arsenic above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

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

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

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-07

Lab Sample ID: 490-77045-1

Date Collected: 04/20/15 13:10

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00852		0.00200	0.000500	mg/L		04/23/15 11:08	04/24/15 17:21	1
Lead	0.00116	J	0.00200	0.000200	mg/L		04/23/15 11:08	04/24/15 17:21	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00762	B	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:38	1
Lead	0.00110	J	0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:38	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-2R

Lab Sample ID: 490-77045-2

Date Collected: 04/20/15 14:35

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00370		0.00200	0.000500	mg/L		04/23/15 11:08	04/24/15 17:27	1
Lead	0.0125		0.00200	0.000200	mg/L		04/23/15 11:08	04/24/15 17:27	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00417	B	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:43	1
Lead	0.0103		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:43	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-05

Lab Sample ID: 490-77045-3

Date Collected: 04/20/15 16:30

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00398		0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 17:54	1
Lead	0.00225		0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 17:54	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00591	B	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:49	1
Lead	0.00191	J	0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:49	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-06

Lab Sample ID: 490-77045-4

Date Collected: 04/20/15 17:40

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00101	J	0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 17:59	1
Lead	0.0354		0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 17:59	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00241	B	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 14:06	1
Lead	0.0317		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 14:06	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-QAQC-DUP-01

Lab Sample ID: 490-77045-5

Date Collected: 04/20/15 01:00

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00270		0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 18:04	1
Lead	0.0110		0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 18:04	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00344	B	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 14:11	1
Lead	0.00891		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 14:11	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-09

Lab Sample ID: 490-77045-6

Date Collected: 04/21/15 08:50

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0245		0.0100	0.00250	mg/L		04/23/15 16:45	04/28/15 11:09	5
Lead	0.000647	J F1	0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 18:09	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0284	B	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:10	1
Lead	0.000948	J	0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:10	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-08

Lab Sample ID: 490-77045-7

Date Collected: 04/21/15 10:50

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0609		0.0200	0.00500	mg/L		04/23/15 16:45	04/28/15 11:25	10
Lead	0.00492	J	0.0200	0.00200	mg/L		04/23/15 16:45	04/28/15 11:25	10

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0791	B	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 14:17	1
Lead	0.00593		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 14:17	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-QAQC-EB-01

Lab Sample ID: 490-77045-8

Date Collected: 04/21/15 11:20

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 18:39	1
Lead	ND		0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 18:39	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		04/24/15 09:18	04/27/15 20:27	1
Lead	ND		0.00200	0.000200	mg/L		04/24/15 09:18	04/27/15 20:27	1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 490-243319/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 243996 — **Prep Batch: 243319**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		04/23/15 11:08	04/24/15 14:39	1
Lead	ND		0.00200	0.000200	mg/L		04/23/15 11:08	04/24/15 14:39	1

Lab Sample ID: LCS 490-243319/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 243996 — **Prep Batch: 243319**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.08938		mg/L		89	80 - 120
Lead	0.100	0.1052		mg/L		105	80 - 120

Lab Sample ID: 490-76961-E-2-B MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 243996 — **Prep Batch: 243319**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.00522		0.100	0.09138		mg/L		86	75 - 125
Lead	0.00953		0.100	0.1182		mg/L		109	75 - 125

Lab Sample ID: 490-76961-E-2-C MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 243996 — **Prep Batch: 243319**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00522		0.100	0.08861		mg/L		83	75 - 125	3	20
Lead	0.00953		0.100	0.1152		mg/L		106	75 - 125	3	20

Lab Sample ID: MB 490-243492/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 244215 — **Prep Batch: 243492**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 16:27	1
Lead	ND		0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 16:27	1

Lab Sample ID: LCS 490-243492/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 244215 — **Prep Batch: 243492**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.09839		mg/L		98	80 - 120
Lead	0.100	0.09810		mg/L		98	80 - 120

Lab Sample ID: LCSD 490-243492/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 244215 — **Prep Batch: 243492**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.100	0.1000		mg/L		100	80 - 120	2	20

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

Lab Sample ID: LCSD 490-243492/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 244215 — **Prep Batch: 243492**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead			0.100	0.09761		mg/L		98	80 - 120	1	20

Lab Sample ID: 490-77045-6 MS — **Client Sample ID: WS-MW-09**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 244215 — **Prep Batch: 243492**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	0.000647	J F1	0.100	0.07202	F1	mg/L		71	75 - 125		

Lab Sample ID: 490-77045-6 MS — **Client Sample ID: WS-MW-09**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 244422 — **Prep Batch: 243492**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic	0.0245		0.100	0.1257		mg/L		101	75 - 125		

Lab Sample ID: 490-77045-6 MSD — **Client Sample ID: WS-MW-09**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 244215 — **Prep Batch: 243492**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	0.000647	J F1	0.100	0.07245	F1	mg/L		72	75 - 125	1	20

Lab Sample ID: 490-77045-6 MSD — **Client Sample ID: WS-MW-09**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 244422 — **Prep Batch: 243492**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.0245		0.100	0.1105		mg/L		86	75 - 125	13	20

Lab Sample ID: MB 490-243168/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 243996 — **Prep Batch: 243168**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0005285	J	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 12:59	1
Lead	ND		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 12:59	1

Lab Sample ID: LCS 490-243168/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 243996 — **Prep Batch: 243168**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic			0.100	0.09812		mg/L		98	80 - 120		
Lead			0.100	0.1078		mg/L		108	80 - 120		

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

Lab Sample ID: MB 490-243562/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 244215 — **Prep Batch: 243562**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		04/24/15 09:18	04/27/15 19:15	1
Lead	ND		0.00200	0.000200	mg/L		04/24/15 09:18	04/27/15 19:15	1

Lab Sample ID: LCS 490-243562/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 244215 — **Prep Batch: 243562**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.1015		mg/L		102	80 - 120
Lead	0.100	0.09527		mg/L		95	80 - 120

Lab Sample ID: 490-77045-6 MS — **Client Sample ID: WS-MW-09**
Matrix: Ground Water — **Prep Type: Dissolved**
Analysis Batch: 243996 — **Prep Batch: 243168**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0284	B	0.100	0.1270		mg/L		99	75 - 125
Lead	0.000948	J	0.100	0.1109		mg/L		110	75 - 125

Lab Sample ID: 490-77045-6 MSD — **Client Sample ID: WS-MW-09**
Matrix: Ground Water — **Prep Type: Dissolved**
Analysis Batch: 243996 — **Prep Batch: 243168**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.0284	B	0.100	0.1262		mg/L		98	75 - 125	1	20
Lead	0.000948	J	0.100	0.1061		mg/L		105	75 - 125	4	20

Lab Sample ID: 490-77081-D-2-B MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 244215 — **Prep Batch: 243562**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.00123	J	0.100	0.1004		mg/L		99	75 - 125
Lead	ND		0.100	0.08921		mg/L		89	75 - 125

Lab Sample ID: 490-77081-D-2-C MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 244215 — **Prep Batch: 243562**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00123	J	0.100	0.1040		mg/L		103	75 - 125	4	20
Lead	ND		0.100	0.08935		mg/L		89	75 - 125	0	20

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Metals

Prep Batch: 243168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-1	WS-MW-07	Dissolved	Ground Water	3005A	
490-77045-2	WS-MW-2R	Dissolved	Ground Water	3005A	
490-77045-3	WS-MW-05	Dissolved	Ground Water	3005A	
490-77045-4	WS-MW-06	Dissolved	Ground Water	3005A	
490-77045-5	WS-QAQC-DUP-01	Dissolved	Ground Water	3005A	
490-77045-6	WS-MW-09	Dissolved	Ground Water	3005A	
490-77045-6 MS	WS-MW-09	Dissolved	Ground Water	3005A	
490-77045-6 MSD	WS-MW-09	Dissolved	Ground Water	3005A	
490-77045-7	WS-MW-08	Dissolved	Ground Water	3005A	
LCS 490-243168/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-243168/1-A	Method Blank	Total Recoverable	Water	3005A	

Prep Batch: 243319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76961-E-2-B MS	Matrix Spike	Total/NA	Water	3010A	
490-76961-E-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	3010A	
490-77045-1	WS-MW-07	Total/NA	Ground Water	3010A	
490-77045-2	WS-MW-2R	Total/NA	Ground Water	3010A	
LCS 490-243319/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 490-243319/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 243492

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-3	WS-MW-05	Total/NA	Ground Water	3010A	
490-77045-4	WS-MW-06	Total/NA	Ground Water	3010A	
490-77045-5	WS-QAQC-DUP-01	Total/NA	Ground Water	3010A	
490-77045-6	WS-MW-09	Total/NA	Ground Water	3010A	
490-77045-6 MS	WS-MW-09	Total/NA	Ground Water	3010A	
490-77045-6 MSD	WS-MW-09	Total/NA	Ground Water	3010A	
490-77045-7	WS-MW-08	Total/NA	Ground Water	3010A	
490-77045-8	WS-QAQC-EB-01	Total/NA	Ground Water	3010A	
LCS 490-243492/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 490-243492/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 490-243492/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 243562

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-8	WS-QAQC-EB-01	Dissolved	Ground Water	3005A	
490-77081-D-2-B MS	Matrix Spike	Dissolved	Water	3005A	
490-77081-D-2-C MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
LCS 490-243562/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-243562/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 243996

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-76961-E-2-B MS	Matrix Spike	Total/NA	Water	6020	243319
490-76961-E-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	6020	243319
490-77045-1	WS-MW-07	Dissolved	Ground Water	6020	243168
490-77045-1	WS-MW-07	Total/NA	Ground Water	6020	243319
490-77045-2	WS-MW-2R	Dissolved	Ground Water	6020	243168
490-77045-2	WS-MW-2R	Total/NA	Ground Water	6020	243319

Metals (Continued)

Analysis Batch: 243996 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-3	WS-MW-05	Dissolved	Ground Water	6020	243168
490-77045-4	WS-MW-06	Dissolved	Ground Water	6020	243168
490-77045-5	WS-QAQC-DUP-01	Dissolved	Ground Water	6020	243168
490-77045-6	WS-MW-09	Dissolved	Ground Water	6020	243168
490-77045-6 MS	WS-MW-09	Dissolved	Ground Water	6020	243168
490-77045-6 MSD	WS-MW-09	Dissolved	Ground Water	6020	243168
490-77045-7	WS-MW-08	Dissolved	Ground Water	6020	243168
LCS 490-243168/2-A	Lab Control Sample	Total Recoverable	Water	6020	243168
LCS 490-243319/2-A	Lab Control Sample	Total/NA	Water	6020	243319
MB 490-243168/1-A	Method Blank	Total Recoverable	Water	6020	243168
MB 490-243319/1-A	Method Blank	Total/NA	Water	6020	243319

Analysis Batch: 244215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-3	WS-MW-05	Total/NA	Ground Water	6020	243492
490-77045-4	WS-MW-06	Total/NA	Ground Water	6020	243492
490-77045-5	WS-QAQC-DUP-01	Total/NA	Ground Water	6020	243492
490-77045-6	WS-MW-09	Total/NA	Ground Water	6020	243492
490-77045-6 MS	WS-MW-09	Total/NA	Ground Water	6020	243492
490-77045-6 MSD	WS-MW-09	Total/NA	Ground Water	6020	243492
490-77045-8	WS-QAQC-EB-01	Dissolved	Ground Water	6020	243562
490-77045-8	WS-QAQC-EB-01	Total/NA	Ground Water	6020	243492
490-77081-D-2-B MS	Matrix Spike	Dissolved	Water	6020	243562
490-77081-D-2-C MSD	Matrix Spike Duplicate	Dissolved	Water	6020	243562
LCS 490-243492/2-A	Lab Control Sample	Total/NA	Water	6020	243492
LCS 490-243562/2-A	Lab Control Sample	Total Recoverable	Water	6020	243562
LCSD 490-243492/3-A	Lab Control Sample Dup	Total/NA	Water	6020	243492
MB 490-243492/1-A	Method Blank	Total/NA	Water	6020	243492
MB 490-243562/1-A	Method Blank	Total Recoverable	Water	6020	243562

Analysis Batch: 244422

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-6	WS-MW-09	Total/NA	Ground Water	6020	243492
490-77045-6 MS	WS-MW-09	Total/NA	Ground Water	6020	243492
490-77045-6 MSD	WS-MW-09	Total/NA	Ground Water	6020	243492
490-77045-7	WS-MW-08	Total/NA	Ground Water	6020	243492

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-07 — Lab Sample ID: 490-77045-1

Date Collected: 04/20/15 13:10 — **Matrix: Ground Water**
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243168	04/22/15 16:58	TSC	TAL NSH
Dissolved	Analysis	6020		1	243996	04/24/15 13:38	JBD	TAL NSH
Total/NA	Prep	3010A			243319	04/23/15 11:08	TSC	TAL NSH
Total/NA	Analysis	6020		1	243996	04/24/15 17:21	JBD	TAL NSH

Client Sample ID: WS-MW-2R — Lab Sample ID: 490-77045-2

Date Collected: 04/20/15 14:35 — **Matrix: Ground Water**
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243168	04/22/15 16:58	TSC	TAL NSH
Dissolved	Analysis	6020		1	243996	04/24/15 13:43	JBD	TAL NSH
Total/NA	Prep	3010A			243319	04/23/15 11:08	TSC	TAL NSH
Total/NA	Analysis	6020		1	243996	04/24/15 17:27	JBD	TAL NSH

Client Sample ID: WS-MW-05 — Lab Sample ID: 490-77045-3

Date Collected: 04/20/15 16:30 — **Matrix: Ground Water**
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243168	04/22/15 16:58	TSC	TAL NSH
Dissolved	Analysis	6020		1	243996	04/24/15 13:49	JBD	TAL NSH
Total/NA	Prep	3010A			243492	04/23/15 16:45	TSC	TAL NSH
Total/NA	Analysis	6020		1	244215	04/27/15 17:54	JBD	TAL NSH

Client Sample ID: WS-MW-06 — Lab Sample ID: 490-77045-4

Date Collected: 04/20/15 17:40 — **Matrix: Ground Water**
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243168	04/22/15 16:58	TSC	TAL NSH
Dissolved	Analysis	6020		1	243996	04/24/15 14:06	JBD	TAL NSH
Total/NA	Prep	3010A			243492	04/23/15 16:45	TSC	TAL NSH
Total/NA	Analysis	6020		1	244215	04/27/15 17:59	JBD	TAL NSH

Client Sample ID: WS-QAQC-DUP-01 — Lab Sample ID: 490-77045-5

Date Collected: 04/20/15 01:00 — **Matrix: Ground Water**
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243168	04/22/15 16:58	TSC	TAL NSH
Dissolved	Analysis	6020		1	243996	04/24/15 14:11	JBD	TAL NSH
Total/NA	Prep	3010A			243492	04/23/15 16:45	TSC	TAL NSH

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-QAQC-DUP-01

Lab Sample ID: 490-77045-5
Date Collected: 04/20/15 01:00
Matrix: Ground Water
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020		1	244215	04/27/15 18:04	JBD	TAL NSH

Client Sample ID: WS-MW-09

Lab Sample ID: 490-77045-6
Date Collected: 04/21/15 08:50
Matrix: Ground Water
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243168	04/22/15 16:58	TSC	TAL NSH
Dissolved	Analysis	6020		1	243996	04/24/15 13:10	JBD	TAL NSH
Total/NA	Prep	3010A			243492	04/23/15 16:45	TSC	TAL NSH
Total/NA	Analysis	6020		1	244215	04/27/15 18:09	JBD	TAL NSH
Total/NA	Prep	3010A			243492	04/23/15 16:45	TSC	TAL NSH
Total/NA	Analysis	6020		5	244422	04/28/15 11:09	JBD	TAL NSH

Client Sample ID: WS-MW-08

Lab Sample ID: 490-77045-7
Date Collected: 04/21/15 10:50
Matrix: Ground Water
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243168	04/22/15 16:58	TSC	TAL NSH
Dissolved	Analysis	6020		1	243996	04/24/15 14:17	JBD	TAL NSH
Total/NA	Prep	3010A			243492	04/23/15 16:45	TSC	TAL NSH
Total/NA	Analysis	6020		10	244422	04/28/15 11:25	JBD	TAL NSH

Client Sample ID: WS-QAQC-EB-01

Lab Sample ID: 490-77045-8
Date Collected: 04/21/15 11:20
Matrix: Ground Water
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			243562	04/24/15 09:18	TSC	TAL NSH
Dissolved	Analysis	6020		1	244215	04/27/15 20:27	JBD	TAL NSH
Total/NA	Prep	3010A			243492	04/23/15 16:45	TSC	TAL NSH
Total/NA	Analysis	6020		1	244215	04/27/15 18:39	JBD	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL NSH

Protocol References:

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

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	10-31-15
Arizona	State Program	9	AZ0473	05-05-16
Arkansas DEQ	State Program	6	88-0737	04-25-16
California	State Program	9	2938	10-31-16
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-15
Illinois	NELAP	5	200010	12-09-15
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	04-30-15 *
Kentucky (UST)	State Program	4	19	06-30-15
Kentucky (WW)	State Program	4	90038	12-31-15
Louisiana	NELAP	6	30613	06-30-15
Maryland	State Program	3	316	03-31-16
Massachusetts	State Program	1	M-TN032	06-30-15
Minnesota	NELAP	5	047-999-345	12-31-15
Mississippi	State Program	4	N/A	06-30-15
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-15
New Hampshire	NELAP	1	2963	10-09-15
New Jersey	NELAP	2	TN965	06-30-15
New York	NELAP	2	11342	03-31-16
North Carolina (WW/SW)	State Program	4	387	12-31-15
North Dakota	State Program	8	R-146	06-30-15
Ohio VAP	State Program	5	CL0033	10-16-15
Oklahoma	State Program	6	9412	08-31-15
Oregon	NELAP	10	TN200001	04-27-16
Pennsylvania	NELAP	3	68-00585	06-30-15
Rhode Island	State Program	1	LAO00268	12-30-15
South Carolina	State Program	4	84009 (001)	02-28-15 *
South Carolina (DW)	State Program	4	84009 (002)	02-23-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-15
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-15
Virginia	NELAP	3	460152	06-14-15
Washington	State Program	10	C789	07-19-15
West Virginia DEP	State Program	3	219	02-28-16
Wisconsin	State Program	5	998020430	08-31-15
Wyoming (UST)	A2LA	8	453.07	12-31-15

* Certification renewal pending - certification considered valid.

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May 07, 2015

Analytical Report for Service Request No: K1504200

Heather Wagner
Test America, Incorporated, Nashville Division
2960 Foster Creighton Drive
Nashville, TN 37204

RE: Winston Salem VCC Semi Annual / 49001238

Dear Heather,

Enclosed are the results of the sample(s) submitted to our laboratory April 22, 2015
For your reference, these analyses have been assigned our service request number **K1504200.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3275. You may also contact me via email at Chris.Leaf@ALSGlobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Chris Leaf
Project Manager

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS ENVIRONMENTAL

Client:	Test America, Incorporated	**Service Request No.:**	K1504200
Project:	Winston Salem VCC Semi Annual/ 49001238	**Date Received:**	04/22/15
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Eight water samples were received for analysis at ALS Environmental on 04/22/15. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4ºC upon receipt at the laboratory.

Total and Dissolved Metals

No anomalies associated with the analysis of these samples were observed.

Approved by_____

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

K1504200

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Lovgren	Lab PM: Wagner, Heather	Carrier Tracking No(s):	COC No: 490-37961-12845.2
Client Contact: Matt Pelton	Phone: 919-604-4557	E-Mail: heather.wagner@testamericainc.com		Page: Page 2 of 2
Company: ARCADIS U.S., Inc.				Job #: B0085732.1501
Address: 801 Corporate Center Drive Suite 300	Due Date Requested:			
City: Raleigh	TAT Requested (days):			
State, Zip: NC, 27607-5073				
Phone: 919-415-2308	Purchase Order Requested			
Email: matthew.pelton@arcadis-us.com	WO #:			
Project Name: Winston Salem VCC Semi Annual	TestAmerica Project #: 49001238			
Site: Winston Salem, NC	Non-ENFOS			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT - Total Arsenic by 7062	SUBCONTRACT - Dissolved Arsenic by 7062	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
WS-MW-07	4-20-15	1310	G	Water	X		1	1		
WS-MW-2R	4-20-15	1435	G		X		1	1		
WS-MW-05	4-20-15	1630	G		X		1	1		
WS-MW-06	4-20-15	1740	G		X		1	1		
WS-QAQC-DUP-01	4-20-15	NIR	G		X		1	1		
WS-MW-09	4-21-15	0850	G		X		1	1		
WS-MW-09 (MS)	4-21-15	0850	G		X		1	1		
WS-MW-09 (MSD)	4-21-15	0850	G		X		1	1		
WS-MW-08	4-21-15	1050	G		X		1	1		
WS-QAQC-EB-01	4-21-15	1120	G		X		1			

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Brian Lovgren	4-21-15/1700	Arcadis	FedEx	4-21-15/1700	FedEx
			ARS	4/22/15 1000	ARS

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

PC CL

Cooler Receipt and Preservation Form

Client / Project: Test America Service Request *K15* 04200

Received: 4-22-15 Opened: 4-22-15 By: GH Unloaded: 4-22-15 By: GH

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 on front 1 on back

   If present, were custody seals intact? Y N If present, were they signed and dated? ~~Y~~ N

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID ~~NA~~	Tracking Number NA	Filed
-0.2	-0.3	0.3	0.2	-0.1	350	440-37461-12845.2	8728 7682 0766	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page _____ ***of*** _____

Metals

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1504200-001**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1504200-001DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1504200-002**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1504200-002DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1504200-003**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1504200-003DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1504200-004**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1504200-004DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

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dba ALS Environmental

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1504200-005**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1504200-005DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1504200-006**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1504200-006DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1504200-007**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

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dba ALS Environmental

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1504200-007DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-EB-01** **Lab Code:** **K1504200-008**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **Method Blank** **Lab Code:** **KQ1504019-01**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Metals
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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238

Project Name: Winston Salem VCC Semi Annual

ICV Source: Inorganic Ventures **CCV Source:** ALS MIXED

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	Method
Arsenic	7.50	7.64	102	7.50	7.78	104	7.86	105	7062

Metals
- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238

Project Name: Winston Salem VCC Semi Annual

ICV Source: Inorganic Ventures **CCV Source:** ALS MIXED

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Arsenic				7.50	7.98	106	8.04	107	7062

Metals

- 2b -
CRDL STANDARD FOR AA AND ICP

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238

Project Name: Winston Salem VCC Semi Annual

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Arsenic	0.50	0.55	110					

ALS Group USA, Corp.
dba ALS Environmental

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238 **Units:** UG/L

Project Name: Winston Salem VCC Semi Annual **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-09S **Lab Code:** K1504200-006DISSS

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	18.0		0.2	U	16.00	112.5		7062

An empty field in the Control Limit column indicates the control limit is not applicable

ALS Group USA, Corp.
dba ALS Environmental

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238 **Units:** UG/L

Project Name: Winston Salem VCC Semi Annual **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-09S **Lab Code:** K1504200-006S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	17.5		0.2	U	16.00	109.4		7062

An empty field in the Control Limit column indicates the control limit is not applicable

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 6 -

DUPLICATES

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238 **Units:** UG/L

Project Name: Winston Salem VCC Semi Annual **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-09D **Lab Code:** K1504200-006D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.2	U	0.2	U			7062

An empty field in the Control Limit column indicates the control limit is not applicable.

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dba ALS Environmental

Metals

- 6 -

DUPLICATES

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238 **Units:** UG/L

Project Name: Winston Salem VCC Semi Annual **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-09D **Lab Code:** K1504200-006DISSD

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.2	U	0.2	U			7062

An empty field in the Control Limit column indicates the control limit is not applicable.

Form VI - IN

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238

Project Name: Winston Salem VCC Semi Annual

Aqueous LCS Source: ALS MIXED **Solid LCS Source:**

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits	%R
Arsenic	10	11.1	111.0					

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 10 -

DETECTION LIMITS

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238

Project Name: Winston Salem VCC Semi Annual

ICP/ICP-MS ID #:

GFAA ID #: K-FLAA-02 **AA ID #:**

Analyte	Wave-length (nm)	Back-ground	MRL ug/L	MDL ug/L	M
Arsenic	193.6		0.5	0.1	H

Comments:

Form X - IN

Metals
-13-
PREPARATION LOG

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238

Project Name: Winston Salem VCC Semi Annual

Method: F

Sample ID	Preparation Date	Initial Volume	Final Volume(mL)
K1504200-001	04/23/15	50.0	50.0
K1504200-001DISS	04/23/15	50.0	50.0
K1504200-002	04/23/15	50.0	50.0
K1504200-002DISS	04/23/15	50.0	50.0
K1504200-003	04/23/15	50.0	50.0
K1504200-003DISS	04/23/15	50.0	50.0
K1504200-004	04/23/15	50.0	50.0
K1504200-004DISS	04/23/15	50.0	50.0
K1504200-005	04/23/15	50.0	50.0
K1504200-005DISS	04/23/15	50.0	50.0
K1504200-006	04/23/15	50.0	50.0
K1504200-006D	04/23/15	50.0	50.0
K1504200-006DISS	04/23/15	50.0	50.0
K1504200-006DISSD	04/23/15	50.0	50.0
K1504200-006DISSS	04/23/15	50.0	50.0
K1504200-006S	04/23/15	50.0	50.0
K1504200-007	04/23/15	50.0	50.0
K1504200-007DISS	04/23/15	50.0	50.0
K1504200-008	04/23/15	50.0	50.0
KQ1504019-01	04/23/15	50.0	50.0
KQ1504019-02	04/23/15	50.0	50.0

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Metals
- 14 -
ANALYSIS RUN LOG

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238 **Run Number:** 050415-As1

Project Name: Winston Salem VCC Semi Annual

Instrument ID Number: K-FLAA-02 **Method:** H

Start Date: 05/04/15 **End Date:** 05/04/15

Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CAL BLK	1.0	10:36				X																					
STD 0.5	1.0	10:38				X																					
STD 1.0	1.0	10:40				X																					
STD 5.0	1.0	10:42				X																					
STD 7.5	1.0	10:44				X																					
STD 10.0	1.0	10:46				X																					
ICV1	1.0	10:49				X																					
ICB1	1.0	10:51				X																					
LLICV	1.0	10:53				X																					
CCV1	1.0	10:55				X																					
CCB1	1.0	10:57				X																					
KQ1504019-01	2.0	10:59				X																					
KQ1504019-02	2.0	11:02				X																					
K1504200-001	2.0	11:04				X																					
K1504200-001A	2.0	11:06				X																					
K1504200-002	2.0	11:08				X																					
K1504200-003	2.0	11:10				X																					
K1504200-004	2.0	11:13				X																					
K1504200-005	2.0	11:15				X																					
ZZZZZZ	2.0	11:17																									
ZZZZZZ	2.0	11:19																									
CCV2	1.0	11:21				X																					
CCB2	1.0	11:23				X																					
ZZZZZZ	2.0	11:26																									
K1504200-007	2.0	11:28				X																					
K1504200-008	2.0	11:30				X																					
K1504200-001DISS	2.0	11:32				X																					
K1504200-002DISS	2.0	11:34				X																					
K1504200-003DISS	2.0	11:36				X																					
K1504200-004DISS	2.0	11:39				X																					
K1504200-005DISS	2.0	11:41				X																					
K1504200-006DISS	2.0	11:43				X																					

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

ALS Group USA, Corp.
dba ALS Environmental

Metals
- 14 -
ANALYSIS RUN LOG

Client: Test America, Incorporated **Service Request:** K1504200

Project No.: 49001238 **Run Number:** 050415-As1

Project Name: Winston Salem VCC Semi Annual

Instrument ID Number: K-FLAA-02 **Method:** H

Start Date: 05/04/15 **End Date:** 05/04/15

Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
K1504200-006DISSD	2.0	11:45				X																					
CCV3	1.0	11:47				X																					
CCB3	1.0	11:49				X																					
K1504200-006DISSS	2.0	11:52				X																					
K1504200-007DISS	2.0	11:54				X																					
K1504200-006	2.0	11:56				X																					
K1504200-006A	2.0	11:58				X																					
K1504200-006D	2.0	12:00				X																					
K1504200-006S	2.0	12:02				X																					
CCV4	1.0	12:05				X																					
CCB4	1.0	12:07				X																					

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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www.alsglobal.com

Preparation Information Benchsheet

Prep Run: 234237
Team: Metals
Analyst: Anna Cheatley

Prep Workflow: MetDig3010A
Prep Method: EPA 3010A
Rush/NPDES: N/A

Status: Prepped
Current Step: Digestion

Prep Date: 04/23/2015 12:17
Due Date: 05/09/2015
Hold Date: 10/17/2015

Lab Code	Client ID	Bottle #	Initial Amt	Final Volume	Spike Amt	Spike ID	TestNo List	Comments
KQ1504019-01	Method Blank		50 mL	50 mL			As D, As T	6%HNO3,5%HCl
KQ1504019-02	Lab Control Sample		50 mL	50 mL	0.2 mL	78500	As D, As T	6%HNO3,5%HCl
K1504200-001	WS-MW-07	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-001	WS-MW-07	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-002	WS-MW-2R	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-002	WS-MW-2R	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-003	WS-MW-05	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-003	WS-MW-05	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-004	WS-MW-06	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-004	WS-MW-06	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-005	WS-QAQC-DUP-01	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-005	WS-QAQC-DUP-01	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-006	WS-MW-09	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-006	WS-MW-09	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-006: KQ1504019-03	Duplicate	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-006: KQ1504019-05	Duplicate	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-006: KQ1504019-04	Matrix Spike	.01	50 mL	50 mL	0.2 mL	77714	As T	6%HNO3,5%HCl
K1504200-006: KQ1504019-06	Matrix Spike	.02	50 mL	50 mL	0.2 mL	77714	As D	6%HNO3,5%HCl
K1504200-007	WS-MW-08	.02	50 mL	50 mL			As D	6%HNO3,5%HCl
K1504200-007	WS-MW-08	.01	50 mL	50 mL			As T	6%HNO3,5%HCl
K1504200-008	WS-QAQC-EB-01	.01	50 mL	50 mL			As T	6%HNO3,5%HCl

14 Total Samples consisting of 8 Client Samples, 4 Client QC Samples, 2 Batch QC Samples associated with the current Prep Run.

Spiking Solutions

Name	Type	ID	Expires	Name	Type	ID	Expires
K-MET GFLCSW	Spike	78500	8/2/2015	K-MET SS2	Spike	77714	5/18/2015

Preparation Materials

Step	Name	ID
Digestion	K-MET HCL	77970
Digestion	K-MET HNO3	78450

Step	Name	ID
Digestion	K-MET 50ml Centrifuge Tube	79485

Preparation Hardware / Equipment

Step	Name	Property	Value	
Digestion	K-HotPlate-02	Thermometer ID 1134195	94	deg C

Step	Name	Property	Value	
Digestion	K-HotPlate-04	Thermometer ID 1135259	93	deg C

Preparation Steps

Step	Started	Finished	By	Assisted By	Training?	Comments
Digestion	23-APR-15 12:17	23-APR-15 17:01	Anna Cheatley		N	

Comments

Thermometer ID 1134195 Observed temperature=94C°C. Correction factor=0. Corrected temperature=94°C. Thermometer ID 1135259 Observed temperature=93C°C. Correction factor=0. Corrected temperature=93°C.

Review

Reviewed by: JDB Date: 4/24/15

METALS SPIKING SOLUTIONS CONCENTRATIONS FORM

Solution Name	Element	mLs of 1000ppm Solution	Final Volume	Solution Conc. mg/L	Enter mls Added
K-MET SS1	HNO3	50.0	1000ml	-	
	Al	100*	1000ml	200	
	Ag	100*	1000ml	5	
	Ba	100*	1000ml	100	
	Be	100*	1000ml	5	
	Cd	100*	1000ml	5	
	Co	100*	1000ml	50	
	Cr	100*	1000ml	20	
	Cu	100*	1000ml	25	
	Fe	100*	1000ml	100	
	Pb	100*	1000ml	50	
*** Add after HNO3	Mn	100*	1000ml	50	
and before cas cal	Ni	100*	1000ml	50	
-14	Sb***	50	1000ml	50	
when making the	V	100*	1000ml	50	
solution	Zn	100*	1000ml	50	
K-MET SS2	HNO3	25.0	500ml	-	
	As	2.0	500ml	4	
	Cd	2.0	500ml	4	
	Pb	2.0	500ml	4	
	Se	2.0	500ml	4	
	Tl	2.0	500ml	4	
	Cu	2.0	500ml	4	
K-MET SS3	HNO3	25.0	500ml	-	
	As	50.0	500ml	100	
	Se	50.0	500ml	100	
	Tl	50.0	500ml	100	
	Hg	6	500	12	
K-MET SS4	HNO3	25	500ml	-	
	B	50	500ml	100	
	Mo	50	500ml	100	
K-MET SS5	HNO3	10.0	200ml	-	
	K**	20	200ml	1000	
	Na**	20	200ml	1000	
	Mg**	20	200ml	1000	
	Ca**	20	200ml	1000	
K-MET GFLCSW	HNO3	10.0	1000ml	-	
	As, Pb, Se, Tl	5.0	1000ml	2.5	
	Cd	-	-	1.25	
	Cu	2.5	1000ml	2.5	
K-MET QCP-CICV-1	Ca, Mg, Na, K	no dilution	-	2500	
	Al, Ba	no dilution	-	1000	
	Fe	no dilution	-	500	
	Co, Mn, Ni, V, Zn	no dilution	-	250	
	Cu, Ag	no dilution	-	125	
	Cr	no dilution	-	100	
	Be	no dilution	-	25	
K-MET QCP-CICV-2	Sb	no dilution	-	500	
K-MET QCP-CICV-3	As, Pb, Se, Tl	no dilution	-	500	
	Cd	no dilution	-	250	

* Denotes volume of mixed stock standard.

** Denotes 10,000 ppm individual stock standards.

Standard	mls of standard	ppm	Logbook #	Exp. Date

Element Analyzed: As Hydride Instrument: K-FLAA-02
Service Request #: K1504200

Batch QC SR's #: K1504200
Calibration Std.: AA1-16-G Expiration Date: 10/01/15
2nd Source Std.: AA1-16-F Expiration Date: 08/03/15
Starlims #: 443174
Run #: 050415-As1

Hydride Data Review Form

		Yes	No	NA
1	ICV within 10% of true Value	X		
2.	Calibration data included	X		
3.	CCV's in control	X		
4.	CCB's and/or ICB's below MRL	X		
5.	All reported Results within Cal. Range	X		
6.	All Calculations are Correct	X		

Comments

Primary Reviewed by: RJS Date: 5/4/15

Secondary Reviewed by: JDB Date: 5/4/15

ALS Enviromental
FAA Run Log

Method: (Circle Method Used) 7742 7062 Other:_____ Element: As Se ____	**Service Request # :**

SAMPLE NUMBER	Dilution Factor	Measured (µg/L)	Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.)		Comments Post Spike = 5 ppb
Cal. Blk	-	0.000			
Cal. Std 0.5	-	0.500	*(0.025-50ml)		*Cal. Std = AA1-16-G
Cal. Std 1.0	-	1.000	*(0.05-50ml)		
Cal. Std 5.0	-	5.000	*(0.25-50ml)		
Cal. Std 7.5	-	7.500	*(0.375-50ml)		
Cal. Std 10.0	-	10.000	*(0.5-50ml)		
ICV	-	7.644	102%		ICV Std = AA1-16-F
ICB	-	0.038			
LLICV	-	0.547	109%		
CCV	-	7.775	104%		
CCB	-	0.037			
KQ1504019-01	1/2	-0.007			
KQ1504019-02	1/2	5.532	111%		
K1504200-001	1/2	0.053			
K1504200-001A	1/2	5.762	115%		
K1504200-002	1/2	0.043			
K1504200-003	1/2	0.040			
K1504200-004	1/2	0.014			
K1504200-005	1/2	0.008			
55 ~~K1504200-006~~	~~1/2*1/5~~	~~0.014~~			
45 ~~K1504200-006D~~	~~1/2*1/5~~	~~0.005~~			
CCV	1/2	7.859	105%		
CCB	1/2	0.038			
~~K1504200-006S~~	~~1/2*1/5~~	~~1.861~~			
K1504200-007	1/2	0.059			
K1504200-008	1/2	0.019			
K1504200-001DISS	1/2	0.011			
K1504200-002DISS	1/2	0.002			
K1504200-003DISS	1/2	0.018			
K1504200-004DISS	1/2	0.005			

True Values/QC Limits:	LCSW	Water Spike	LCSS (ERA D045540)	Soil Spike
Arsenic:	10ppb (80-120%)	16ppb (75-125%)	99.6mg/kg (70-130%)	40ppb (75-125%)
Selenium	10ppb (80-120%)	16ppb (75-125%)	150mg/kg (68-132%)	40ppb (75-125%)

Cx = MSA Corrected Concentration (as per method)

Analyst	**Date:**	**Page Number:**
[signature]	5/14/15	1

R:\ICP\MISC\FLAA\Copy of Hydride Tissue Template

ALS Enviromental
FAA Run Log

Method: (Circle Method Used) 7742 7062 Other:_____ Element: As Se ____	**Service Request # :**

SAMPLE NUMBER	Dilution Factor	Measured (µg/L)	Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.)		Comments Post Spike = 5 ppb
K1504200-005DISS	1/2	-0.006			
K1504200-006DISS	1/2	-0.007			
K1504200-006DDISS	1/2	0.012			
CCV	-	7.980	106%		
CCB	-	0.043			
K1504200-006SDISS	1/2	9.009	113%		
K1504200-007DISS	1/2	0.035			
K1504200-006	1/2	-0.004			
K1504200-006A	1/2	5.536	111%		
K1504200-006D	1/2	0.018			
K1504200-006S	1/2	8.762	110%		
CCV	-	8.042	107%		
CCB	-	0.063			

True Values/QC Limits:	LCSW	Water Spike	LCSS (ERA D045540)	Soil Spike
Arsenic:	10ppb (80-120%)	16ppb (75-125%)	146.0mg/kg (80-120%)	20ppb (75-125%)
Selenium	10ppb (80-120%)	16ppb (75-125%)	192.0mg/kg (62-147%)	20ppb (75-125%)

Cx = MSA Corrected Concentration (as per method)

Analyst	**Date:**	**Page Number:**
[illegible]	5/14/15	2

==========

Analysis Begun

Logged In Analyst: alkls.nouser **Technique: AA FIAS-Flame**
Spectrometer Model: AAnalyst 200, S/N 200S5061701 **Autosampler Model: AS-90**

Sample Information File: C:\data-AA\alkls.nouser\Sample Information\050415-As1.sif
Batch ID: 050415-As1
Results Data Set: 050415-As1
Results Library: C:\data-AA\alkls.nouser\Results\Hydride 2015.mdb

==========

Method Loaded
Method Name: As Hydride **Method Last Saved: 3/6/2015 9:53:52 AM**
Method Description: As Hydride

==========

Sequence No.: 1 **Autosampler Location: 1**
Sample ID: Cal blk **Date Collected: 5/4/2015 10:34:38 AM**
Analyst: **Data Type: Original**

Replicate Data: Cal blk

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.00]	0.002	-0.003	0.002			10:35:00	Yes
2		[0.00]	0.003	0.011	0.003			10:35:31	Yes
3		[0.00]	0.002	0.008	0.002			10:36:01	Yes
Mean:		[0.00]	0.002						
SD:		0.00	0.0007						
%RSD:		0.00	33.17						

Auto-zero performed.

==========

Sequence No.: 2 **Autosampler Location: 2**
Sample ID: Std 0.5 **Date Collected: 5/4/2015 10:36:47 AM**
Analyst: **Data Type: Original**

Replicate Data: Std 0.5

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.5]	0.015	0.063	0.018			10:37:09	Yes
2		[0.5]	0.014	0.050	0.016			10:37:40	Yes
3		[0.5]	0.014	0.058	0.017			10:38:10	Yes
Mean:		[0.5]	0.014						
SD:		0.0	0.0009						
%RSD:		0.0	6.54						

Standard number 1 applied. [0.5]
Correlation Coef.: 1.000000 Slope: 0.02894 Intercept: 0.00000

==========

Sequence No.: 3 **Autosampler Location: 3**
Sample ID: Std 1.0 **Date Collected: 5/4/2015 10:38:56 AM**
Analyst: **Data Type: Original**

Replicate Data: Std 1.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[1.0]	0.029	0.112	0.031			10:39:18	Yes
2		[1.0]	0.027	0.113	0.029			10:39:49	Yes
3		[1.0]	0.026	0.092	0.028			10:40:20	Yes
Mean:		[1.0]	0.027						
SD:		0.0	0.0012						
%RSD:		0.0	4.49						

Standard number 2 applied. [1.0]
Correlation Coef.: 0.997380 Slope: 0.02769 Intercept: 0.00000

==========

Sequence No.: 4 **Autosampler Location: 4**
Sample ID: Std 5.0 **Date Collected: 5/4/2015 10:41:06 AM**
Analyst: **Data Type: Original**

Replicate Data: Std 5.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[5.0]	0.140	0.545	0.143			10:41:29	Yes
2		[5.0]	0.138	0.546	0.140			10:41:59	Yes
3		[5.0]	0.141	0.541	0.143			10:42:30	Yes
Mean:		[5.0]	0.140						
SD:		0.0	0.0015						
%RSD:		0.0	1.09						

Standard number 3 applied. [5.0]
Correlation Coef.: 0.999968 Slope: 0.02796 Intercept: 0.00000

==========

Sequence No.: 5 **Autosampler Location: 5**
Sample ID: Std 7.5 **Date Collected: 5/4/2015 10:43:18 AM**
Analyst: **Data Type: Original**

Replicate Data: Std 7.5

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[7.5]	0.220	0.827	0.222			10:43:41	Yes
2		[7.5]	0.213	0.818	0.216			10:44:11	Yes
3		[7.5]	0.213	0.827	0.215			10:44:42	Yes
Mean:		[7.5]	0.215						
SD:		0.0	0.0038						
%RSD:		0.0	1.79						

Standard number 4 applied. [7.5]
Correlation Coef.: 0.999812 Slope: 0.02846 Intercept: 0.00000

==========

Sequence No.: 6 **Autosampler Location: 6**
Sample ID: Std 10.0 **Date Collected: 5/4/2015 10:45:29 AM**
Analyst: **Data Type: Original**

Replicate Data: Std 10.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[10.0]	0.274	1.052	0.276			10:45:52	Yes
2		[10.0]	0.270	1.037	0.272			10:46:23	Yes
3		[10.0]	0.269	1.052	0.271			10:46:54	Yes
Mean:		[10.0]	0.271						
SD:		0.0	0.0027						
%RSD:		0.0	0.99						

Standard number 5 applied. [10.0]
Correlation Coef.: 0.999098 Slope: 0.02773 Intercept: 0.00000

Calibration data for As 193.70 **Equation: Linear Through Zero**

ID	Mean Signal (Abs)	Entered Conc. ug/L	Calculated Conc. ug/L	Standard Deviation	%RSD
Cal blk	0.0000	0	0.000	0.00	33.2
Std 0.5	0.0145	0.5	0.522	0.00	6.5
Std 1.0	0.0274	1.0	0.986	0.00	4.5
Std 5.0	0.1398	5.0	5.043	0.00	1.1
Std 7.5	0.2152	7.5	7.759	0.00	1.8

Std 10.0	0.2710	10.0	9.772	0.00	1.0

Correlation Coef.: 0.999098 Slope: 0.02773 Intercept: 0.00000

==========

Sequence No.: 7 **Autosampler Location: 7**
Sample ID: ICV **Date Collected: 5/4/2015 10:47:42 AM**
Analyst: **Data Type: Original**

Replicate Data: ICV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	7.477	7.477	0.207	0.826	0.210			10:48:06	Yes
2	7.809	7.809	0.217	0.816	0.219			10:48:37	Yes
3	7.646	7.646	0.212	0.836	0.214			10:49:08	Yes
Mean:	7.644	7.644	0.212						
SD:	0.166	0.166	0.0046						
%RSD:	2.175	2.175	2.18						

QC value within limits for As 193.70 Recovery = 101.92%
All analyte(s) passed QC.

==========

Sequence No.: 8 **Autosampler Location: 1**
Sample ID: ICB **Date Collected: 5/4/2015 10:49:56 AM**
Analyst: **Data Type: Original**

Replicate Data: ICB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.041	0.041	0.001	0.008	0.003			10:50:17	Yes
2	0.045	0.045	0.001	0.014	0.003			10:50:47	Yes
3	0.030	0.030	0.001	0.002	0.003			10:51:18	Yes
Mean:	0.038	0.038	0.001						
SD:	0.008	0.008	0.0002						
%RSD:	20.53	20.53	20.53						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

==========

Sequence No.: 9 **Autosampler Location: 2**
Sample ID: LLICV **Date Collected: 5/4/2015 10:52:04 AM**
Analyst: **Data Type: Original**

Replicate Data: LLICV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.565	0.565	0.016	0.067	0.018			10:52:26	Yes
2	0.561	0.561	0.016	0.062	0.018			10:52:56	Yes
3	0.515	0.515	0.014	0.061	0.016			10:53:27	Yes
Mean:	0.547	0.547	0.015						
SD:	0.028	0.028	0.0008						
%RSD:	5.133	5.133	5.13						

QC value within limits for As 193.70 Recovery = 109.41%
All analyte(s) passed QC.

==========

Sequence No.: 10 **Autosampler Location: 5**
Sample ID: CCV **Date Collected: 5/4/2015 10:54:14 AM**
Analyst: **Data Type: Original**

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	7.770	7.770	0.215	0.846	0.218			10:54:37	Yes

2	7.745	7.745	0.215	0.829	0.217		10:55:08	Yes
3	7.812	7.812	0.217	0.831	0.219		10:55:39	Yes
Mean:	7.775	7.775	0.216					
SD:	0.034	0.034	0.0009					
%RSD:	0.437	0.437	0.44					

QC value within limits for As 193.70 Recovery = 103.67%
All analyte(s) passed QC.

Sequence No.: 11 **Autosampler Location: 1**
Sample ID: CCB **Date Collected: 5/4/2015 10:56:26 AM**
Analyst: **Data Type: Original**

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.054	0.054	0.002	0.006	0.004			10:56:47	Yes
2	0.061	0.061	0.002	0.022	0.004			10:57:17	Yes
3	-0.005	-0.005	-0.000	0.003	0.002			10:57:48	Yes
Mean:	0.037	0.037	0.001						
SD:	0.036	0.036	0.0010						
%RSD:	98.56	98.56	98.56						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 12 **Autosampler Location: 9**
Sample ID: KQ1504019-01 **Date Collected: 5/4/2015 10:58:33 AM**
Analyst: **Data Type: Original**

Replicate Data: KQ1504019-01

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.034	-0.034	-0.001	-0.007	0.001			10:58:54	Yes
2	0.006	0.006	0.000	0.008	0.002			10:59:25	Yes
3	0.006	0.006	0.000	0.005	0.002			10:59:56	Yes
Mean:	-0.007	-0.007	-0.000						
SD:	0.023	0.023	0.0006						
%RSD:	329.4	329.4	329.39						

Sequence No.: 13 **Autosampler Location: 10**
Sample ID: KQ1504019-02 **Date Collected: 5/4/2015 11:00:41 AM**
Analyst: **Data Type: Original**

Replicate Data: KQ1504019-02

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	5.532	5.532	0.153	0.590	0.156			11:01:02	Yes
2	5.514	5.514	0.153	0.591	0.155			11:01:33	Yes
3	5.549	5.549	0.154	0.595	0.156			11:02:04	Yes
Mean:	5.532	5.532	0.153						
SD:	0.018	0.018	0.0005						
%RSD:	0.319	0.319	0.32						

Sequence No.: 14 **Autosampler Location: 11**
Sample ID: K1504200-001 **Date Collected: 5/4/2015 11:02:49 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-001

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored

1	0.039	0.039	0.001	0.003	0.003		11:03:11	Yes
2	0.090	0.090	0.002	0.012	0.005		11:03:42	Yes
3	0.029	0.029	0.001	0.008	0.003		11:04:13	Yes
Mean:	0.053	0.053	0.001					
SD:	0.033	0.033	0.0009					
%RSD:	62.52	62.52	62.52					

Sequence No.: 15 **Autosampler Location: 12**
Sample ID: K1504200-001A **Date Collected: 5/4/2015 11:04:59 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-001A

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	5.863	5.863	0.163	0.626	0.165			11:05:21	Yes
2	5.677	5.677	0.157	0.622	0.160			11:05:52	Yes
3	5.748	5.748	0.159	0.611	0.162			11:06:23	Yes
Mean:	5.762	5.762	0.160						
SD:	0.094	0.094	0.0026						
%RSD:	1.629	1.629	1.63						

Sequence No.: 16 **Autosampler Location: 13**
Sample ID: K1504200-002 **Date Collected: 5/4/2015 11:07:09 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-002

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.007	0.007	0.000	-0.002	0.002			11:07:32	Yes
2	0.071	0.071	0.002	0.017	0.004			11:08:03	Yes
3	0.050	0.050	0.001	0.011	0.004			11:08:33	Yes
Mean:	0.043	0.043	0.001						
SD:	0.033	0.033	0.0009						
%RSD:	76.48	76.48	76.48						

Sequence No.: 17 **Autosampler Location: 14**
Sample ID: K1504200-003 **Date Collected: 5/4/2015 11:09:21 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-003

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.040	0.040	0.001	0.009	0.003			11:09:44	Yes
2	0.037	0.037	0.001	0.007	0.003			11:10:15	Yes
3	0.044	0.044	0.001	0.006	0.003			11:10:46	Yes
Mean:	0.040	0.040	0.001						
SD:	0.004	0.004	0.0001						
%RSD:	9.663	9.663	9.66						

Sequence No.: 18 **Autosampler Location: 15**
Sample ID: K1504200-004 **Date Collected: 5/4/2015 11:11:35 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-004

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.015	0.015	0.000	0.004	0.003			11:11:58	Yes
2	0.004	0.004	0.000	0.005	0.002			11:12:30	Yes
3	0.023	0.023	0.001	0.006	0.003			11:13:00	Yes

Mean:	0.014	0.014	0.000
SD:	0.010	0.010	0.0003
%RSD:	68.88	68.88	68.88

==========

Sequence No.: 19 **Autosampler Location: 16**
Sample ID: K1504200-005 **Date Collected: 5/4/2015 11:13:49 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-005

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.009	-0.009	-0.000	0.000	0.002			11:14:13	Yes
2	0.015	0.015	0.000	0.009	0.003			11:14:44	Yes
3	0.017	0.017	0.000	0.008	0.003			11:15:14	Yes
Mean:	0.008	0.008	0.000						
SD:	0.014	0.014	0.0004						
%RSD:	183.6	183.6	183.63						

==========

Sequence No.: 20 **Autosampler Location: 17**
Sample ID: K1504200-006 **Date Collected: 5/4/2015 11:16:02 AM**
Analyst: **Data Type: Original**

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Replicate Data: K1504200-006

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.027	0.027	0.001	0.014	0.003			11:16:23	Yes
2	-0.008	-0.008	-0.000	0.003	0.002			11:16:54	Yes
3	0.023	0.023	0.001	0.007	0.003			11:17:25	Yes
Mean:	0.014	0.014	0.000						
SD:	0.019	0.019	0.0005						
%RSD:	141.2	141.2	141.15						

==========

Sequence No.: 21 **Autosampler Location: 18**
Sample ID: K1504200-006D **Date Collected: 5/4/2015 11:18:10 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-006D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.016	-0.016	-0.000	0.002	0.002			11:18:31	Yes
2	0.010	0.010	0.000	0.000	0.002			11:19:02	Yes
3	0.021	0.021	0.001	0.008	0.003			11:19:33	Yes
Mean:	0.005	0.005	0.000						
SD:	0.019	0.019	0.0005						
%RSD:	392.8	392.8	392.83						

==========

Sequence No.: 22 **Autosampler Location: 5**
Sample ID: CCV **Date Collected: 5/4/2015 11:20:19 AM**
Analyst: **Data Type: Original**

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	7.887	7.887	0.219	0.864	0.221			11:20:42	Yes
2	7.820	7.820	0.217	0.852	0.219			11:21:12	Yes
3	7.871	7.871	0.218	0.854	0.220			11:21:43	Yes
Mean:	7.859	7.859	0.218						
SD:	0.035	0.035	0.0010						
%RSD:	0.448	0.448	0.45						

QC value within limits for As 193.70 Recovery = 104.79%
All analyte(s) passed QC.

Sequence No.: 23 **Autosampler Location: 1**
Sample ID: CCB **Date Collected: 5/4/2015 11:22:31 AM**
Analyst: **Data Type: Original**

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.054	0.054	0.001	0.011	0.004			11:22:52	Yes
2	0.044	0.044	0.001	0.009	0.003			11:23:23	Yes
3	0.016	0.016	0.000	0.009	0.003			11:23:54	Yes
Mean:	0.038	0.038	0.001						
SD:	0.020	0.020	0.0005						
%RSD:	52.16	52.16	52.16						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 24 **Autosampler Location: 19**
Sample ID: K1504200-006S **Date Collected: 5/4/2015 11:24:40 AM**
Analyst: **Data Type: Original**

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Replicate Data: K1504200-006S

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	1.870	1.870	0.052	0.208	0.054			11:25:01	Yes
2	1.879	1.879	0.052	0.207	0.054			11:25:32	Yes
3	1.834	1.834	0.051	0.209	0.053			11:26:02	Yes
Mean:	1.861	1.861	0.052						
SD:	0.024	0.024	0.0007						
%RSD:	1.299	1.299	1.30						

Sequence No.: 25 **Autosampler Location: 20**
Sample ID: K1504200-007 **Date Collected: 5/4/2015 11:26:48 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-007

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.063	0.063	0.002	0.011	0.004			11:27:09	Yes
2	0.070	0.070	0.002	0.004	0.004			11:27:40	Yes
3	0.043	0.043	0.001	0.000	0.003			11:28:11	Yes
Mean:	0.059	0.059	0.002						
SD:	0.014	0.014	0.0004						
%RSD:	23.92	23.92	23.92						

Sequence No.: 26 **Autosampler Location: 21**
Sample ID: K1504200-008 **Date Collected: 5/4/2015 11:28:56 AM**
Analyst: **Data Type: Original**

Replicate Data: K1504200-008

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.026	0.026	0.001	0.008	0.003			11:29:18	Yes
2	0.000	0.000	0.000	0.003	0.002			11:29:49	Yes
3	0.031	0.031	0.001	0.015	0.003			11:30:19	Yes
Mean:	0.019	0.019	0.001						
SD:	0.016	0.016	0.0005						

%RSD: 86.50 86.50 86.50

==========

Sequence No.: 27 Autosampler Location: 22
Sample ID: K1504200-001DISS Date Collected: 5/4/2015 11:31:05 AM
Analyst: Data Type: Original

Replicate Data: K1504200-001DISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.014	-0.014	-0.000	-0.003	0.002			11:31:27	Yes
2	0.025	0.025	0.001	0.007	0.003			11:31:58	Yes
3	0.023	0.023	0.001	0.007	0.003			11:32:28	Yes
Mean:	0.011	0.011	0.000						
SD:	0.022	0.022	0.0006						
%RSD:	199.4	199.4	199.43						

==========

Sequence No.: 28 Autosampler Location: 23
Sample ID: K1504200-002DISS Date Collected: 5/4/2015 11:33:15 AM
Analyst: Data Type: Original

Replicate Data: K1504200-002DISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.012	0.012	0.000	-0.000	0.003			11:33:37	Yes
2	-0.016	-0.016	-0.000	-0.006	0.002			11:34:08	Yes
3	0.010	0.010	0.000	0.002	0.002			11:34:39	Yes
Mean:	0.002	0.002	0.000						
SD:	0.016	0.016	0.0004						
%RSD:	919.6	919.6	919.58						

==========

Sequence No.: 29 Autosampler Location: 24
Sample ID: K1504200-003DISS Date Collected: 5/4/2015 11:35:25 AM
Analyst: Data Type: Original

Replicate Data: K1504200-003DISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.024	0.024	0.001	0.002	0.003			11:35:48	Yes
2	0.022	0.022	0.001	0.009	0.003			11:36:18	Yes
3	0.008	0.008	0.000	0.006	0.002			11:36:49	Yes
Mean:	0.018	0.018	0.000						
SD:	0.009	0.009	0.0002						
%RSD:	49.83	49.83	49.83						

==========

Sequence No.: 30 Autosampler Location: 25
Sample ID: K1504200-004DISS Date Collected: 5/4/2015 11:37:36 AM
Analyst: Data Type: Original

Replicate Data: K1504200-004DISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.037	0.037	0.001	0.012	0.003			11:37:59	Yes
2	-0.028	-0.028	-0.001	-0.002	0.001			11:38:30	Yes
3	0.005	0.005	0.000	0.003	0.002			11:39:00	Yes
Mean:	0.005	0.005	0.000						
SD:	0.033	0.033	0.0009						
%RSD:	698.1	698.1	698.11						

==========

Sequence No.: 31
Sample ID: K1504200-005DISS
Analyst:
Autosampler Location: 26
Date Collected: 5/4/2015 11:39:47 AM
Data Type: Original

Replicate Data: K1504200-005DISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.017	0.017	0.000	-0.003	0.003			11:40:10	Yes
2	-0.025	-0.025	-0.001	-0.003	0.001			11:40:41	Yes
3	-0.008	-0.008	-0.000	-0.002	0.002			11:41:11	Yes
Mean:	-0.006	-0.006	-0.000						
SD:	0.021	0.021	0.0006						
%RSD:	386.0	386.0	386.04						

Sequence No.: 32
Sample ID: K1504200-006DISS
Analyst:
Autosampler Location: 27
Date Collected: 5/4/2015 11:41:59 AM
Data Type: Original

Replicate Data: K1504200-006DISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.026	-0.026	-0.001	-0.001	0.001			11:42:22	Yes
2	-0.026	-0.026	-0.001	0.002	0.001			11:42:52	Yes
3	0.032	0.032	0.001	0.009	0.003			11:43:23	Yes
Mean:	-0.007	-0.007	-0.000						
SD:	0.033	0.033	0.0009						
%RSD:	496.8	496.8	496.80						

Sequence No.: 33
Sample ID: K1504200-006DDISS
Analyst:
Autosampler Location: 28
Date Collected: 5/4/2015 11:44:11 AM
Data Type: Original

Replicate Data: K1504200-006DDISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.016	0.016	0.000	0.011	0.003			11:44:34	Yes
2	0.023	0.023	0.001	0.008	0.003			11:45:05	Yes
3	-0.002	-0.002	-0.000	0.011	0.002			11:45:36	Yes
Mean:	0.012	0.012	0.000						
SD:	0.013	0.013	0.0004						
%RSD:	101.8	101.8	101.76						

Sequence No.: 34
Sample ID: CCV
Analyst:
Autosampler Location: 5
Date Collected: 5/4/2015 11:46:24 AM
Data Type: Original

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.026	8.026	0.223	0.888	0.225			11:46:47	Yes
2	7.995	7.995	0.222	0.875	0.224			11:47:17	Yes
3	7.918	7.918	0.220	0.880	0.222			11:47:48	Yes
Mean:	7.980	7.980	0.221						
SD:	0.056	0.056	0.0015						
%RSD:	0.699	0.699	0.70						

QC value within limits for As 193.70 Recovery = 106.40%
All analyte(s) passed QC.

Sequence No.: 35
Autosampler Location: 1

Sample ID: CCB
Analyst:
Date Collected: 5/4/2015 11:48:36 AM
Data Type: Original

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.042	0.042	0.001	0.006	0.003			11:48:57	Yes
2	0.052	0.052	0.001	0.005	0.004			11:49:28	Yes
3	0.036	0.036	0.001	0.012	0.003			11:49:58	Yes
Mean:	0.043	0.043	0.001						
SD:	0.008	0.008	0.0002						
%RSD:	18.10	18.10	18.10						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 36
Sample ID: K1504200-006SDISS
Analyst:
Autosampler Location: 29
Date Collected: 5/4/2015 11:50:44 AM
Data Type: Original

Replicate Data: K1504200-006SDISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.946	8.946	0.248	0.988	0.250			11:51:07	Yes
2	9.081	9.081	0.252	0.984	0.254			11:51:38	Yes
3	9.000	9.000	0.250	0.991	0.252			11:52:08	Yes
Mean:	9.009	9.009	0.250						
SD:	0.068	0.068	0.0019						
%RSD:	0.753	0.753	0.75						

Sequence No.: 37
Sample ID: K1504200-007DISS
Analyst:
Autosampler Location: 30
Date Collected: 5/4/2015 11:52:56 AM
Data Type: Original

Replicate Data: K1504200-007DISS

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.011	0.011	0.000	-0.020	0.002			11:53:20	Yes
2	0.073	0.073	0.002	0.008	0.004			11:53:50	Yes
3	0.021	0.021	0.001	0.007	0.003			11:54:21	Yes
Mean:	0.035	0.035	0.001						
SD:	0.033	0.033	0.0009						
%RSD:	96.28	96.28	96.28						

Sequence No.: 38
Sample ID: K1504200-006
Analyst:
Autosampler Location: 31
Date Collected: 5/4/2015 11:55:09 AM
Data Type: Original

Replicate Data: K1504200-006

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.009	0.009	0.000	0.001	0.002			11:55:33	Yes
2	0.002	0.002	0.000	0.010	0.002			11:56:04	Yes
3	-0.024	-0.024	-0.001	-0.006	0.002			11:56:35	Yes
Mean:	-0.004	-0.004	-0.000						
SD:	0.018	0.018	0.0005						
%RSD:	393.5	393.5	393.49						

Sequence No.: 39
Sample ID: K1504200-006A
Autosampler Location: 32
Date Collected: 5/4/2015 11:57:22 AM

Analyst: Data Type: Original

Replicate Data: K1504200-006A

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	5.457	5.457	0.151	0.587	0.154			11:57:43	Yes
2	5.643	5.643	0.156	0.603	0.159			11:58:14	Yes
3	5.510	5.510	0.153	0.595	0.155			11:58:44	Yes
Mean:	5.536	5.536	0.154						
SD:	0.096	0.096	0.0027						
%RSD:	1.731	1.731	1.73						

Sequence No.: 40 Autosampler Location: 33
Sample ID: K1504200-006D Date Collected: 5/4/2015 11:59:29 AM
Analyst: Data Type: Original

Replicate Data: K1504200-006D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.043	-0.043	-0.001	-0.028	0.001			11:59:50	Yes
2	0.072	0.072	0.002	0.028	0.004			12:00:21	Yes
3	0.023	0.023	0.001	0.008	0.003			12:00:52	Yes
Mean:	0.018	0.018	0.000						
SD:	0.058	0.058	0.0016						
%RSD:	327.3	327.3	327.34						

Sequence No.: 41 Autosampler Location: 34
Sample ID: K1504200-006S Date Collected: 5/4/2015 12:01:36 PM
Analyst: Data Type: Original

Replicate Data: K1504200-006S

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.673	8.673	0.241	0.961	0.243			12:01:57	Yes
2	8.711	8.711	0.242	0.967	0.244			12:02:28	Yes
3	8.903	8.903	0.247	0.980	0.249			12:02:58	Yes
Mean:	8.762	8.762	0.243						
SD:	0.123	0.123	0.0034						
%RSD:	1.403	1.403	1.40						

Sequence No.: 42 Autosampler Location: 5
Sample ID: CCV Date Collected: 5/4/2015 12:03:44 PM
Analyst: Data Type: Original

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.043	8.043	0.223	0.867	0.225			12:04:07	Yes
2	7.961	7.961	0.221	0.881	0.223			12:04:38	Yes
3	8.123	8.123	0.225	0.897	0.227			12:05:08	Yes
Mean:	8.042	8.042	0.223						
SD:	0.081	0.081	0.0023						
%RSD:	1.010	1.010	1.01						

QC value within limits for As 193.70 Recovery = 107.23%
All analyte(s) passed QC.

Sequence No.: 43 Autosampler Location: 1
Sample ID: CCB Date Collected: 5/4/2015 12:05:55 PM
Analyst: Data Type: Original

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.084	0.084	0.002	0.019	0.005			12:06:16	Yes
2	0.080	0.080	0.002	0.007	0.004			12:06:47	Yes
3	0.026	0.026	0.001	0.009	0.003			12:07:17	Yes
Mean:	0.063	0.063	0.002						
SD:	0.033	0.033	0.0009						
%RSD:	51.42	51.42	51.42						

QC value within limits for As 193.70 Recovery = Not calculated

All analyte(s) passed QC.

Sample Name: K1504200-001 Acquired: 4/28/2015 15:25:29 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3282	-.0018	.0088	.6505	.00308	.0083	.0024	.0023
#1	.3280	-.0026	.0079	.6516	.00314	.0081	.0023	.0023
#2	.3285	-.0011	.0097	.6493	.00302	.0086	.0024	.0023

Elem	Ca3158	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	36.16	.0008	.0003	.0019	.0023	.2306	.0030	.0076
#1	36.19	.0007	.0002	.0021	.0023	.2312	.0026	.0092
#2	36.13	.0008	.0004	.0016	.0024	.2300	.0033	.0060

Elem	Mg2852	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	63.68	.2026	.0011	-.0002	.0065	13.30	.0007	7.582
#1	63.64	.2022	.0012	-.0003	.0046	13.34	-.0009	7.568
#2	63.73	.2030	.0011	-.0002	.0084	13.25	.0022	7.596

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008	36.42	.39208	-.0010	.0002	.0068	.0001	.3045
#1	.000[illegible]	36.46	.39197	-.0012	.0002	.0068	.0001	.3029
#2	.00[illegible]	36.39	.39219	-.0007	.0002	.0068	.0000	.3061

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	.4530	-.0043	3.689
#1	.4503	-.0030	3.584
#2	.4558	-.0056	3.794

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	W 3964.6	W 113310.	W 6660.1
#1	3956.3	113360.	6649.3
#2	3973.0	113260.	6670.8

As not referenced to an int. std.

Sample Name: K1504200-002 Acquired: 4/28/2015 15:27:56 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3003	-.0013	.0008	.0364	.00204	.0146	.0216	.0218
#1	.3009	-.0023	-.0001	.0366	.00207	.0150	.0215	.0218
#2	.2997	-.0002	.0017	.0363	.00201	.0143	.0217	.0218

Elem	Ca3158	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	10.47	.0005	.0321	.4809	.5966	.1493	.0131	.0071
#1	10.43	.0006	.0322	.4803	.5993	.1474	.0132	.0082
#2	10.50	.0005	.0320	.4814	.5939	.1512	.0131	.0060

Elem	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.289	.5858	.0005	.0046	.0051	4.559	-.0002	7.200
#1	5.274	.5874	.0005	.0051	.0044	4.560	-.0019	7.153
#2	5.304	.5841	.0005	.0042	.0058	4.558	.0016	7.247

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004	21.24	.04984	-.0019	-.0003	.0007	.0003	7.064
#1	.0004	21.18	.04982	-.0015	-.0003	.0006	.0002	7.067
#2	.0004	21.30	.04985	-.0022	-.0003	.0007	.0003	7.061

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	>4.500	-.0001	15.22
#1	7.998	.0007	15.20
#2	8.044	-.0009	15.24

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	3165.7	91234.	5166.1
#1	3160.3	91266.	5163.1
#2	3171.1	91203.	5169.1

Sample Name: K1504200-003 Acquired: 4/28/2015 15:30:19 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al3944	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.483	-.0013	.0052	.0703	.00172	.0084	.0022	.0021
#1	4.499	.0001	.0028	.0704	.00168	.0067	.0022	.0021
#2	4.467	-.0026	.0077	.0702	.00175	.0100	.0022	.0021

Elem	Ca3933	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.121	.0003	.0051	.0029	.0041	.7006	.0043	.0095
#1	4.161	-.0001	.0051	.0027	.0037	.6998	.0043	.0080
#2	4.080	.0007	.0051	.0031	.0045	.7013	.0043	.0109

Elem	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.716	.8704	.0003	.0010	.0063	3.038	-.0011	6.330
#1	3.716	.8667	.0004	.0012	.0072	3.002	-.0015	6.361
#2	3.716	.8740	.0003	.0007	.0053	3.073	-.0007	6.300

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.0002	11.59	.02000	-.0034	.0002	.0282	.0011	.1592
#1	-.0002	11.67	.01992	-.0027	.0006	.0280	.0011	.1591
#2	-.0002	11.52	.02007	-.0042	-.0001	.0284	.0010	.1593

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	.1744	-.0014	9.771
#1	.1741	.0003	9.777
#2	.1747	-.0030	9.766

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	2970.4	85732.	4871.6
#1	2971.3	85773.	4879.1
#2	2969.5	85691.	4864.2

Sample Name: K1504200-004 Acquired: 4/28/2015 15:32:42 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Al3944	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.201	2.550	-.0007	-.0001	.0951	.00208	.0073	.0026
#1	2.197	2.562	-.0007	-.0002	.0949	.00210	.0066	.0027
#2	2.204	2.538	-.0006	.0001	.0953	.00207	.0080	.0026

Elem	Cd2265	Ca3933	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0026	4.696	.0003	.0035	.0961	.1062	.4673	.0363
#1	.0027	4.621	.0003	.0035	.0958	.1065	.4674	.0362
#2	.0026	4.771	.0002	.0035	.0964	.1059	.4671	.0364

Elem	Li6707	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0075	5.137	.3997	.0003	.0005	.0063	4.448	.0000
#1	.0062	5.134	.3983	.0001	.0005	.0062	4.468	.0004
#2	.0088	5.139	.4012	.0005	.0005	.0064	4.429	-.0003

Elem	Si2516	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	11.89	.0004	16.07	.05676	-.0027	-.0002	.0140	.0006
#1	11.91	.0006	16.14	.05656	-.0014	-.0002	.0141	.0006
#2	11.87	.0002	16.00	.05695	-.0039	-.0002	.0139	.0005

Elem	Zn2062	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm	ppm
Avg	.7404	.7634	-.0013	9.602
#1	.7402	.7632	-.0022	9.612
#2	.7406	.7636	-.0003	9.593

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	2822.3	81683.	4594.2
#1	2823.1	81971.	4613.2
#2	2821.5	81396.	4575.3

Sample Name: K1504200-005 Acquired: 4/28/2015 15:35:06 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2949	-.0009	.0036	.0355	.00196	.0134	.0214	.0216
#1	.2954	-.0012	.0060	.0357	.00194	.0134	.0214	.0216
#2	.2945	-.0006	.0012	.0352	.00198	.0134	.0214	.0216

Elem	Ca3158	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	10.36	.0005	.0313	.4763	.5871	.1322	.0124	.0047
#1	10.37	.0001	.0312	.4762	.5885	.1297	.0112	.0039
#2	10.35	.0009	.0314	.4764	.5857	.1348	.0136	.0054

Elem	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.236	.5718	.0003	.0049	.0053	4.407	.0021	7.179
#1	5.257	.5729	.0003	.0046	.0052	4.447	.0023	7.208
#2	5.216	.5707	.0002	.0052	.0054	4.367	.0018	7.151

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001	20.11	.04959	-.0020	-.0001	.0005	.0004	6.968
#1	-.0001	20.18	.04964	-.0016	-.0004	.0006	.0007	6.977
#2	.0004	20.05	.04953	-.0025	.0003	.0005	.0001	6.959

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	>4.500	-.0013	14.87
#1	7.893	-.0005	14.88
#2	7.876	-.0021	14.85

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	3162.8	91098.	5127.9
#1	3163.1	90937.	5109.4
#2	3162.5	91259.	5146.4

Sample Name: K1504200-006 Acquired: 4/28/2015 15:57:52 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8435	-.0029	.0337	.0262	.00108	.0072	.0011	.0011
#1	.8440	-.0031	.0347	.0263	.00110	.0076	.0011	.0010
#2	.8429	-.0027	.0326	.0261	.00106	.0068	.0012	.0011

Elem	Ca3158	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	16.71	.0004	.0136	.0008	-.0009	.0993	.0068	.0042
#1	16.67	.0005	.0136	.0006	-.0008	.0990	.0067	.0041
#2	16.75	.0002	.0135	.0010	-.0010	.0996	.0069	.0044

Elem	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.756	.8647	.0004	-.0001	.0043	10.90	.0015	5.832
#1	1.758	.8639	.0005	-.0003	.0042	10.96	.0030	5.855
#2	1.755	.8655	.0003	.0000	.0043	10.84	.0000	5.810

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.0005	6.886	.04198	-.0023	.0001	-.0004	.0007	.3099
#1	-.0006	6.927	.04189	-.0024	.0004	-.0004	.0008	.3108
#2	-.0004	6.845	.04207	-.0022	-.0002	-.0004	.0006	.3090

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	.4822	-.0045	31.38
#1	.4824	-.0037	31.41
#2	.4819	-.0053	31.35

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	W 4226.3	W 121850.	W 6937.8
#1	4221.3	121510.	6957.7
#2	4231.2	122180.	6917.8

Sample Name: K1504200-006D Acquired: 4/28/2015 16:00:16 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8520	-.0006	.0337	.0264	.00107	.0061	.0012	.0011
#1	.8513	-.0016	.0328	.0266	.00111	.0058	.0012	.0011
#2	.8527	.0004	.0347	.0263	.00104	.0063	.0012	.0011

Elem	Ca3158	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	16.88	.0003	.0137	.0005	-.0006	.1052	.0062	.0048
#1	16.94	.0003	.0139	.0006	.0002	.1044	.0064	.0043
#2	16.82	.0004	.0136	.0004	-.0015	.1060	.0060	.0054

Elem	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.783	.8723	.0005	-.0001	.0032	11.11	.0023	5.978
#1	1.788	.8696	.0005	-.0002	.0032	11.03	.0014	5.939
#2	1.779	.8750	.0005	.0000	.0031	11.19	.0033	6.017

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.0010	6.939	.04229	-.0020	.0005	-.0003	.0003	.3121
#1	-.0012	6.927	.04237	-.0020	.0005	-.0002	.0005	.3126
#2	-.0007	6.950	.04221	-.0021	.0006	-.0004	.0001	.3117

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	.4911	-.0052	31.96
#1	.4903	-.0052	31.91
#2	.4918	-.0053	32.01

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	W 4253.4	W 123490.	W 6980.6
#1	4243.0	123220.	6949.6
#2	4263.9	123760.	7011.7

Sample Name: K1504200-006S Acquired: 4/28/2015 16:02:40 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8561	-.0017	.0479	.0266	.00113	.0071	.0111	.0111
#1	.8551	-.0027	.0476	.0267	.00113	.0068	.0110	.0111
#2	.8572	-.0006	.0482	.0265	.00112	.0074	.0111	.0111

Elem	Ca3158	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	16.89	.0007	.0137	.0104	.0152	.1099	.0153	.0039
#1	16.85	.0005	.0137	.0102	.0152	.1090	.0154	.0036
#2	16.94	.0008	.0137	.0106	.0151	.1107	.0152	.0041

Elem	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.780	.8746	.0003	-.0004	.0027	11.17	.0144	5.911
#1	1.782	.8736	.0003	-.0004	.0019	11.26	.0143	5.933
#2	1.778	.8755	.0004	-.0005	.0034	11.08	.0145	5.890

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.0007	6.982	.04231	.0075	.0000	-.0002	.0005	.3122
#1	-.0009	7.015	.04233	.0077	.0004	.0000	.0005	.3122
#2	-.0006	6.949	.04228	.0072	-.0004	-.0004	.0006	.3122

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	.4933	-.0061	31.97
#1	.4935	-.0069	32.00
#2	.4931	-.0054	31.95

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	W 4271.9	W 123630.	W 6974.9
#1	4275.5	123980.	6996.9
#2	4268.3	123280.	6952.8

Sample Name: K1504200-007 Acquired: 4/28/2015 16:05:03 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Al3944	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5809	3.908	-.0025	.1310	.0044	.00673	.2301	.0006
#1	.5813	3.900	-.0027	.1316	.0043	.00677	.2282	.0006
#2	.5805	3.917	-.0023	.1304	.0044	.00669	.2320	.0006

Elem	Cd2265	Ca3158	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0006	8.998	.0005	.0014	.0011	-.0022	.1081	.0063
#1	.0005	9.000	.0006	.0014	.0010	-.0021	.1083	.0063
#2	.0006	8.997	.0004	.0014	.0011	-.0024	.1080	.0062

Elem	Li6707	Mg2795	Mg2852	Mn2576	Mo2020	Ni2216	P_1782	K_7664
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0104	3.959	26.30	.7524	.0002	-.0047	.0026	54.52
#1	.0090	3.961	26.28	.7539	.0002	-.0047	.0025	54.56
#2	.0119	3.956	26.32	.7510	.0002	-.0047	.0027	54.48

Elem	Se1960	Si2516	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0048	12.27	-.0010	45.92	.03074	-.0010	.0000	.0014
#1	.0038	12.27	-.0006	45.94	.03065	-.0010	-.0001	.0014
#2	.0058	12.28	-.0013	45.90	.03083	-.0010	.0001	.0014

Elem	V_2924	Zn2062	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm	ppm	ppm
Avg	.0000	.1111	.6461	-.0077	86.42
#1	-.0001	.1110	.6451	-.0078	86.30
#2	.0000	.1112	.6470	-.0077	86.54

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	W 15549.	W 443900.	W 26162.
#1	15525.	444470.	26127.
#2	15572.	443340.	26196.

Sample Name: K1504200-008 Acquired: 4/28/2015 16:07:40 Type: Unk
Method: 2015A-ICP03(v91) Mode: CONC Corr. Factor: 1.000000
User: admin Dilution: 1 Test Type: Sample Type:
Comment: EM 042815A SCREEN

Elem	Al1670	Sb2068	As1890	Ba4554	Be2348	B_2496	Cd2144	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0070	.0012	.0000	.0001	-.00004	.0049	-.0001	-.0002
#1	.0070	.0012	.0010	.0000	.00001	.0038	-.0001	-.0002
#2	.0070	.0012	-.0010	.0001	-.00008	.0059	-.0001	-.0002

Elem	Ca3933	Cr2677	Co2307	Cu2247	Cu3273	Fe2599	Pb2203	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0238	.0006	.0001	.0005	.0006	.0047	.0005	-.0003
#1	.0244	.0007	.0002	.0005	.0000	.0045	.0002	-.0012
#2	.0233	.0005	.0001	.0006	.0013	.0049	.0008	.0005

Elem	Mg2795	Mn2576	Mo2020	Ni2216	P_1782	K_7664	Se1960	Si2516
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0063	.0003	.0002	-.0004	.0021	.0365	-.0002	.0330
#1	.0065	.0003	.0004	-.0002	.0024	.0636	-.0023	.0283
#2	.0062	.0003	.0001	-.0005	.0018	.0094	.0019	.0378

Elem	Ag3280	Na5895	Sr4077	Tl1908	Sn1899	Ti3361	V_2924	Zn2062
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002	.4736	.00011	-.0011	.1361	-.0002	-.0001	.0019
#1	-.0003	.4778	.00006	-.0018	.1367	.0000	-.0004	.0020
#2	.0007	.4693	.00016	-.0004	.1354	-.0003	.0002	.0018

Elem	Zn2138	Bi2230	S_1820
Units	ppm	ppm	ppm
Avg	.0022	-.0016	.0857
#1	.0022	-.0010	.0895
#2	.0022	-.0022	.0818

Int. Std.	Y_2243	Y_3600	Y_3600-2
Units	Cts/S	Cts/S	Cts/S
Avg	2789.0	81410.	4487.4
#1	2788.6	81656.	4484.6
#2	2789.4	81165.	4490.1

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

490-77045 Chain of Custody

Cooler Received/Opened On 4/22/2015 @ 0830

1. Tracking # 6847 (last 4 digits, FedEx)

Courier: Fed-ex IR Gun ID 17960357

2. Temperature of rep. sample or temp blank when opened: 2.7 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 1 Front / 1 Back

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) _____

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence #_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) MDM

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) MDM

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) MDM

I certify that I attached a label with the unique LIMS number to each container (intial) MDM

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment

Loc: 490
77045

5/13/2015

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Nashville Division
2960 Foster Creighton
Nashville, TN 37204
Phone: 615-726-0177
Toll Free: 800-765-0980
Fax: 615-726-3404

ExxonMobil

Consultant Name: ARCADIS Cary - Exxon (10141)
Address: 801 Corporate Center Dr, Suite 300
City/State/Zip: Raleigh, NC 27607
ExxonMobil Project Mgr:
Consultant Project Mgr: Matt Pelton
Consultant Telephone Number: 919-469-1952 Fax No.: 919-469-5676
Sampler Name: (Print) Brian Lovgren
Sampler Signature:

TA Account #: 49001238 PO: B0085732.1401
Invoice To: Arcadis
Report To: Matt Pelton
Project Name: VCC Winston Salem
Retail # (MRN #):
Major Project (AFE#):
Site Address 3000 N. Liberty Street
City, State, Zip Winston-Salem, NC
Regulatory District (CA)

	Sample ID or Field ID	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Methanol	Sodium Bisulfate	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass (Yellow Label)	HNO_3 (Red Label)	None (Black Label)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: 6010 Dissolved As, Pb	6010 Total As, Pb	6010 TAL Metals	6010 TCLP Metals	pH	RUSH TAT (Pre-Schedule) *	TAT request (in Bus. Days)	Fax Results (yes or no)	Due Date of Report
1	WS-MW-07	4-20-15	1310	2	X									2		X						1	1							
2	WS-MW-2R	4-20-15	1435	2	X									2		X						1	1							
3	WS-MW-05	4-20-15	1630	2	X									2		X						1	1							
4	WS-MW-06	4-20-15	1740	2	X									2		X						1	1							
5	WS-QAQC-DUP-01	4-20-15	N/R	2	X									2		X						1	1							
6	WS-MW-09	4-21-15	0850	2	X									2		X						1	1							
1	WS-MW-09 (MS)	4-21-15	0850	2	X									2		X						1	1							
1	WS-MW-09 (MSD)	4-21-15	0850	2	X									2		X						1	1							
7	WS-MW-08	4-21-15	1050	2	X									2		X						1	1							
8	WS-QAQC-FB-01	4-21-15	1120	1	X									1		X							1							

Comments/Special Instructions:

Laboratory Comments:
Temperature Upon Receipt: 2.7c
Sample Containers Intact? Y N
VOCs Free of Headspace? Y N
QC Deliverables (please circle one)
Level 2 Level 3 Level 4 Other

Relinquished by:	Date	Time	Received by:	Date	Time
Brian Lovgren	4-21-15	1700	FedEx	4-21-15	1700
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time
			TAN	4-22-15	0830

* It will be the responsibility of ExxonMobil or its consultant to notify the TestAmerica Project Manager by phone or fax that a rush sample will be submitted.
TA Project Manager:_____ Date:_____

Wagner, Heather

From: Roddy, Jackie [Jacqueline.Roddy@arcadis-us.com]
Sent: Wednesday, April 22, 2015 9:02 AM
To: Wagner, Heather
Cc: Hagemeister, Anna
Subject: Winston-Salem Chain of Custody
Follow Up Flag: Follow up
Flag Status: Red
Attachments: Winston_COC.pdf

Heather,

I received the attached COCs from Brian and noticed that he indicated analysis for Arsenic/Lead using 6010. As noted on our work authorization, we actually want the analysis to be done using Method 6020. As previously discussed, samples will also need to be sent to ALS for analysis of dissolved/total arsenic using Method 7062. Please confirm that you can make the paperwork adjustment on your end to ensure analysis by Method 6020 and not 6010.

Thanks,

Jacqueline Roddy, P.E. (NC) | Staff Environmental Engineer | Jacqueline.Roddy@arcadis-us.com
ARCADIS U.S., Inc. | 801 Corporate Center Drive, Suite 300 | Raleigh, North Carolina 27607-5073
T: 919 415 2288
www.arcadis-us.com
Professional Registration / PE-NC, 37489

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 490-77045-1

Login Number: 77045
List Number: 1
Creator: McBride, Mike

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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	2.7
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-77045-2
Client Project/Site: VCC Winston Salem

For:
ARCADIS U.S., Inc.
801 Corporate Center Drive
Suite 300
Raleigh, North Carolina 27607-5073

Attn: Matt Pelton

Authorized for release by:
7/20/2015 4:51:52 PM

Heather Wagner, Project Manager I
(615)301-5763
heather.wagner@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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.

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Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-77045-6	WS-MW-09	Ground Water	04/21/15 08:50	04/22/15 08:30
490-77045-7	WS-MW-08	Ground Water	04/21/15 10:50	04/22/15 08:30

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Job ID: 490-77045-2

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-77045-2

Comments
No additional comments.

Receipt
The samples were received on 4/22/2015 8:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.7º C.

Metals
Method 6020: The samples in this report were run by a modified 6020 method that corrected for rare earth element interference in arsenic recovery. The lab analyzed the single rare earth elements Neodymium and Samarium to determine the positive interferences on Arsenic. An equation was derived to calculate the correction which would offset the interference of these rare earth elements. The individual rare earth analytes were added to the interference check sample A (ICSA) at a concentration greater than what was expected in the samples (500ppb) to verify the equation was sufficient. The instrument was then calibrated for all analytes of interest including the rare earth elements. The client samples were then analyzed using this calibration and the derived equation.

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

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

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Client Sample ID: WS-MW-09

Date Collected: 04/21/15 08:50
Date Received: 04/22/15 08:30

Lab Sample ID: 490-77045-6

Matrix: Ground Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00254		0.00200	0.000500	mg/L		07/07/15 11:51	07/13/15 19:26	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00191	J	0.00200	0.000500	mg/L		07/09/15 09:27	07/13/15 18:30	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Client Sample ID: WS-MW-08

Date Collected: 04/21/15 10:50
Date Received: 04/22/15 08:30

Lab Sample ID: 490-77045-7

Matrix: Ground Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00755		0.00200	0.000500	mg/L		07/07/15 11:51	07/13/15 19:00	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00583		0.00200	0.000500	mg/L		07/09/15 09:27	07/13/15 18:04	1

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 490-262480/1-A
Matrix: Water
Analysis Batch: 264701

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 262480

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		07/07/15 11:51	07/13/15 18:50	1

Lab Sample ID: LCS 490-262480/2-A
Matrix: Water
Analysis Batch: 264701

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 262480

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.1087		mg/L		109	80 - 120

Lab Sample ID: 490-77045-7 MS
Matrix: Ground Water
Analysis Batch: 264701

Client Sample ID: WS-MW-08
Prep Type: Total/NA
Prep Batch: 262480

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.00755		0.100	0.1154		mg/L		108	75 - 125

Lab Sample ID: 490-77045-7 MSD
Matrix: Ground Water
Analysis Batch: 264701

Client Sample ID: WS-MW-08
Prep Type: Total/NA
Prep Batch: 262480

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00755		0.100	0.1184		mg/L		111	75 - 125	3	20

Lab Sample ID: MB 490-263121/1-A
Matrix: Water
Analysis Batch: 264701

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 263121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		07/09/15 09:27	07/13/15 17:54	1

Lab Sample ID: LCS 490-263121/2-A
Matrix: Water
Analysis Batch: 264701

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 263121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.1128		mg/L		113	80 - 120

Lab Sample ID: 490-77045-7 MS
Matrix: Ground Water
Analysis Batch: 264701

Client Sample ID: WS-MW-08
Prep Type: Dissolved
Prep Batch: 263121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.00583		0.100	0.1161		mg/L		110	75 - 125

Lab Sample ID: 490-77045-7 MSD
Matrix: Ground Water
Analysis Batch: 264701

Client Sample ID: WS-MW-08
Prep Type: Dissolved
Prep Batch: 263121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00583		0.100	0.1171		mg/L		111	75 - 125	1	20

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Metals

Prep Batch: 262480

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-6	WS-MW-09	Total/NA	Ground Water	3010A	
490-77045-7	WS-MW-08	Total/NA	Ground Water	3010A	
490-77045-7 MS	WS-MW-08	Total/NA	Ground Water	3010A	
490-77045-7 MSD	WS-MW-08	Total/NA	Ground Water	3010A	
LCS 490-262480/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 490-262480/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 263121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-6	WS-MW-09	Dissolved	Ground Water	3005A	
490-77045-7	WS-MW-08	Dissolved	Ground Water	3005A	
490-77045-7 MS	WS-MW-08	Dissolved	Ground Water	3005A	
490-77045-7 MSD	WS-MW-08	Dissolved	Ground Water	3005A	
LCS 490-263121/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-263121/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 264701

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-77045-6	WS-MW-09	Dissolved	Ground Water	6020	263121
490-77045-6	WS-MW-09	Total/NA	Ground Water	6020	262480
490-77045-7	WS-MW-08	Dissolved	Ground Water	6020	263121
490-77045-7	WS-MW-08	Total/NA	Ground Water	6020	262480
490-77045-7 MS	WS-MW-08	Dissolved	Ground Water	6020	263121
490-77045-7 MS	WS-MW-08	Total/NA	Ground Water	6020	262480
490-77045-7 MSD	WS-MW-08	Dissolved	Ground Water	6020	263121
490-77045-7 MSD	WS-MW-08	Total/NA	Ground Water	6020	262480
LCS 490-262480/2-A	Lab Control Sample	Total/NA	Water	6020	262480
LCS 490-263121/2-A	Lab Control Sample	Total Recoverable	Water	6020	263121
MB 490-262480/1-A	Method Blank	Total/NA	Water	6020	262480
MB 490-263121/1-A	Method Blank	Total Recoverable	Water	6020	263121

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Client Sample ID: WS-MW-09

Lab Sample ID: 490-77045-6

Date Collected: 04/21/15 08:50
Matrix: Ground Water
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			263121	07/09/15 09:27	ZLN	TAL NSH
Dissolved	Analysis	6020		1	264701	07/13/15 18:30	CME	TAL NSH
Total/NA	Prep	3010A			262480	07/07/15 11:51	ZLN	TAL NSH
Total/NA	Analysis	6020		1	264701	07/13/15 19:26	CME	TAL NSH

Client Sample ID: WS-MW-08

Lab Sample ID: 490-77045-7

Date Collected: 04/21/15 10:50
Matrix: Ground Water
Date Received: 04/22/15 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			263121	07/09/15 09:27	ZLN	TAL NSH
Dissolved	Analysis	6020		1	264701	07/13/15 18:04	CME	TAL NSH
Total/NA	Prep	3010A			262480	07/07/15 11:51	ZLN	TAL NSH
Total/NA	Analysis	6020		1	264701	07/13/15 19:00	CME	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL NSH

Protocol References:

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

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	10-31-15 *
Arizona	State Program	9	AZ0473	05-05-16
Arkansas DEQ	State Program	6	88-0737	04-25-16
California	State Program	9	2938	10-31-16
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-16
Georgia	State Program	4	N/A	06-30-16
Illinois	NELAP	5	200010	12-09-15
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	10-31-15
Kentucky (UST)	State Program	4	19	06-30-16
Kentucky (WW)	State Program	4	90038	12-31-15
Louisiana	NELAP	6	30613	06-30-16
Maryland	State Program	3	316	03-31-16
Massachusetts	State Program	1	M-TN032	06-30-16
Minnesota	NELAP	5	047-999-345	12-31-15
Mississippi	State Program	4	N/A	06-30-16
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-15
New Hampshire	NELAP	1	2963	10-09-15
New Jersey	NELAP	2	TN965	09-30-15
New York	NELAP	2	11342	03-31-16
North Carolina (WW/SW)	State Program	4	387	12-31-15
North Dakota	State Program	8	R-146	06-30-15 *
Ohio VAP	State Program	5	CL0033	07-10-17
Oklahoma	State Program	6	9412	08-31-15
Oregon	NELAP	10	TN200001	04-27-16
Pennsylvania	NELAP	3	68-00585	06-30-16
Rhode Island	State Program	1	LAO00268	12-30-15
South Carolina	State Program	4	84009 (001)	02-28-16
South Carolina (DW)	State Program	4	84009 (002)	12-16-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-15
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-15 *
Virginia	NELAP	3	460152	06-14-16
Washington	State Program	10	C789	07-19-15 *
West Virginia DEP	State Program	3	219	02-28-16
Wisconsin	State Program	5	998020430	08-31-15
Wyoming (UST)	A2LA	8	453.07	12-31-15

* Certification renewal pending - certification considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM

490-77045 Chain of Custody

Cooler Received/Opened On 4/22/2015 @ 0830

1. Tracking # 6847 (last 4 digits, FedEx)

Courier: Fed-ex IR Gun ID 17960357

2. Temperature of rep. sample or temp blank when opened: 2.7 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 1 Front / 1 Back

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) _____

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence #_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) MDM

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) MDM

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) MDM

I certify that I attached a label with the unique LIMS number to each container (intial) MDM

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment

Loc: 490
77045

7/20/2015

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Nashville Division
2960 Foster Creighton
Nashville, TN 37204
Phone: 615-726-0177
Toll Free: 800-765-0980
Fax: 615-726-3404

ExxonMobil

Consultant Name: ARCADIS Cary - Exxon (10141)
Address: 801 Corporate Center Dr, Suite 300
City/State/Zip: Raleigh, NC 27607
ExxonMobil Project Mgr:
Consultant Project Mgr: Matt Pelton
Consultant Telephone Number: 919-469-1952 Fax No.: 919-469-5676
Sampler Name: (Print) Brian Lougran
Sampler Signature: [signature]

TA Account #: 49001238 PO: B0085732.1401
Invoice To: Arcadis
Report To: Matt Pelton
Project Name: VCC Winston Salem
Retail # (MRN #):
Major Project (AFE#):
Site Address 3000 N. Liberty Street
City, State, Zip Winston-Salem, NC
Regulatory District (CA)

	Sample ID or Field ID	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Methanol	Sodium Bisulfate	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass (Yellow Label)	HNO_3 (Red Label)	None (Black Label)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: 6010 Dissolved As, Pb	6010 Total As, Pb	6010 TAL Metals	6010 TCLP Metals	pH	RUSH TAT (Pre-Schedule) *	TAT request (in Bus. Days)	Fax Results (yes or no)	Due Date of Report
1	WS-MW-07	4-20-15	1310	2	X									2		X						1	1							
2	WS-MW-2R	4-20-15	1435	2	X									2		X						1	1							
3	WS-MW-05	4-20-15	1630	2	X									2		X						1	1							
4	WS-MW-06	4-20-15	1740	2	X									2		X						1	1							
5	WS-QAQC-DUP-01	4-20-15	N/R	2	X									2		X						1	1							
6	WS-MW-09	4-21-15	0850	2	X									2		X						1	1							
1	WS-MW-09 (MS)	4-21-15	0850	2	X									2		X						1	1							
1	WS-MW-09 (MSD)	4-21-15	0850	2	X									2		X						1	1							
7	WS-MW-08	4-21-15	1050	2	X									2		X						1	1							
8	WS-QAQC-FB-01	4-21-15	1120	1	X									1		X							1							

Comments/Special Instructions:

Laboratory Comments:
Temperature Upon Receipt: 2.7c
Sample Containers Intact? Y N
VOCs Free of Headspace? Y N
QC Deliverables (please circle one)
Level 2 Level 3 Level 4 Other

Relinquished by:	Date	Time	Received by:	Date	Time
Brian Lougran	4-21-15	1700	FedEx	4-21-15	1700
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time
			[signature] TAN	4-22-15	0830

* It will be the responsibility of ExxonMobil or its consultant to notify the TestAmerica Project Manager by phone or fax that a rush sample will be submitted.
TA Project Manager:_____ Date:_____

Wagner, Heather

From:	Roddy, Jackie [Jacqueline.Roddy@arcadis-us.com]
Sent:	Wednesday, April 22, 2015 9:02 AM
To:	Wagner, Heather
Cc:	Hagemeister, Anna
Subject:	Winston-Salem Chain of Custody
Follow Up Flag:	Follow up
Flag Status:	Red
Attachments:	Winston_COC.pdf

Heather,

I received the attached COCs from Brian and noticed that he indicated analysis for Arsenic/Lead using 6010. As noted on our work authorization, we actually want the analysis to be done using Method 6020. As previously discussed, samples will also need to be sent to ALS for analysis of dissolved/total arsenic using Method 7062. Please confirm that you can make the paperwork adjustment on your end to ensure analysis by Method 6020 and not 6010.

Thanks,

Jacqueline Roddy, P.E. (NC) | Staff Environmental Engineer | Jacqueline.Roddy@arcadis-us.com
ARCADIS U.S., Inc. | 801 Corporate Center Drive, Suite 300 | Raleigh, North Carolina 27607-5073
T: 919 415 2288
www.arcadis-us.com
Professional Registration / PE-NC, 37489

Wagner, Heather

From: Roddy, Jackie [Jacqueline.Roddy@arcadis-us.com]
Sent: Tuesday, July 07, 2015 11:44 AM
To: Wagner, Heather
Subject: RE: Request 6020 analysis with rare earth correction for arsenic

Yes, total and dissolved arsenic using the corrected 6020 method.

Jacqueline Roddy, P.E. (NC) | Staff Environmental Engineer | Jacqueline.Roddy@arcadis-us.com
ARCADIS U.S., Inc. | 801 Corporate Center Drive, Suite 300 | Raleigh, North Carolina 27607-5073
T: 919 415 2288
www.arcadis-us.com
Professional Registration / PE-NC, 37489

From: Wagner, Heather [mailto:Heather.Wagner@testamericainc.com]
Sent: Tuesday, July 07, 2015 12:43 PM
To: Roddy, Jackie
Subject: RE: Request 6020 analysis with rare earth correction for arsenic

Jackie,

Do you want us to run these samples for total and dissolved 6020?

HEATHER WAGNER
TestAmerica-Nashville
Tel 615.301.5763

From: Roddy, Jackie [mailto:Jacqueline.Roddy@arcadis-us.com]
Sent: Monday, July 06, 2015 7:22 AM
To: Wagner, Heather; Gillow, Jeff
Subject: RE: Request 6020 analysis with rare earth correction for arsenic

Heather,

Sorry for the delay in my response. We only want samples WS-MW-08 and WS-MW-09 analyzed.

Thanks,

Jacqueline Roddy, P.E. (NC) | Staff Environmental Engineer | Jacqueline.Roddy@arcadis-us.com
ARCADIS U.S., Inc. | 801 Corporate Center Drive, Suite 300 | Raleigh, North Carolina 27607-5073
T: 919 415 2288
www.arcadis-us.com
Professional Registration / PE-NC, 37489

From: Wagner, Heather [mailto:Heather.Wagner@testamericainc.com]
Sent: Thursday, July 02, 2015 10:11 AM
To: Gillow, Jeff
Cc: Roddy, Jackie
Subject: RE: Request 6020 analysis with rare earth correction for arsenic

Jackie,

Please let me know if you would like us to analyze all samples from SDG 490-77045 or only select samples.

Thanks,

HEATHER WAGNER
TestAmerica-Nashville
Tel 615.301.5763

From: Gillow, Jeff [mailto:Jeff.Gillow@arcadis-us.com]
Sent: Wednesday, July 01, 2015 2:27 PM
To: Burrows, Richard
Cc: Wagner, Heather; Roddy, Jackie
Subject: Request 6020 analysis with rare earth correction for arsenic

Hello Richard,

I'm working on a project where we are concerned about rare earth elements possibly interfering with the accurate quantification of arsenic in groundwater by method 6020. Just as you had in the past, we'll need you to direct the lab to run the protocol that corrects for the neodymium and samarium interference.

Heather has been working with Jackie Roddy at ARCADIS to get these samples in the cue.

Thanks,
Jeff

Jeff Gillow, Ph.D. | Associate Vice President, Technical Expert -Geochemistry | jeff.gillow@arcadis-us.com

ARCADIS U.S., Inc. | 630 Plaza Drive | Highlands Ranch, CO 80129
T: 303 471 3446 | M: 303 330 6866

ARCADIS, Imagine the result

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Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 490-77045-2

Login Number: 77045
List Number: 1
Creator: McBride, Mike

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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	2.7
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ATTACHMENT 8

Groundwater Laboratory Analytical Report – October 2015

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-90074-2
Client Project/Site: VCC Winston Salem

For:
ARCADIS U.S., Inc.
801 Corporate Center Drive
Suite 300
Raleigh, North Carolina 27607-5073

Attn: Matt Pelton

Authorized for release by:
11/16/2015 10:22:42 AM

Heather Wagner, Project Manager I
(615)301-5763
heather.wagner@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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.

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Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-90074-1	WS-MW-07	Water	10/19/15 10:45	10/21/15 09:30
490-90074-2	WS-MW-2R	Water	10/19/15 12:40	10/21/15 09:30
490-90074-3	WS-MW-05	Water	10/19/15 14:15	10/21/15 09:30
490-90074-4	WS-MW-06	Water	10/19/15 16:00	10/21/15 09:30
490-90074-5	WS-QAQC-DUP-01	Water	10/19/15 01:00	10/21/15 09:30
490-90074-6	WS-MW-09	Water	10/20/15 09:25	10/21/15 09:30
490-90074-7	WS-MW-08	Water	10/20/15 11:15	10/21/15 09:30
490-90074-8	WS-QAQC-EB-01	Water	10/20/15 11:45	10/21/15 09:30

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Job ID: 490-90074-2

Laboratory: TestAmerica Nashville

Narrative

Add REE comment

Job Narrative
490-90074-2

Comments
No additional comments.

Receipt
The samples were received on 10/21/2015 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4º C.

Metals
Method 6020: The samples in this report were run by a modified 6020 method that corrected for rare earth element interference in arsenic recovery. The lab analyzed the single rare earth elements Neodymium and Samarium to determine the positive interferences on Arsenic. An equation was derived to calculate the correction which would offset the interference of these rare earth elements. The individual rare earth analytes were added to the interference check sample A (ICSA) at a concentration greater than what was expected in the samples (500ppb) to verify the equation was sufficient. The instrument was then calibrated for all analytes of interest including the rare earth elements. The client samples were then analyzed using this calibration and the derived equation.

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

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

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-07

Lab Sample ID: 490-90074-1

Date Collected: 10/19/15 10:45
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00185	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 13:24	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00149	J	0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:03	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-2R

Lab Sample ID: 490-90074-2

Date Collected: 10/19/15 12:40
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000880	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:43	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000859	J	0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:09	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-05

Lab Sample ID: 490-90074-3

Date Collected: 10/19/15 14:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00157	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 12:58	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00106	J	0.00200	0.000500	mg/L		10/27/15 10:10	11/13/15 17:11	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-06

Lab Sample ID: 490-90074-4

Date Collected: 10/19/15 16:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.000533**	**J**	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:48	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:14	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-QAQC-DUP-01

Lab Sample ID: 490-90074-5

Date Collected: 10/19/15 01:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000983	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:53	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000929	J	0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:29	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-09

Lab Sample ID: 490-90074-6

Date Collected: 10/20/15 09:25
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00425		0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:58	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00370		0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:35	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-08

Lab Sample ID: 490-90074-7

Date Collected: 10/20/15 11:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00813		0.00400	0.00100	mg/L		10/24/15 14:06	11/13/15 17:42	2

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00557		0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:40	1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 490-292685/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 298372 — **Prep Batch: 292685**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 12:48	1

Lab Sample ID: LCS 490-292685/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 298372 — **Prep Batch: 292685**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.1005		mg/L		101	80 - 120

Lab Sample ID: 490-90074-3 MS — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 298372 — **Prep Batch: 292685**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.00157	J	0.100	0.08988		mg/L		88	75 - 125

Lab Sample ID: 490-90074-3 MSD — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 298372 — **Prep Batch: 292685**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00157	J	0.100	0.09097		mg/L		89	75 - 125	1	20

Lab Sample ID: MB 490-292649/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 298413 — **Prep Batch: 292649**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 15:25	1

Lab Sample ID: LCS 490-292649/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 298413 — **Prep Batch: 292649**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.09037		mg/L		90	80 - 120

Lab Sample ID: MB 490-293111/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 298413 — **Prep Batch: 293111**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/27/15 10:10	11/13/15 17:01	1

Lab Sample ID: LCS 490-293111/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 298413 — **Prep Batch: 293111**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.09648		mg/L		96	80 - 120

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Lab Sample ID: 490-90074-3 MS
Matrix: Water
Analysis Batch: 298413

Client Sample ID: WS-MW-05
Prep Type: Dissolved
Prep Batch: 293111

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic	0.00106	J	0.100	0.09951		mg/L		98	75 - 125		

Lab Sample ID: 490-90074-3 MSD
Matrix: Water
Analysis Batch: 298413

Client Sample ID: WS-MW-05
Prep Type: Dissolved
Prep Batch: 293111

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00106	J	0.100	0.09960		mg/L		99	75 - 125	0	20

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Metals

Prep Batch: 292649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-1	WS-MW-07	Dissolved	Water	3005A	
490-90074-2	WS-MW-2R	Dissolved	Water	3005A	
490-90074-4	WS-MW-06	Dissolved	Water	3005A	
490-90074-5	WS-QAQC-DUP-01	Dissolved	Water	3005A	
490-90074-6	WS-MW-09	Dissolved	Water	3005A	
490-90074-7	WS-MW-08	Dissolved	Water	3005A	
LCS 490-292649/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-292649/1-A	Method Blank	Total Recoverable	Water	3005A	

Prep Batch: 292685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-1	WS-MW-07	Total/NA	Water	3010A	
490-90074-2	WS-MW-2R	Total/NA	Water	3010A	
490-90074-3	WS-MW-05	Total/NA	Water	3010A	
490-90074-3 MS	WS-MW-05	Total/NA	Water	3010A	
490-90074-3 MSD	WS-MW-05	Total/NA	Water	3010A	
490-90074-4	WS-MW-06	Total/NA	Water	3010A	
490-90074-5	WS-QAQC-DUP-01	Total/NA	Water	3010A	
490-90074-6	WS-MW-09	Total/NA	Water	3010A	
490-90074-7	WS-MW-08	Total/NA	Water	3010A	
LCS 490-292685/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 490-292685/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 293111

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-3	WS-MW-05	Dissolved	Water	3005A	
490-90074-3 MS	WS-MW-05	Dissolved	Water	3005A	
490-90074-3 MSD	WS-MW-05	Dissolved	Water	3005A	
LCS 490-293111/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-293111/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 298372

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-1	WS-MW-07	Total/NA	Water	6020	292685
490-90074-2	WS-MW-2R	Total/NA	Water	6020	292685
490-90074-3	WS-MW-05	Total/NA	Water	6020	292685
490-90074-3 MS	WS-MW-05	Total/NA	Water	6020	292685
490-90074-3 MSD	WS-MW-05	Total/NA	Water	6020	292685
490-90074-4	WS-MW-06	Total/NA	Water	6020	292685
490-90074-5	WS-QAQC-DUP-01	Total/NA	Water	6020	292685
490-90074-6	WS-MW-09	Total/NA	Water	6020	292685
LCS 490-292685/2-A	Lab Control Sample	Total/NA	Water	6020	292685
MB 490-292685/1-A	Method Blank	Total/NA	Water	6020	292685

Analysis Batch: 298413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-1	WS-MW-07	Dissolved	Water	6020	292649
490-90074-2	WS-MW-2R	Dissolved	Water	6020	292649
490-90074-3	WS-MW-05	Dissolved	Water	6020	293111
490-90074-3 MS	WS-MW-05	Dissolved	Water	6020	293111
490-90074-3 MSD	WS-MW-05	Dissolved	Water	6020	293111

Metals (Continued)

Analysis Batch: 298413 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-4	WS-MW-06	Dissolved	Water	6020	292649
490-90074-5	WS-QAQC-DUP-01	Dissolved	Water	6020	292649
490-90074-6	WS-MW-09	Dissolved	Water	6020	292649
490-90074-7	WS-MW-08	Dissolved	Water	6020	292649
490-90074-7	WS-MW-08	Total/NA	Water	6020	292685
LCS 490-292649/2-A	Lab Control Sample	Total Recoverable	Water	6020	292649
LCS 490-293111/2-A	Lab Control Sample	Total Recoverable	Water	6020	293111
MB 490-292649/1-A	Method Blank	Total Recoverable	Water	6020	292649
MB 490-293111/1-A	Method Blank	Total Recoverable	Water	6020	293111

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-07 — Lab Sample ID: 490-90074-1

Date Collected: 10/19/15 10:45 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	298413	11/13/15 16:03	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	298372	11/13/15 13:24	CME	TAL NSH

Client Sample ID: WS-MW-2R — Lab Sample ID: 490-90074-2

Date Collected: 10/19/15 12:40 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	298413	11/13/15 16:09	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	298372	11/13/15 14:43	CME	TAL NSH

Client Sample ID: WS-MW-05 — Lab Sample ID: 490-90074-3

Date Collected: 10/19/15 14:15 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			293111	10/27/15 10:10	ZLN	TAL NSH
Dissolved	Analysis	6020		1	298413	11/13/15 17:11	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	298372	11/13/15 12:58	CME	TAL NSH

Client Sample ID: WS-MW-06 — Lab Sample ID: 490-90074-4

Date Collected: 10/19/15 16:00 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	298413	11/13/15 16:14	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	298372	11/13/15 14:48	CME	TAL NSH

Client Sample ID: WS-QAQC-DUP-01 — Lab Sample ID: 490-90074-5

Date Collected: 10/19/15 01:00 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	298413	11/13/15 16:29	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-QAQC-DUP-01 — Lab Sample ID: 490-90074-5

Date Collected: 10/19/15 01:00 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020		1	298372	11/13/15 14:53	CME	TAL NSH

Client Sample ID: WS-MW-09 — Lab Sample ID: 490-90074-6

Date Collected: 10/20/15 09:25 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	298413	11/13/15 16:35	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	298372	11/13/15 14:58	CME	TAL NSH

Client Sample ID: WS-MW-08 — Lab Sample ID: 490-90074-7

Date Collected: 10/20/15 11:15 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	298413	11/13/15 16:40	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		2	298413	11/13/15 17:42	CME	TAL NSH

Laboratory References:

= Kelso WA, 1317 S. 13th Avenue, Kelso, WA 98626

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL NSH
Dissolved Arsenic by 7062	General Sub Contract Method	NONE	
Total Arsenic by 7062	General Sub Contract Method	NONE	

Protocol References:

NONE = NONE

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

Laboratory References:

= Kelso WA, 1317 S. 13th Avenue, Kelso, WA 98626

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	07-24-16
Arizona	State Program	9	AZ0473	05-05-16
Arkansas DEQ	State Program	6	88-0737	04-25-16
California	State Program	9	2938	10-31-16
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-16
Georgia	State Program	4	N/A	06-30-16
Illinois	NELAP	5	200010	12-09-15 *
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	01-31-16
Kentucky (UST)	State Program	4	19	06-30-16
Kentucky (WW)	State Program	4	90038	12-31-15
Louisiana	NELAP	6	30613	06-30-16
Maine	State Program	1	TN00032	11-03-17
Maryland	State Program	3	316	03-31-16
Massachusetts	State Program	1	M-TN032	06-30-16
Minnesota	NELAP	5	047-999-345	12-31-16
Mississippi	State Program	4	N/A	06-30-16
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-16
New Hampshire	NELAP	1	2963	10-09-16
New Jersey	NELAP	2	TN965	11-30-15
New York	NELAP	2	11342	03-31-16
North Carolina (WW/SW)	State Program	4	387	12-31-15
North Dakota	State Program	8	R-146	06-30-15 *
Ohio VAP	State Program	5	CL0033	07-10-17
Oklahoma	State Program	6	9412	08-31-16
Oregon	NELAP	10	TN200001	04-27-16
Pennsylvania	NELAP	3	68-00585	06-30-16
Rhode Island	State Program	1	LAO00268	12-30-15
South Carolina	State Program	4	84009 (001)	02-28-16
South Carolina (Do Not Use - DW)	State Program	4	84009 (002)	12-16-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-16
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-16
Virginia	NELAP	3	460152	06-14-16
Washington	State Program	10	C789	07-19-16
West Virginia DEP	State Program	3	219	02-28-16
Wisconsin	State Program	5	998020430	08-31-16
Wyoming (UST)	A2LA	8	453.07	12-31-15

* Certification renewal pending - certification considered valid.

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November 09, 2015

Analytical Report for Service Request No: K1512005

Heather Wagner
Test America, Incorporated, Nashville Division
2960 Foster Creighton Drive
Nashville, TN 37204

RE: VCC Winston Salem / 49001238

Dear Heather,

Enclosed are the results of the sample(s) submitted to our laboratory October 22, 2015
For your reference, these analyses have been assigned our service request number **K1512005.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3275. You may also contact me via email at Chris.Leaf@ALSGlobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Chris Leaf
Project Manager

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

ALS ENVIRONMENTAL

Client:	Test America, Incorporated	**Service Request No.:**	K1512005
Project:	VCC Winston Salem/ 49001238	**Date Received:**	10/22/15
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Eight water samples were received for analysis at ALS Environmental on 10/22/15. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4ºC upon receipt at the laboratory.

Total and Dissolved Metals

No anomalies associated with the analysis of these samples were observed.

Approved by_____

Chain of Custody

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

K1512005

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Wagner, Heather	Carrier Tracking No(s):	COC No: 490-37889.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: heather.wagner@testamericainc.com		Page: Page 1 of 1
Company: ALS Laboratory Group				Job #: 490-90074-2
Address: 1317 S. 13th Avenue, ,	Due Date Requested: 11/2/2015			
City: Kelso	TAT Requested (days):			
State, Zip: WA, 98626				
Phone:	PO #:			
Email:	WO #:			
Project Name: VCC Winston Salem	Project #: 49001238			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification - Client ID		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Total Arsenic by 7062)/ Total Arsenic by 7062	SUB (Dissolved Arsenic by 7062)/ Dissolved Arsenic by 7062	Total Number of containers	Special Instructions/Note:
				Preservation Code:							
WS-MW-07	1	10/19/15	10:45 Eastern		Water			X	X	2	
WS-MW-2R	2	10/19/15	12:40 Eastern		Water			X	X	2	
WS-MW-05	3	10/19/15	14:15 Eastern		Water			X	X	2	
WS-MW-05		10/19/15	14:15 Eastern	MS	Water			X	X	2	
WS-MW-05		10/19/15	14:15 Eastern	MSD	Water			X	X	2	
WS-MW-06	4	10/19/15	16:00 Eastern		Water			X	X	2	
WS-QAQC-DUP-01	5	10/19/15	01:00 Eastern		Water			X	X	2	
WS-MW-09	6	10/20/15	09:25 Eastern		Water			X	X	2	
WS-MW-08	7	10/20/15	11:15 Eastern		Water			X	X	2	
WS-QAQC-EB-01	8	10/20/15	11:45 Eastern		Water			X		1	

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 10/21/15 16:58	Company: NASHtenn	Received by: [signature]	Date/Time: 10/22/15 0930	Company: ALS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

PC CV

Cooler Receipt and Preservation Form

Client / Project: TestAmerica Service Request K15 12005

Received: 10/22/15 Opened: 10/22/15 By: [illegible] Unloaded: 10/22/15 By: [illegible]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? one, front

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.6	-0.3	—	—	+0.3	358		6493 8977 2167	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

11/16/2015

Metals

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www.alsglobal.com

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1512005-001**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1512005-001DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1512005-002**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1512005-002DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1512005-003**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1512005-003DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1512005-004**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1512005-004DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1512005-005**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1512005-005DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1512005-006**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1512005-006DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1512005-007**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1512005-007DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-EB-01** **Lab Code:** **K1512005-008**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	
Project Name:	VCC Winston Salem	**Date Received:**	
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **Method Blank** **Lab Code:** **KQ1512287-01**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals
- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

ICV Source: Inorganic Ventures **CCV Source:** ALS MIXED

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Arsenic	7.50	8.20	109	7.50	8.06	107	7.88	105	7062

Metals
- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

ICV Source: Inorganic Ventures **CCV Source:** ALS MIXED

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	Method
Arsenic				7.50	7.86	105	7.96	106	7062

Metals

- 2b -
CRDL STANDARD FOR AA AND ICP

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Arsenic	0.50	0.49	98					

Metals

- 3 -

BLANKS

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Method
Arsenic	0.2	U	0.2	U	0.2	U	0.2	U	7062

Metals

- 3 -

BLANKS

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Method
Arsenic			0.2	U					7062

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238 **Units:** UG/L

Project Name: VCC Winston Salem **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-05S **Lab Code:** K1512005-003DISSS

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	15.7		0.4	U	16.00	98.1		7062

An empty field in the Control Limit column indicates the control limit is not applicable

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238 **Units:** UG/L

Project Name: VCC Winston Salem **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-05S **Lab Code:** K1512005-003S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	17.7		0.4	U	16.00	110.6		7062

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 5B -
POST SPIKE SAMPLE RECOVERY

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238 **Units:** UG/L

Project Name: VCC Winston Salem **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-07A **Lab Code:** K1512005-001A

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	80 - 120	5.5		0.2		5.0	110		7062

Metals

- 6 -

DUPLICATES

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238 **Units:** UG/L

Project Name: VCC Winston Salem **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-05D **Lab Code:** K1512005-003D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.4	U	0.4	U			7062

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 6 -

DUPLICATES

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238 **Units:** UG/L

Project Name: VCC Winston Salem **Basis:** NA

Matrix: WATER

Sample Name: WS-MW-05D **Lab Code:** K1512005-003DISSD

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.2	U	0.4	U			7062

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

Aqueous LCS Source: ALS MIXED **Solid LCS Source:**

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits	%R
Arsenic	10	11.7	117.0					

Metals

- 10 -

DETECTION LIMITS

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

ICP/ICP-MS ID #:

GFAA ID #: K-FLAA-02 **AA ID #:**

Analyte	Wave-length (nm)	Back-ground	MRL ug/L	MDL ug/L	M
Arsenic	193.6		0.5	0.2	H

Comments:

Metals
-13-
PREPARATION LOG

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238

Project Name: VCC Winston Salem

Method: F

Sample ID	Preparation Date	Initial Volume	Final Volume(mL)
K1512005-001	10/26/15	25.0	25.0
K1512005-001DISS	10/26/15	25.0	25.0
K1512005-002	10/26/15	25.0	25.0
K1512005-002DISS	10/26/15	25.0	25.0
K1512005-003	10/26/15	25.0	25.0
K1512005-003D	10/26/15	25.0	25.0
K1512005-003DISS	10/26/15	25.0	25.0
K1512005-003DISSD	10/26/15	25.0	25.0
K1512005-003DISSS	10/26/15	25.0	25.0
K1512005-003S	10/26/15	25.0	25.0
K1512005-004	10/26/15	25.0	25.0
K1512005-004DISS	10/26/15	25.0	25.0
K1512005-005	10/26/15	25.0	25.0
K1512005-005DISS	10/26/15	25.0	25.0
K1512005-006	10/26/15	25.0	25.0
K1512005-006DISS	10/26/15	25.0	25.0
K1512005-007	10/26/15	25.0	25.0
K1512005-007DISS	10/26/15	25.0	25.0
K1512005-008	10/26/15	25.0	25.0
KQ1512287-01	10/26/15	25.0	25.0
KQ1512287-02	10/26/15	25.0	25.0

Metals
- 14 -
ANALYSIS RUN LOG

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238 **Run Number:** 110515-As2 edit

Project Name: VCC Winston Salem

Instrument ID Number: K-FLAA-02 **Method:** H

Start Date: 11/05/15 **End Date:** 11/05/15

Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.0	13:41																									
ZZZZZZ	1.0	13:42																									
ZZZZZZ	1.0	13:46																									
ZZZZZZ	1.0	13:48																									
ZZZZZZ	1.0	13:50																									
ZZZZZZ	1.0	13:52																									
ZZZZZZ	1.0	13:54																									
ZZZZZZ	1.0	13:57																									
CAL BLK	1.0	14:04				X																					
STD 0.5	1.0	14:06				X																					
STD 1.0	1.0	14:09				X																					
STD 5.0	1.0	14:11				X																					
STD 7.5	1.0	14:13				X																					
STD 10.0	1.0	14:15				X																					
ZZZZZZ	1.0	14:17																									
ICV1	1.0	14:20				X																					
ICB1	1.0	14:22				X																					
LLICV	1.0	14:24				X																					
CCV1	1.0	14:26				X																					
CCB1	1.0	14:28				X																					
KQ1512287-01	2.0	14:30				X																					
ZZZZZZ	2.0	14:33																									
K1512005-001	2.0	14:35				X																					
K1512005-001A	2.0	14:37				X																					
K1512005-002	2.0	14:39				X																					
K1512005-003	2.0	14:41				X																					
K1512005-003D	2.0	14:44				X																					
K1512005-003S	2.0	14:46				X																					
K1512005-004	2.0	14:48				X																					
K1512005-005	2.0	14:50				X																					
CCV2	1.0	14:52				X																					
CCB2	1.0	14:54				X																					

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

ALS Group USA, Corp.
dba ALS Environmental

Metals
- 14 -
ANALYSIS RUN LOG

Client: Test America, Incorporated **Service Request:** K1512005

Project No.: 49001238 **Run Number:** 110515-As2 edit

Project Name: VCC Winston Salem

Instrument ID Number: K-FLAA-02 **Method:** H

Start Date: 11/05/15 **End Date:** 11/05/15

Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
K1512005-006	2.0	14:57				X																					
K1512005-007	2.0	14:59				X																					
K1512005-008	2.0	15:01				X																					
K1512005-001DISS	2.0	15:03				X																					
K1512005-002DISS	2.0	15:05				X																					
K1512005-003DISS	2.0	15:07				X																					
K1512005-003DISSD	2.0	15:09				X																					
K1512005-003DISSS	2.0	15:12				X																					
K1512005-004DISS	2.0	15:14				X																					
K1512005-005DISS	2.0	15:16				X																					
CCV3	1.0	15:18				X																					
CCB3	1.0	15:20				X																					
K1512005-006DISS	2.0	15:23				X																					
K1512005-007DISS	2.0	15:25				X																					
KQ1512287-02	2.0	15:27				X																					
CCV4	1.0	15:29				X																					
CCB4	1.0	15:31				X																					

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
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Preparation Information Benchsheet

Prep Run: 248097
Team: Metals
Analyst: Anna Cheatley
Prep Workflow: MetDig3010A
Prep Method: EPA 3010A
Rush/NPDES: N/A
Status: Prepped
Current Step: Digestion
Prep Date: 10/26/2015 10:08
Due Date: 10/31/2015
Hold Date: 04/16/2016

Lab Code	Client ID	Bottle #	Initial Amt	Final Volume	Spike Amt	Spike ID	TestNo List	Comments
KQ1512287-01	Method Blank		25 mL	25 mL			As D, As T	6%HNO3,5%HCl
KQ1512287-02	Lab Control Sample		25 mL	25 mL	0.1 mL	83147	As D, As T	6%HNO3,5%HCl
K1512005-001	WS-MW-07	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-001	WS-MW-07	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-002	WS-MW-2R	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-002	WS-MW-2R	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-003	WS-MW-05	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-003	WS-MW-05	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-003: KQ1512287-03	Duplicate	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-003: KQ1512287-05	Duplicate	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-003: KQ1512287-04	Matrix Spike	.01	25 mL	25 mL	0.1 mL	84119	As T	6%HNO3,5%HCl
K1512005-003: KQ1512287-06	Matrix Spike	.02	25 mL	25 mL	0.1 mL	84119	As D	6%HNO3,5%HCl
K1512005-004	WS-MW-06	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-004	WS-MW-06	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-005	WS-QAQC-DUP-01	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-005	WS-QAQC-DUP-01	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-006	WS-MW-09	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-006	WS-MW-09	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-007	WS-MW-08	.02	25 mL	25 mL			As D	6%HNO3,5%HCl
K1512005-007	WS-MW-08	.01	25 mL	25 mL			As T	6%HNO3,5%HCl
K1512005-008	WS-QAQC-EB-01	.01	25 mL	25 mL			As T	6%HNO3,5%HCl

14 Total Samples consisting of 8 Client Samples, 4 Client QC Samples, 2 Batch QC Samples associated with the current Prep Run.

Spiking Solutions

Name	Type	ID	Expires	Name	Type	ID	Expires
K-MET GFLCSW	Spike	83147	12/1/2015	K-MET SS2	Spike	84119	3/8/2016

Preparation Materials

Step	Name	ID	Step	Name	ID
Digestion	K-MET 50ml Centrifuge Tube	83469	Digestion	K-MET HNO3	84717
Digestion	K-MET HCL	84123			

Preparation Hardware / Equipment

Step	Name	Property	Value		Step	Name	Property	Value	
Digestion	K-HotPlate-03	Corrected Temperature	94	deg C	Digestion	K-HotPlate-04	Corrected Temperture	97	deg C
Digestion	K-HotPlate-03	Correction Factor	0	deg C	Digestion	K-HotPlate-04	Correction Factor	0	deg C
Digestion	K-HotPlate-03	Observed Temperature	94	deg C	Digestion	K-HotPlate-04	Observed Temperature	97	deg C
Digestion	K-HotPlate-03	Thermometer ID 1109026		deg C	Digestion	K-HotPlate-04	Thermometer ID 1108904		deg C

Preparation Steps

Step	Started	Finished	By	Assisted By	Training?	Comments
Digestion	26-OCT-15 10:08	26-OCT-15 13:44	Anna Cheatley		N	

Comments

Review

Reviewed by: _____ Date: 10/26/15

METALS SPIKING SOLUTIONS CONCENTRATIONS FORM

Solution Name	Element	mLs of 1000ppm Solution	Final Volume	Solution Conc. mg/L	Enter mls Added
K-MET SS1	HNO3	50.0	1000ml	-	
	Al	100*	1000ml	200	
	Ag	100*	1000ml	5	
	Ba	100*	1000ml	100	
	Be	100*	1000ml	5	
	Cd	100*	1000ml	5	
	Co	100*	1000ml	50	
	Cr	100*	1000ml	20	
	Cu	100*	1000ml	25	
	Fe	100*	1000ml	100	
	Pb	100*	1000ml	50	
*** Add after HNO3	Mn	100*	1000ml	50	
and before case cal	Ni	100*	1000ml	50	
-14	Sb***	50	1000ml	50	
when making the	V	100*	1000ml	50	
solution	Zn	100*	1000ml	50	
K-MET SS2	HNO3	25.0	500ml	-	
	As	2.0	500ml	4	
	Cd	2.0	500ml	4	
	Pb	2.0	500ml	4	
	Se	2.0	500ml	4	
	Tl	2.0	500ml	4	
	Cu	2.0	500ml	4	
K-MET SS3	HNO3	25.0	500ml	-	
	As	50.0	500ml	100	
	Se	50.0	500ml	100	
	Tl	50.0	500ml	100	
	Hg	6	500	12	
K-MET SS4	HNO3	25	500ml	-	
	B	50	500ml	100	
	Mo	50	500ml	100	
K-MET SS5	HNO3	10.0	200ml	-	
	K**	20	200ml	1000	
	Na**	20	200ml	1000	
	Mg**	20	200ml	1000	
	Ca**	20	200ml	1000	

K MET GFLCSW	HNO3	10.0	1000ml	-	
	As, Pb, Se, Tl	5.0	1000ml	2.5	
	Cd	-	-	1.25	
	Cu	2.5	1000ml	2.5	
K MET QCP-CICV 1	Ca, Mg, Na, K	no dilution	-	2500	
	Al, Ba	no dilution	-	1000	
	Fe	no dilution	-	500	
	Co, Mn, Ni, V, Zn	no dilution	-	250	
	Cu, Ag	no dilution	-	125	
	Cr	no dilution	-	100	
	Be	no dilution	-	25	
K MET QCP CICV 2	Sb	no dilution	-	500	
K MET QCP CICV 3	As, Pb, Se, Tl	no dilution	-	500	
	Cd	no dilution	-	250	

* Denotes volume of mixed stock standard.

** Denotes 10,000 ppm individual stock standards.

Standard	mls of standard	ppm	Logbook #	Exp. Date

Element Analyzed: As Hydride Instrument: K-FLAA-02
Service Request #: K1512005

Batch QC SR's #:
Calibration Std.: AA1-16-I Expiration Date: 05/23/16
2nd Source Std.: AA1-16-H Expiration Date: 02/05/16
Starlims #: 470759
Run #: 110515-As2

Hydride Data Review Form

	Yes	No	NA
1 ICV within 10% of true Value	X		
2. Calibration data included	X		
3. CCV's in control	X		
4. CCB's and/or ICB's below MRL	X		
5. All reported Results within Cal. Range	X		
6. All Calculations are Correct	X		

Comments

Primary Reviewed by: 3C Date: 11/5/15

Secondary Reviewed by: [illegible] Date: 11/5/15

ALS Enviromental
FAA Run Log

Method: (Circle Method Used) 7742 7062 Other:_____ Element: As Se	**Service Request # :**

SAMPLE NUMBER	Dilution Factor	Measured (µg/L)	Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.)		Comments Post Spike = 5 ppb
Cal. Blk	-	0.000			
Cal. Std 0.5	-	0.500	*(0.025-50ml)		*Cal. Std = AA1-16-I
Cal. Std 1.0	-	1.000	*(0.05-50ml)		
Cal. Std 5.0	-	5.000	*(0.25-50ml)		
Cal. Std 7.5	-	7.500	*(0.375-50ml)		
Cal. Std 10.0	-	10.000	*(0.5-50ml)		
~~ICV~~	-	~~8.329~~	~~111%~~		ICV Std = AA1-16-II
ICV	-	8.197	109%		
ICB	-	-0.018			
LLICV	-	0.490	98%		
CCV		8.056	107%		
CCB		-0.009			
KQ1512287-01	1/2	0.086			
~~KQ1512287-02~~	~~1/2~~	~~3.517~~			see rerun
K1512005-001 2	1/2	-0.026			
K1512005-001A 2	1/2	5.479	110%		
K1512005-002 2	1/2	0.047			
K1512005-003 2	1/2	0.115			
K1512005-003D 2	1/2	0.082			
K1512005-003S 2	1/2	8.868	109%		
K1512005-004 2	1/2	0.033			
K1512005-005 2	1/2	0.107			
CCV		7.877	105%		
CCB		-0.012			
K1512005-006 2	1/2	-0.002			
K1512005-007 2	1/2	0.125			
K1512005-008 2	1/2	-0.029			
K1512005-001 2 D	1/2	0.102			
K1512005-002 2 D	1/2	0.032			
K1512005-003 2 D	1/2	-0.006			

True Values/QC Limits:	LCSW	Water Spike	LCSS (ERA D045540)	Soil Spike
Arsenic:	10ppb (80-120%)	16ppb (75-125%)	99.6mg/kg (70-130%)	40ppb (75-125%)
Selenium	10ppb (80-120%)	16ppb (75-125%)	150mg/kg (68-132%)	40ppb (75-125%)

Cx = MSA Corrected Concentration (as per method)

Analyst	**Date:**	**Page Number:**
3L	11/5/15	1

R:\ICP\MISC\FLAA\hydride runs\110515-As2

ALS Enviromental
FAA Run Log

Method: (Circle Method Used) 7742 7062 Other:_____ Element: As Se	**Service Request # :**

SAMPLE NUMBER	Dilution Factor	Measured (µg/L)	Recoveries (ICV, CCV, CRA, LCS, Matrix Spk.)		Comments Post Spike = 5 ppb
K1512005-003D 2 D	1/2	0.042			
K1512005-003S 2 D	1/2	7.843	98%		
K1512005-004 2 D	1/2	0.006			
K1512005-005 2 D	1/2	0.035			
CCV		7.861	105%		
CCB		-0.044			
K1512005-006 2 D	1/2	-0.005			
K1512005-007 2 D	1/2	0.000			
KQ1512287-02	1/2	5.843	117%		
CCV		7.961	106%		
CCB		-0.016			

True Values/QC Limits:	LCSW	Water Spike	LCSS (ERA D045540)	Soil Spike
Arsenic:	10ppb (80-120%)	16ppb (75-125%)	146.0mg/kg (80-120%)	20ppb (75-125%)
Selenium	10ppb (80-120%)	16ppb (75-125%)	192.0mg/kg (62-147%)	20ppb (75-125%)

Cx = MSA Corrected Concentration (as per method)

Analyst	**Date:**	**Page Number:**
3C	11/5/15	2

R:\ICP\MISC\FLAA\hydride runs\110515-As2

==========
Analysis Begun

Logged In Analyst: alkls.nouser Technique: AA FIAS-Flame
Spectrometer Model: AAnalyst 200, S/N 200S5061701 Autosampler Model: AS-90

Sample Information File: C:\data-AA\alkls.nouser\Sample Information\110515-As1.sif
Batch ID: 110515-As1
Results Data Set: 110515-As2
Results Library: C:\data-AA\alkls.nouser\Results\Hydride 2015.mdb

11/5/15

==========
Sequence No.: 1 Autosampler Location: 1
Sample ID: Cal blk Date Collected: 11/5/2015 1:39:47 PM
Analyst: Data Type: Original

Replicate Data: Cal blk

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.00]	0.002	-0.004	0.002			13:40:08	Yes
2		[0.00]	0.003	0.010	0.003			13:40:39	Yes
3		[0.00]	0.002	0.002	0.002			13:41:10	Yes
Mean:		[0.00]	0.002						
SD:		0.00	0.0003						
%RSD:		0.00	11.44						

Auto-zero performed.

==========
Sequence No.: 2 Autosampler Location: 2
Sample ID: Std 0.5 Date Collected: 11/5/2015 1:41:55 PM
Analyst: Data Type: Original

Replicate Data: Std 0.5

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.5]	0.007	0.031	0.010			13:42:17	Yes
2		[0.5]	0.006	0.014	0.009			13:42:48	Yes

User canceled analysis.

==========
Analysis Begun

Logged In Analyst: alkls.nouser Technique: AA FIAS-Flame
Spectrometer Model: AAnalyst 200, S/N 200S5061701 Autosampler Model: AS-90

Sample Information File: C:\data-AA\alkls.nouser\Sample Information\110515-As1.sif
Batch ID: 110515-As1
Results Data Set: 110515-As2
Results Library: C:\data-AA\alkls.nouser\Results\Hydride 2015.mdb

==========
Sequence No.: 1 Autosampler Location: 1
Sample ID: Cal blk Date Collected: 11/5/2015 1:44:50 PM
Analyst: Data Type: Original

Replicate Data: Cal blk

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.00]	0.003	0.008	0.003			13:45:11	Yes
2		[0.00]	0.003	0.014	0.003			13:45:42	Yes
3		[0.00]	0.002	0.000	0.002			13:46:12	Yes
Mean:		[0.00]	0.002						
SD:		0.00	0.0007						

%RSD: 0.00 26.35
Auto-zero performed.

Sequence No.: 2
Sample ID: Std 0.5
Analyst:
Autosampler Location: 2
Date Collected: 11/5/2015 1:46:57 PM
Data Type: Original

3C 11/5/15
HHS 11/5/15

Replicate Data: Std 0.5

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.5]	0.007	0.026	0.010			13:47:19	Yes
2		[0.5]	0.007	0.023	0.010			13:47:49	Yes
3		[0.5]	0.007	0.018	0.009			13:48:20	Yes
Mean:		[0.5]	0.007						
SD:		0.0	0.0003						
%RSD:		0.0	3.79						

Standard number 1 applied. [0.5]
Correlation Coef.: 1.000000 Slope: 0.01421 Intercept: 0.00000

Sequence No.: 3
Sample ID: Std 1.0
Analyst:
Autosampler Location: 3
Date Collected: 11/5/2015 1:49:06 PM
Data Type: Original

Replicate Data: Std 1.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[1.0]	0.013	0.034	0.016			13:49:28	Yes
2		[1.0]	0.014	0.043	0.016			13:49:58	Yes
3		[1.0]	0.013	0.041	0.016			13:50:29	Yes
Mean:		[1.0]	0.013						
SD:		0.0	0.0003						
%RSD:		0.0	2.45						

Standard number 2 applied. [1.0]
Correlation Coef.: 0.997466 Slope: 0.01361 Intercept: 0.00000

Sequence No.: 4
Sample ID: Std 5.0
Analyst:
Autosampler Location: 4
Date Collected: 11/5/2015 1:51:15 PM
Data Type: Original

Replicate Data: Std 5.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[5.0]	0.073	0.193	0.076			13:51:38	Yes
2		[5.0]	0.076	0.201	0.078			13:52:08	Yes
3		[5.0]	0.074	0.194	0.077			13:52:39	Yes
Mean:		[5.0]	0.074						
SD:		0.0	0.0012						
%RSD:		0.0	1.65						

Standard number 3 applied. [5.0]
Correlation Coef.: 0.999607 Slope: 0.01484 Intercept: 0.00000

Sequence No.: 5
Sample ID: Std 7.5
Analyst:
Autosampler Location: 5
Date Collected: 11/5/2015 1:53:26 PM
Data Type: Original

Replicate Data: Std 7.5

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[7.5]	0.115	0.299	0.118			13:53:49	Yes

2	[7.5]	0.127	0.316	0.130	13:54:19	Yes
3	[7.5]	0.115	0.304	0.118	13:54:50	Yes
Mean:	[7.5]	0.119				
SD:	0.0	0.0068				
%RSD:	0.0	5.69				

Standard number 4 applied. [7.5]
Correlation Coef.: 0.998602 Slope: 0.01558 Intercept: 0.00000

3C 11/5/15

Sequence No.: 6 Autosampler Location: 6
Sample ID: Std 10.0 Date Collected: 11/5/2015 1:55:38 PM
Analyst: Data Type: Original

Replicate Data: Std 10.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[10.0]	0.135	0.352	0.138			13:56:01	Yes
2		[10.0]	0.130	0.353	0.133			13:56:32	Yes
3		[10.0]	0.134	0.347	0.136			13:57:03	Yes
Mean:		[10.0]	0.133						
SD:		0.0	0.0025						
%RSD:		0.0	1.91						

Standard number 5 applied. [10.0]
Correlation Coef.: 0.990964 Slope: 0.01443 Intercept: 0.00000
Correlation Coefficient is less than 0.995000. Analysis stopped.

Calibration data for As 193.70 Equation: Linear Through Zero

ID	Mean Signal (Abs)	Entered Conc. ug/L	Calculated Conc. ug/L	Standard Deviation	%RSD
Cal blk	0.0000	0	0.000	0.00	26.4
Std 0.5	0.0071	0.5	0.493	0.00	3.8
Std 1.0	0.0134	1.0	0.932	0.00	2.5
Std 5.0	0.0745	5.0	5.161	0.00	1.6
Std 7.5	0.1193	7.5	8.267	0.01	5.7
Std 10.0	0.1332	10.0	9.231	0.00	1.9

Correlation Coef.: 0.990964 Slope: 0.01443 Intercept: 0.00000
User canceled analysis.

Analysis Begun

Logged In Analyst: alkls.nouser Technique: AA FIAS-Flame
Spectrometer Model: AAnalyst 200, S/N 200S5061701 Autosampler Model: AS-90

Sample Information File: C:\data-AA\alkls.nouser\Sample Information\110515-As1.sif
Batch ID: 110515-As1
Results Data Set: 110515-As2
Results Library: C:\data-AA\alkls.nouser\Results\Hydride 2015.mdb

---

Sequence No.: 1 Autosampler Location: 1
Sample ID: Cal blk Date Collected: 11/5/2015 2:03:26 PM
Analyst: Data Type: Original

Replicate Data: Cal blk

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.00]	0.003	0.003	0.003			14:03:47	Yes
2		[0.00]	0.002	0.001	0.002			14:04:18	Yes
3		[0.00]	0.003	0.000	0.003			14:04:49	Yes
Mean:		[0.00]	0.002						
SD:		0.00	0.0006						
%RSD:		0.00	22.24						

Auto-zero performed.

Sequence No.: 2 Autosampler Location: 2
Sample ID: Std 0.5 Date Collected: 11/5/2015 2:05:34 PM
Analyst: Data Type: Original

Replicate Data: Std 0.5

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[0.5]	0.005	0.019	0.008			14:05:56	Yes
2		[0.5]	0.006	0.019	0.008			14:06:26	Yes
3		[0.5]	0.005	0.016	0.008			14:06:57	Yes
Mean:		[0.5]	0.005						
SD:		0.0	0.0002						
%RSD:		0.0	4.50						

Standard number 1 applied. [0.5]
Correlation Coef.: 1.000000 Slope: 0.01098 Intercept: 0.00000

Sequence No.: 3 Autosampler Location: 3
Sample ID: Std 1.0 Date Collected: 11/5/2015 2:07:43 PM
Analyst: Data Type: Original

Replicate Data: Std 1.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[1.0]	0.011	0.033	0.013			14:08:05	Yes
2		[1.0]	0.011	0.035	0.014			14:08:35	Yes
3		[1.0]	0.013	0.027	0.015			14:09:06	Yes
Mean:		[1.0]	0.012						
SD:		0.0	0.0009						
%RSD:		0.0	7.96						

Standard number 2 applied. [1.0]
Correlation Coef.: 0.998053 Slope: 0.01143 Intercept: 0.00000

Sequence No.: 4 Autosampler Location: 4
Sample ID: Std 5.0 Date Collected: 11/5/2015 2:09:51 PM
Analyst: Data Type: Original

Replicate Data: Std 5.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[5.0]	0.062	0.166	0.065			14:10:14	Yes
2		[5.0]	0.062	0.176	0.065			14:10:45	Yes
3		[5.0]	0.064	0.167	0.066			14:11:16	Yes
Mean:		[5.0]	0.063						
SD:		0.0	0.0010						
%RSD:		0.0	1.52						

Standard number 3 applied. [5.0]
Correlation Coef.: 0.999576 Slope: 0.01252 Intercept: 0.00000

Sequence No.: 5 Autosampler Location: 5
Sample ID: Std 7.5 Date Collected: 11/5/2015 2:12:03 PM
Analyst: Data Type: Original

Replicate Data: Std 7.5

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[7.5]	0.101	0.272	0.104			14:12:25	Yes
2		[7.5]	0.102	0.267	0.105			14:12:56	Yes

3	[7.5]	0.103	0.268	0.106		14:13:27	Yes
Mean:	[7.5]	0.102					
SD:	0.0	0.0009					
%RSD:	0.0	0.85					

Standard number 4 applied. [7.5]
Correlation Coef.: 0.997981 Slope: 0.01330 Intercept: 0.00000

==========

Sequence No.: 6 **Autosampler Location: 6**
Sample ID: Std 10.0 **Date Collected: 11/5/2015 2:14:15 PM**
Analyst: **Data Type: Original**

Replicate Data: Std 10.0

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1		[10.0]	0.134	0.343	0.136			14:14:38	Yes
2		[10.0]	0.130	0.336	0.133			14:15:09	Yes
3		[10.0]	0.130	0.336	0.133			14:15:40	Yes
Mean:		[10.0]	0.131						
SD:		0.0	0.0021						
%RSD:		0.0	1.60						

Standard number 5 applied. [10.0]
Correlation Coef.: 0.998941 Slope: 0.01321 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for As 193.70 **Equation: Linear Through Zero**

ID	Mean Signal (Abs)	Entered Conc. ug/L	Calculated Conc. ug/L	Standard Deviation	%RSD
Cal blk	0.0000	0	0.000	0.00	22.2
Std 0.5	0.0055	0.5	0.416	0.00	4.5
Std 1.0	0.0115	1.0	0.874	0.00	8.0
Std 5.0	0.0629	5.0	4.759	0.00	1.5
Std 7.5	0.1022	7.5	7.741	0.00	0.8
Std 10.0	0.1313	10.0	9.942	0.00	1.6

Correlation Coef.: 0.998941 Slope: 0.01321 Intercept: 0.00000

==========

Sequence No.: 7 **Autosampler Location: 7**
Sample ID: ICV **Date Collected: 11/5/2015 2:16:27 PM**
Analyst: **Data Type: Original**

Replicate Data: ICV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.594	8.594	0.114	0.291	0.116			14:16:51	Yes
2	8.165	8.165	0.108	0.282	0.110			14:17:22	Yes
3	8.227	8.227	0.109	0.287	0.111			14:17:53	Yes
Mean:	8.329	8.329	0.110						
SD:	0.232	0.232	0.0031						
%RSD:	2.783	2.783	2.78						

See Rerun 3L 11/5/15

QC value greater than the upper limit for As 193.70 Recovery = 111.05%
QC Failed. Stop the analysis.
User canceled analysis.

==========

Analysis Begun

Logged In Analyst: alkls.nouser **Technique: AA FIAS-Flame**
Spectrometer Model: AAnalyst 200, S/N 200S5061701 **Autosampler Model: AS-90**

Sample Information File: C:\data-AA\alkls.nouser\Sample Information\110515-As1.sif
Batch ID: 110515-As1
Results Data Set: 110515-As2

Results Library: C:\data-AA\alkls.nouser\Results\Hydride 2015.mdb

Sequence No.: 7
Sample ID: ICV
Analyst:

Autosampler Location: 7
Date Collected: 11/5/2015 2:18:48 PM
Data Type: Original

Replicate Data: ICV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.162	8.162	0.108	0.275	0.110			14:19:12	Yes
2	8.058	8.058	0.106	0.264	0.109			14:19:42	Yes
3	8.372	8.372	0.111	0.276	0.113			14:20:13	Yes
Mean:	8.197	8.197	0.108						
SD:	0.160	0.160	0.0021						
%RSD:	1.950	1.950	1.95						

QC value within limits for As 193.70 Recovery = 109.30%
All analyte(s) passed QC.

Sequence No.: 8
Sample ID: ICB
Analyst:

Autosampler Location: 1
Date Collected: 11/5/2015 2:21:02 PM
Data Type: Original

Replicate Data: ICB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.022	-0.022	-0.000	0.007	0.002			14:21:23	Yes
2	-0.033	-0.033	-0.000	0.007	0.002			14:21:53	Yes
3	0.000	0.000	0.000	0.006	0.002			14:22:24	Yes
Mean:	-0.018	-0.018	-0.000						
SD:	0.017	0.017	0.0002						
%RSD:	91.76	91.76	91.76						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 9
Sample ID: LLICV
Analyst:

Autosampler Location: 2
Date Collected: 11/5/2015 2:23:09 PM
Data Type: Original

Replicate Data: LLICV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.510	0.510	0.007	0.021	0.009			14:23:31	Yes
2	0.476	0.476	0.006	0.020	0.009			14:24:01	Yes
3	0.484	0.484	0.006	0.026	0.009			14:24:31	Yes
Mean:	0.490	0.490	0.006						
SD:	0.017	0.017	0.0002						
%RSD:	3.547	3.547	3.55						

QC value within limits for As 193.70 Recovery = 98.03%
All analyte(s) passed QC.

Sequence No.: 10
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 11/5/2015 2:25:17 PM
Data Type: Original

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.016	8.016	0.106	0.277	0.108			14:25:40	Yes
2	8.116	8.116	0.107	0.274	0.110			14:26:11	Yes

3	8.035	8.035	0.106	0.281	0.109		14:26:41	Yes
Mean:	8.056	8.056	0.106					
SD:	0.053	0.053	0.0007					
%RSD:	0.659	0.659	0.66					

QC value within limits for As 193.70 Recovery = 107.41%
All analyte(s) passed QC.

Sequence No.: 11
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/5/2015 2:27:29 PM
Data Type: Original

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.054	-0.054	-0.001	-0.002	0.002			14:27:50	Yes
2	0.018	0.018	0.000	0.002	0.003			14:28:21	Yes
3	0.009	0.009	0.000	0.009	0.003			14:28:51	Yes
Mean:	-0.009	-0.009	-0.000						
SD:	0.039	0.039	0.0005						
%RSD:	427.9	427.9	427.87						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 12
Sample ID: KQ1512287-01
Analyst:

Autosampler Location: 9
Date Collected: 11/5/2015 2:29:37 PM
Data Type: Original

Replicate Data: KQ1512287-01

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.069	0.069	0.001	0.007	0.003			14:29:58	Yes
2	0.140	0.140	0.002	0.015	0.004			14:30:28	Yes
3	0.048	0.048	0.001	0.007	0.003			14:30:58	Yes
Mean:	0.086	0.086	0.001						
SD:	0.048	0.048	0.0006						
%RSD:	56.22	56.22	56.22						

Sequence No.: 13
Sample ID: KQ1512287-02
Analyst:

Autosampler Location: 10
Date Collected: 11/5/2015 2:31:44 PM
Data Type: Original

Replicate Data: KQ1512287-02

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	5.898	5.898	0.078	0.201	0.080			14:32:05	Yes
2	-0.390	-0.390	-0.005	-0.657	-0.003			14:32:36	Yes
3	5.041	5.041	0.067	0.095	0.069			14:33:07	Yes
Mean:	3.517	3.517	0.046						
SD:	3.410	3.410	0.0450						
%RSD:	96.97	96.97	96.97						

See 11/5/15 3C Rerun uneven Replicates

Sequence No.: 14
Sample ID: K1512005-001 2
Analyst:

Autosampler Location: 11
Date Collected: 11/5/2015 2:33:53 PM
Data Type: Original

Replicate Data: K1512005-001 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.149	-0.149	-0.002	-0.185	0.001			14:34:15	Yes

2	0.078	0.078	0.001	0.004	0.004		14:34:45	Yes
3	-0.008	-0.008	-0.000	-0.014	0.002		14:35:16	Yes
Mean:	-0.026	-0.026	-0.000					
SD:	0.115	0.115	0.0015					
%RSD:	436.3	436.3	436.33					

Sequence No.: 15
Sample ID: K1512005-001A 2
Analyst:
Autosampler Location: 12
Date Collected: 11/5/2015 2:36:03 PM
Data Type: Original

Replicate Data: K1512005-001A 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	5.440	5.440	0.072	0.183	0.074			14:36:25	Yes
2	5.421	5.421	0.072	0.188	0.074			14:36:55	Yes
3	5.578	5.578	0.074	0.188	0.076			14:37:26	Yes
Mean:	5.479	5.479	0.072						
SD:	0.086	0.086	0.0011						
%RSD:	1.567	1.567	1.57						

Sequence No.: 16
Sample ID: K1512005-002 2
Analyst:
Autosampler Location: 13
Date Collected: 11/5/2015 2:38:13 PM
Data Type: Original

Replicate Data: K1512005-002 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.068	0.068	0.001	-0.010	0.003			14:38:36	Yes
2	0.031	0.031	0.000	0.005	0.003			14:39:06	Yes
3	0.041	0.041	0.001	0.010	0.003			14:39:37	Yes
Mean:	0.047	0.047	0.001						
SD:	0.019	0.019	0.0003						
%RSD:	41.06	41.06	41.06						

Sequence No.: 17
Sample ID: K1512005-003 2
Analyst:
Autosampler Location: 14
Date Collected: 11/5/2015 2:40:25 PM
Data Type: Original

Replicate Data: K1512005-003 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.130	0.130	0.002	0.017	0.004			14:40:48	Yes
2	0.093	0.093	0.001	0.012	0.004			14:41:18	Yes
3	0.122	0.122	0.002	0.014	0.004			14:41:49	Yes
Mean:	0.115	0.115	0.002						
SD:	0.019	0.019	0.0003						
%RSD:	16.79	16.79	16.79						

Sequence No.: 18
Sample ID: K1512005-003D 2
Analyst:
Autosampler Location: 15
Date Collected: 11/5/2015 2:42:37 PM
Data Type: Original

Replicate Data: K1512005-003D 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.053	0.053	0.001	0.005	0.003			14:43:01	Yes
2	0.094	0.094	0.001	0.005	0.004			14:43:31	Yes
3	0.099	0.099	0.001	0.007	0.004			14:44:02	Yes
Mean:	0.082	0.082	0.001						

SD:	0.025	0.025	0.0003
%RSD:	30.67	30.67	30.67

Sequence No.: 19
Sample ID: K1512005-003S 2
Analyst:

Autosampler Location: 16
Date Collected: 11/5/2015 2:44:51 PM
Data Type: Original

Replicate Data: K1512005-003S 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.688	8.688	0.115	0.307	0.117			14:45:15	Yes
2	9.193	9.193	0.121	0.307	0.124			14:45:46	Yes
3	8.723	8.723	0.115	0.310	0.118			14:46:16	Yes
Mean:	8.868	8.868	0.117						
SD:	0.282	0.282	0.0037						
%RSD:	3.179	3.179	3.18						

Sequence No.: 20
Sample ID: K1512005-004 2
Analyst:

Autosampler Location: 17
Date Collected: 11/5/2015 2:47:05 PM
Data Type: Original

Replicate Data: K1512005-004 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.005	-0.005	-0.000	-0.009	0.002			14:47:26	Yes
2	0.062	0.062	0.001	0.007	0.003			14:47:57	Yes
3	0.041	0.041	0.001	0.001	0.003			14:48:28	Yes
Mean:	0.033	0.033	0.000						
SD:	0.034	0.034	0.0005						
%RSD:	104.5	104.5	104.46						

Sequence No.: 21
Sample ID: K1512005-005 2
Analyst:

Autosampler Location: 18
Date Collected: 11/5/2015 2:49:13 PM
Data Type: Original

Replicate Data: K1512005-005 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.035	0.035	0.000	-0.005	0.003			14:49:34	Yes
2	0.138	0.138	0.002	0.009	0.004			14:50:05	Yes
3	0.148	0.148	0.002	0.014	0.004			14:50:35	Yes
Mean:	0.107	0.107	0.001						
SD:	0.062	0.062	0.0008						
%RSD:	58.26	58.26	58.26						

Sequence No.: 22
Sample ID: CCV
Analyst:

Autosampler Location: 5
Date Collected: 11/5/2015 2:51:21 PM
Data Type: Original

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	7.893	7.893	0.104	0.271	0.107			14:51:44	Yes
2	7.805	7.805	0.103	0.259	0.106			14:52:15	Yes
3	7.933	7.933	0.105	0.270	0.107			14:52:45	Yes
Mean:	7.877	7.877	0.104						
SD:	0.065	0.065	0.0009						
%RSD:	0.829	0.829	0.83						

QC value within limits for As 193.70 Recovery = 105.03%

All analyte(s) passed QC.

Sequence No.: 23
Sample ID: CCB
Analyst:
Autosampler Location: 1
Date Collected: 11/5/2015 2:53:33 PM
Data Type: Original

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.059	0.059	0.001	0.015	0.003			14:53:54	Yes
2	-0.044	-0.044	-0.001	-0.009	0.002			14:54:25	Yes
3	-0.050	-0.050	-0.001	0.001	0.002			14:54:56	Yes
Mean:	-0.012	-0.012	-0.000						
SD:	0.061	0.061	0.0008						
%RSD:	529.5	529.5	529.48						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 24
Sample ID: K1512005-006 2
Analyst:
Autosampler Location: 19
Date Collected: 11/5/2015 2:55:41 PM
Data Type: Original

Replicate Data: K1512005-006 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.011	0.011	0.000	0.005	0.003			14:56:02	Yes
2	0.013	0.013	0.000	-0.000	0.003			14:56:33	Yes
3	-0.029	-0.029	-0.000	-0.000	0.002			14:57:04	Yes
Mean:	-0.002	-0.002	-0.000						
SD:	0.024	0.024	0.0003						
%RSD:	>999.9%	>999.9%	>999.9%						

Sequence No.: 25
Sample ID: K1512005-007 2
Analyst:
Autosampler Location: 20
Date Collected: 11/5/2015 2:57:49 PM
Data Type: Original

Replicate Data: K1512005-007 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.084	0.084	0.001	0.012	0.004			14:58:10	Yes
2	0.152	0.152	0.002	0.012	0.004			14:58:41	Yes
3	0.138	0.138	0.002	0.011	0.004			14:59:12	Yes
Mean:	0.125	0.125	0.002						
SD:	0.036	0.036	0.0005						
%RSD:	28.60	28.60	28.60						

Sequence No.: 26
Sample ID: K1512005-008 2
Analyst:
Autosampler Location: 21
Date Collected: 11/5/2015 2:59:57 PM
Data Type: Original

Replicate Data: K1512005-008 2

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.027	0.027	0.000	0.007	0.003			15:00:19	Yes
2	-0.147	-0.147	-0.002	-0.039	0.001			15:00:49	Yes
3	0.034	0.034	0.000	0.005	0.003			15:01:20	Yes
Mean:	-0.029	-0.029	-0.000						
SD:	0.102	0.102	0.0014						
%RSD:	357.8	357.8	357.79						

Sequence No.: 27
Sample ID: K1512005-001 2 D
Analyst:
Autosampler Location: 22
Date Collected: 11/5/2015 3:02:06 PM
Data Type: Original

Replicate Data: K1512005-001 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.238	0.238	0.003	0.022	0.006			15:02:28	Yes
2	0.062	0.062	0.001	0.005	0.003			15:02:58	Yes
3	0.005	0.005	0.000	0.001	0.003			15:03:29	Yes
Mean:	0.102	0.102	0.001						
SD:	0.121	0.121	0.0016						
%RSD:	119.2	119.2	119.17						

Sequence No.: 28
Sample ID: K1512005-002 2 D
Analyst:
Autosampler Location: 23
Date Collected: 11/5/2015 3:04:15 PM
Data Type: Original

Replicate Data: K1512005-002 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.007	-0.007	-0.000	-0.012	0.002			15:04:37	Yes
2	0.023	0.023	0.000	-0.002	0.003			15:05:08	Yes
3	0.082	0.082	0.001	0.003	0.004			15:05:38	Yes
Mean:	0.032	0.032	0.000						
SD:	0.045	0.045	0.0006						
%RSD:	139.7	139.7	139.65						

Sequence No.: 29
Sample ID: K1512005-003 2 D
Analyst:
Autosampler Location: 24
Date Collected: 11/5/2015 3:06:25 PM
Data Type: Original

Replicate Data: K1512005-003 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.023	-0.023	-0.000	0.002	0.002			15:06:47	Yes
2	-0.014	-0.014	-0.000	-0.002	0.002			15:07:18	Yes
3	0.019	0.019	0.000	0.008	0.003			15:07:49	Yes
Mean:	-0.006	-0.006	-0.000						
SD:	0.022	0.022	0.0003						
%RSD:	371.4	371.4	371.43						

Sequence No.: 30
Sample ID: K1512005-003D 2 D
Analyst:
Autosampler Location: 25
Date Collected: 11/5/2015 3:08:36 PM
Data Type: Original

Replicate Data: K1512005-003D 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.090	0.090	0.001	0.009	0.004			15:08:58	Yes
2	-0.017	-0.017	-0.000	0.006	0.002			15:09:29	Yes
3	0.053	0.053	0.001	0.013	0.003			15:09:59	Yes
Mean:	0.042	0.042	0.001						
SD:	0.054	0.054	0.0007						
%RSD:	128.5	128.5	128.54						

Sequence No.: 31
Autosampler Location: 26

Sample ID: K1512005-003S 2 D
Analyst:
Date Collected: 11/5/2015 3:10:46 PM
Data Type: Original

Replicate Data: K1512005-003S 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	7.802	7.802	0.103	0.270	0.106			15:11:09	Yes
2	7.805	7.805	0.103	0.252	0.106			15:11:40	Yes
3	7.921	7.921	0.105	0.277	0.107			15:12:10	Yes
Mean:	7.843	7.843	0.104						
SD:	0.068	0.068	0.0009						
%RSD:	0.865	0.865	0.86						

Sequence No.: 32
Autosampler Location: 27
Sample ID: K1512005-004 2 D
Date Collected: 11/5/2015 3:12:58 PM
Analyst:
Data Type: Original

Replicate Data: K1512005-004 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.031	0.031	0.000	0.011	0.003			15:13:21	Yes
2	-0.005	-0.005	-0.000	0.006	0.002			15:13:52	Yes
3	-0.009	-0.009	-0.000	0.002	0.002			15:14:22	Yes
Mean:	0.006	0.006	0.000						
SD:	0.022	0.022	0.0003						
%RSD:	382.6	382.6	382.56						

Sequence No.: 33
Autosampler Location: 28
Sample ID: K1512005-005 2 D
Date Collected: 11/5/2015 3:15:10 PM
Analyst:
Data Type: Original

Replicate Data: K1512005-005 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.001	0.001	0.000	-0.001	0.002			15:15:33	Yes
2	0.013	0.013	0.000	0.004	0.003			15:16:04	Yes
3	0.090	0.090	0.001	0.009	0.004			15:16:34	Yes
Mean:	0.035	0.035	0.000						
SD:	0.049	0.049	0.0006						
%RSD:	141.1	141.1	141.06						

Sequence No.: 34
Autosampler Location: 5
Sample ID: CCV
Date Collected: 11/5/2015 3:17:22 PM
Analyst:
Data Type: Original

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	7.759	7.759	0.102	0.270	0.105			15:17:45	Yes
2	7.711	7.711	0.102	0.276	0.104			15:18:15	Yes
3	8.114	8.114	0.107	0.274	0.110			15:18:46	Yes
Mean:	7.861	7.861	0.104						
SD:	0.220	0.220	0.0029						
%RSD:	2.799	2.799	2.80						

QC value within limits for As 193.70 Recovery = 104.82%
All analyte(s) passed QC.

Sequence No.: 35
Autosampler Location: 1
Sample ID: CCB
Date Collected: 11/5/2015 3:19:34 PM

Analyst: Data Type: Original

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.057	-0.057	-0.001	-0.002	0.002			15:19:55	Yes
2	-0.059	-0.059	-0.001	-0.001	0.002			15:20:25	Yes
3	-0.017	-0.017	-0.000	-0.001	0.002			15:20:56	Yes
Mean:	-0.044	-0.044	-0.001						
SD:	0.024	0.024	0.0003						
%RSD:	54.00	54.00	54.00						

QC value within limits for As 193.70 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 36 Autosampler Location: 29
Sample ID: K1512005-006 2 D Date Collected: 11/5/2015 3:21:42 PM
Analyst: Data Type: Original

Replicate Data: K1512005-006 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.101	0.101	0.001	0.012	0.004			15:22:05	Yes
2	0.081	0.081	0.001	0.011	0.004			15:22:36	Yes
3	-0.199	-0.199	-0.003	-0.085	-0.000			15:23:07	Yes
Mean:	-0.005	-0.005	-0.000						
SD:	0.168	0.168	0.0022						
%RSD:	>999.9%	>999.9%	>999.9%						

Sequence No.: 37 Autosampler Location: 30
Sample ID: K1512005-007 2 D Date Collected: 11/5/2015 3:23:55 PM
Analyst: Data Type: Original

Replicate Data: K1512005-007 2 D

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	0.043	0.043	0.001	0.006	0.003			15:24:19	Yes
2	-0.024	-0.024	-0.000	-0.003	0.002			15:24:49	Yes
3	-0.020	-0.020	-0.000	0.006	0.002			15:25:20	Yes
Mean:	0.000	0.000	-0.000						
SD:	0.037	0.037	0.0005						
%RSD:	>999.9%	>999.9%	>999.9%						

Sequence No.: 38 Autosampler Location: 31
Sample ID: KQ1512287-02 Date Collected: 11/5/2015 3:26:09 PM
Analyst: Data Type: Original

Replicate Data: KQ1512287-02

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	6.011	6.011	0.079	0.210	0.082			15:26:33	Yes
2	5.708	5.708	0.075	0.201	0.078			15:27:03	Yes
3	5.808	5.808	0.077	0.202	0.079			15:27:34	Yes
Mean:	5.843	5.843	0.077						
SD:	0.154	0.154	0.0020						
%RSD:	2.641	2.641	2.64						

Sequence No.: 39 Autosampler Location: 5
Sample ID: CCV Date Collected: 11/5/2015 3:28:22 PM
Analyst: Data Type: Original

Replicate Data: CCV

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	8.149	8.149	0.108	0.262	0.110			15:28:45	Yes
2	8.003	8.003	0.106	0.280	0.108			15:29:16	Yes
3	7.730	7.730	0.102	0.281	0.105			15:29:46	Yes
Mean:	7.961	7.961	0.105						
SD:	0.212	0.212	0.0028						
%RSD:	2.669	2.669	2.67						

QC value within limits for As 193.70 Recovery = 106.14%

All analyte(s) passed QC.

Sequence No.: 40
Sample ID: CCB
Analyst:

Autosampler Location: 1
Date Collected: 11/5/2015 3:30:34 PM
Data Type: Original

Replicate Data: CCB

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Bkgnd Area	Bkgnd Height	Time	Peak Stored
1	-0.042	-0.042	-0.001	-0.003	0.002			15:30:55	Yes
2	-0.014	-0.014	-0.000	0.002	0.002			15:31:26	Yes
3	0.007	0.007	0.000	0.007	0.003			15:31:57	Yes
Mean:	-0.016	-0.016	-0.000						
SD:	0.025	0.025	0.0003						
%RSD:	150.9	150.9	150.92						

QC value within limits for As 193.70 Recovery = Not calculated

All analyte(s) passed QC.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FOR Baton Rouge

490-90074 Chain of Custody

Cooler Received/Opened On: 10/21/2015 @0930

1. **Tracking #** 6282 **(last 4 digits, FedEx)**

Courier: Fed-Ex **IR Gun ID:** 17960357

2. **Temperature of rep. sample or temp blank when opened:** 1.4 *Degrees Celsius*

3. **If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?** YES NO...NA

4. **Were custody seals on outside of cooler?** YES...NO...NA

   If yes, how many and where: 1 Front

5. **Were the seals intact, signed, and dated correctly?** YES...NO...NA

6. **Were custody papers inside cooler?** YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) HG

7. **Were custody seals on containers:** YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. **Packing mat'l used?** Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. **Cooling process:** Ice Ice-pack Ice (direct contact) Dry ice Other None

10. **Did all containers arrive in good condition (unbroken)?** YES...NO...NA

11. **Were all container labels complete (#, date, signed, pres., etc)?** YES...NO...NA

12. **Did all container labels and tags agree with custody papers?** YES...NO...NA

13a. **Were VOA vials received?** YES...NO...NA

   b. **Was there any observable headspace present in any VOA vial?** YES...NO...NA

14. **Was there a Trip Blank in this cooler?** YES...NO...NA **If multiple coolers, sequence #**_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) HKG

15a. **On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?** YES...NO...NA

   b. **Did the bottle labels indicate that the correct preservatives were used** YES...NO...NA

16. **Was residual chlorine present?** YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) HKG

17. **Were custody papers properly filled out (ink, signed, etc)?** YES...NO...NA

18. **Did you sign the custody papers in the appropriate place?** YES...NO...NA

19. **Were correct containers used for the analysis requested?** YES...NO...NA

20. **Was sufficient amount of sample sent in each container?** YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) HKG

I certify that I attached a label with the unique LIMS number to each container (intial) HKG

21. **Were there Non-Conformance issues at login?** YES...NO **Was a NCM generated?** YES...NO...#_____

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 11/28/12

11/16/2015

Loc: 490
90074

11/16/2015

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
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Consultant Project Mgr: Matt Pelton
Consultant Telephone Number: 919-469-1952 Fax No.: 919-469-5676
Sampler Name: (Print)
Sampler Signature:

TA Account #: 49001238 PO: B0085732.1401
Invoice To: Arcadis
Report To: Matt Pelton
Project Name: VCC Winston Salem
Retail # (MRN #):
Major Project (AFE#):
Site Address: 3000 N. Liberty
City, State, Zip: Winston-Salem, NC
Regulatory District (CA)

	Sample ID or Field ID	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Methanol	Sodium Bisulfate	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass(Yellow Label)	HNO_3 (Red Label)	None (Black Label)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: 6020 Dissolved As, Pb	6020 Total As, Pb	SUB - Total As 7062	SUB - Dissolved As 7062	6020 As with Rare Earth Correction	RUSH TAT (Pre-Schedule) *	TAT request (in Bus. Days)	Fax Results (yes or no)	Due Date of Report
1	WS-MW-07	10-19-15	1045	4	X									4		X						1	1	1	1	✓				
2	WS-MW-2R	10-19-15	1240	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05 (MS)	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05 (MSD)	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
4	WS-MW-06	10-19-15	1600	4	X									4		X						1	1	1	1	✓				
5	WS-QAQC-DUP-01	10-19-15	N/R	4	X									4		X						1	1	1	1	✓				
6	WS-MW-09	10-20-15	0925	4	X									4		X						1	1	1	1	✓				
7	WS-MW-08	10-20-15	1115	4	X									4		X						1	1	1	1	✓				
8	WS-QAQC-EB-01	10-20-15	1145	2	X									2		X							1	1						

Comments/Special Instructions:

Dissolved Parameters were field filtered using 0.45 micron filter

Relinquished by:	Date	Time	Received by:	Date	Time
DB-3 Brian Lovgren	10-20-15	1700	Fed Ex	10-20-15	1700
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time
			2/0g 1.4 TAN	10/21/15	0930

Laboratory Comments:
Temperature Upon Receipt:
Sample Containers Intact? Y N
VOCs Free of Headspace? Y N
QC Deliverables (please circle one)
Level 2 Level 3 Level 4 Other

* It will be the responsibility of ExxonMobil or its consultant to notify the TestAmerica Project Manager by phone or fax that a rush sample will be submitted.
TA Project Manager:_____ Date:_____

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 490-90074-2

Login Number: 90074
List Number: 1
Creator: Gundi, Hozar K

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-90074-1
Client Project/Site: VCC Winston Salem

For:
ARCADIS U.S., Inc.
801 Corporate Center Drive
Suite 300
Raleigh, North Carolina 27607-5073

Attn: Matt Pelton

Authorized for release by:
11/9/2015 2:54:53 PM

Heather Wagner, Project Manager I
(615)301-5763
heather.wagner@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

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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.

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Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-90074-1	WS-MW-07	Water	10/19/15 10:45	10/21/15 09:30
490-90074-2	WS-MW-2R	Water	10/19/15 12:40	10/21/15 09:30
490-90074-3	WS-MW-05	Water	10/19/15 14:15	10/21/15 09:30
490-90074-4	WS-MW-06	Water	10/19/15 16:00	10/21/15 09:30
490-90074-5	WS-QAQC-DUP-01	Water	10/19/15 01:00	10/21/15 09:30
490-90074-6	WS-MW-09	Water	10/20/15 09:25	10/21/15 09:30
490-90074-7	WS-MW-08	Water	10/20/15 11:15	10/21/15 09:30
490-90074-8	WS-QAQC-EB-01	Water	10/20/15 11:45	10/21/15 09:30

Case Narrative

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Job ID: 490-90074-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-90074-1

Comments
No additional comments.

Receipt
The samples were received on 10/21/2015 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4º C.

Metals
Method(s) 6020: The following samples was diluted due to the nature of the sample matrix: WS-MW-09 (490-90074-6) and WS-MW-08 (490-90074-7). Elevated reporting limits (RLs) are provided.

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

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

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
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.
¤	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-07

Lab Sample ID: 490-90074-1

Date Collected: 10/19/15 10:45
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00474		0.00200	0.000500	mg/L		10/24/15 14:06	11/05/15 15:58	1
Lead	0.000651	J	0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:40	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00336		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 04:51	1
Lead	0.000655	J	0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 04:51	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-2R

Lab Sample ID: 490-90074-2

Date Collected: 10/19/15 12:40
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00350		0.00200	0.000500	mg/L		10/24/15 14:06	11/05/15 16:04	1
Lead	0.0158		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:45	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00171	J	0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 04:57	1
Lead	0.0108		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 04:57	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-05

Lab Sample ID: 490-90074-3

Date Collected: 10/19/15 14:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00373		0.00200	0.000500	mg/L		10/24/15 14:06	11/06/15 19:46	1
Lead	0.00202		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 12:43	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00496		0.00200	0.000500	mg/L		10/27/15 10:10	10/30/15 16:52	1
Lead	0.00125	J	0.00200	0.000200	mg/L		10/27/15 10:10	10/30/15 16:52	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-06

Lab Sample ID: 490-90074-4

Date Collected: 10/19/15 16:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00175	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/05/15 16:09	1
Lead	0.0458		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:50	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000963	J	0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:12	1
Lead	0.0315		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:12	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-QAQC-DUP-01

Lab Sample ID: 490-90074-5

Date Collected: 10/19/15 01:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00225		0.00200	0.000500	mg/L		10/24/15 14:06	11/06/15 20:11	1
Lead	0.0161		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:55	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00202		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:17	1
Lead	0.0109		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:17	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-09

Lab Sample ID: 490-90074-6

Date Collected: 10/20/15 09:25
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00971	J	0.0200	0.00500	mg/L		10/24/15 14:06	11/07/15 14:26	10
Lead	0.000374	J	0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 14:01	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00904		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:23	1
Lead	0.000227	J	0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:23	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-08

Lab Sample ID: 490-90074-7

Date Collected: 10/20/15 11:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0204		0.0200	0.00500	mg/L		10/24/15 14:06	11/07/15 14:31	10
Lead	0.00382		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 14:06	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0129		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:28	1
Lead	0.00269		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:28	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-QAQC-EB-01

Lab Sample ID: 490-90074-8

Date Collected: 10/20/15 11:45
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 14:06	11/06/15 20:37	1
Lead	ND		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 14:13	1

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 490-292685/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294891 — **Prep Batch: 292685**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 12:32	1

Lab Sample ID: MB 490-292685/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 296537 — **Prep Batch: 292685**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 14:06	11/06/15 19:35	1

Lab Sample ID: LCS 490-292685/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294891 — **Prep Batch: 292685**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	0.100	0.1100		mg/L		110	80 - 120

Lab Sample ID: LCS 490-292685/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 296537 — **Prep Batch: 292685**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.09354		mg/L		94	80 - 120

Lab Sample ID: 490-90074-3 MS — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294891 — **Prep Batch: 292685**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	0.00202		0.100	0.1099		mg/L		108	75 - 125

Lab Sample ID: 490-90074-3 MS — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 296537 — **Prep Batch: 292685**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.00373		0.100	0.08205		mg/L		78	75 - 125

Lab Sample ID: 490-90074-3 MSD — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 294891 — **Prep Batch: 292685**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	0.00202		0.100	0.1135		mg/L		111	75 - 125	3	20

Lab Sample ID: 490-90074-3 MSD — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 296537 — **Prep Batch: 292685**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00373		0.100	0.08660		mg/L		83	75 - 125	5	20

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Lab Sample ID: MB 490-292303/1-A
Matrix: Water
Analysis Batch: 292903

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 292303

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/23/15 09:23	10/24/15 15:55	1
Lead	ND		0.00200	0.000200	mg/L		10/23/15 09:23	10/24/15 15:55	1

Lab Sample ID: LCS 490-292303/2-A
Matrix: Water
Analysis Batch: 292903

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 292303

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.09299		mg/L		93	80 - 120
Lead	0.100	0.09564		mg/L		96	80 - 120

Lab Sample ID: MB 490-292649/1-A
Matrix: Water
Analysis Batch: 293823

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 292649

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 03:08	1
Lead	ND		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 03:08	1

Lab Sample ID: LCS 490-292649/2-A
Matrix: Water
Analysis Batch: 293823

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 292649

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.08709		mg/L		87	80 - 120
Lead	0.100	0.09019		mg/L		90	80 - 120

Lab Sample ID: MB 490-293111/1-A
Matrix: Water
Analysis Batch: 294891

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 293111

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/27/15 10:10	10/30/15 16:42	1
Lead	ND		0.00200	0.000200	mg/L		10/27/15 10:10	10/30/15 16:42	1

Lab Sample ID: LCS 490-293111/2-A
Matrix: Water
Analysis Batch: 294891

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 293111

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.09752		mg/L		98	80 - 120
Lead	0.100	0.1014		mg/L		101	80 - 120

Lab Sample ID: 490-89853-A-19-A MS
Matrix: Water
Analysis Batch: 292903

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 292303

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	22.2	E	0.100	22.71	E 4	mg/L		510	75 - 125
Lead	ND		0.100	0.09131		mg/L		91	75 - 125

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

Lab Sample ID: 490-89853-B-19-B MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 292903 — **Prep Batch: 292303**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	22.2	E	0.100	20.74	E 4	mg/L		-1460	75 - 125	9	20
Lead	ND		0.100	0.08925		mg/L		89	75 - 125	2	20

Lab Sample ID: 490-90023-B-3-B MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 293823 — **Prep Batch: 292649**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	ND		0.100	0.1002		mg/L		100	75 - 125

Lab Sample ID: 490-90023-B-3-C MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 293823 — **Prep Batch: 292649**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	ND		0.100	0.09942		mg/L		99	75 - 125	1	20

Lab Sample ID: 490-90074-3 MS — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 294891 — **Prep Batch: 293111**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.00496		0.100	0.08049		mg/L		76	75 - 125
Lead	0.00125	J	0.100	0.1110		mg/L		110	75 - 125

Lab Sample ID: 490-90074-3 MSD — **Client Sample ID: WS-MW-05**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 294891 — **Prep Batch: 293111**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.00496		0.100	0.08787		mg/L		83	75 - 125	9	20
Lead	0.00125	J	0.100	0.1170		mg/L		116	75 - 125	5	20

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Metals

Prep Batch: 292303

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-89853-A-19-A MS	Matrix Spike	Dissolved	Water	3005A	
490-89853-B-19-B MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
LCS 490-292303/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-292303/1-A	Method Blank	Total Recoverable	Water	3005A	

Prep Batch: 292649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90023-B-3-B MS	Matrix Spike	Dissolved	Water	3005A	
490-90023-B-3-C MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
490-90074-1	WS-MW-07	Dissolved	Water	3005A	
490-90074-2	WS-MW-2R	Dissolved	Water	3005A	
490-90074-4	WS-MW-06	Dissolved	Water	3005A	
490-90074-5	WS-QAQC-DUP-01	Dissolved	Water	3005A	
490-90074-6	WS-MW-09	Dissolved	Water	3005A	
490-90074-7	WS-MW-08	Dissolved	Water	3005A	
LCS 490-292649/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-292649/1-A	Method Blank	Total Recoverable	Water	3005A	

Prep Batch: 292685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-1	WS-MW-07	Total/NA	Water	3010A	
490-90074-2	WS-MW-2R	Total/NA	Water	3010A	
490-90074-3	WS-MW-05	Total/NA	Water	3010A	
490-90074-3 MS	WS-MW-05	Total/NA	Water	3010A	
490-90074-3 MSD	WS-MW-05	Total/NA	Water	3010A	
490-90074-4	WS-MW-06	Total/NA	Water	3010A	
490-90074-5	WS-QAQC-DUP-01	Total/NA	Water	3010A	
490-90074-6	WS-MW-09	Total/NA	Water	3010A	
490-90074-7	WS-MW-08	Total/NA	Water	3010A	
490-90074-8	WS-QAQC-EB-01	Total/NA	Water	3010A	
LCS 490-292685/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 490-292685/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 292903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-89853-A-19-A MS	Matrix Spike	Dissolved	Water	6020	292303
490-89853-B-19-B MSD	Matrix Spike Duplicate	Dissolved	Water	6020	292303
LCS 490-292303/2-A	Lab Control Sample	Total Recoverable	Water	6020	292303
MB 490-292303/1-A	Method Blank	Total Recoverable	Water	6020	292303

Prep Batch: 293111

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-3	WS-MW-05	Dissolved	Water	3005A	
490-90074-3 MS	WS-MW-05	Dissolved	Water	3005A	
490-90074-3 MSD	WS-MW-05	Dissolved	Water	3005A	
LCS 490-293111/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-293111/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 293823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90023-B-3-B MS	Matrix Spike	Dissolved	Water	6020	292649

Metals (Continued)

Analysis Batch: 293823 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90023-B-3-C MSD	Matrix Spike Duplicate	Dissolved	Water	6020	292649
490-90074-1	WS-MW-07	Dissolved	Water	6020	292649
490-90074-2	WS-MW-2R	Dissolved	Water	6020	292649
490-90074-4	WS-MW-06	Dissolved	Water	6020	292649
490-90074-5	WS-QAQC-DUP-01	Dissolved	Water	6020	292649
490-90074-6	WS-MW-09	Dissolved	Water	6020	292649
490-90074-7	WS-MW-08	Dissolved	Water	6020	292649
LCS 490-292649/2-A	Lab Control Sample	Total Recoverable	Water	6020	292649
MB 490-292649/1-A	Method Blank	Total Recoverable	Water	6020	292649

Analysis Batch: 294891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-1	WS-MW-07	Total/NA	Water	6020	292685
490-90074-2	WS-MW-2R	Total/NA	Water	6020	292685
490-90074-3	WS-MW-05	Dissolved	Water	6020	293111
490-90074-3	WS-MW-05	Total/NA	Water	6020	292685
490-90074-3 MS	WS-MW-05	Dissolved	Water	6020	293111
490-90074-3 MS	WS-MW-05	Total/NA	Water	6020	292685
490-90074-3 MSD	WS-MW-05	Dissolved	Water	6020	293111
490-90074-3 MSD	WS-MW-05	Total/NA	Water	6020	292685
490-90074-4	WS-MW-06	Total/NA	Water	6020	292685
490-90074-5	WS-QAQC-DUP-01	Total/NA	Water	6020	292685
490-90074-6	WS-MW-09	Total/NA	Water	6020	292685
490-90074-7	WS-MW-08	Total/NA	Water	6020	292685
490-90074-8	WS-QAQC-EB-01	Total/NA	Water	6020	292685
LCS 490-292685/2-A	Lab Control Sample	Total/NA	Water	6020	292685
LCS 490-293111/2-A	Lab Control Sample	Total Recoverable	Water	6020	293111
MB 490-292685/1-A	Method Blank	Total/NA	Water	6020	292685
MB 490-293111/1-A	Method Blank	Total Recoverable	Water	6020	293111

Analysis Batch: 296262

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-1	WS-MW-07	Total/NA	Water	6020	292685
490-90074-2	WS-MW-2R	Total/NA	Water	6020	292685
490-90074-4	WS-MW-06	Total/NA	Water	6020	292685

Analysis Batch: 296537

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-3	WS-MW-05	Total/NA	Water	6020	292685
490-90074-3 MS	WS-MW-05	Total/NA	Water	6020	292685
490-90074-3 MSD	WS-MW-05	Total/NA	Water	6020	292685
490-90074-5	WS-QAQC-DUP-01	Total/NA	Water	6020	292685
490-90074-8	WS-QAQC-EB-01	Total/NA	Water	6020	292685
LCS 490-292685/2-A	Lab Control Sample	Total/NA	Water	6020	292685
MB 490-292685/1-A	Method Blank	Total/NA	Water	6020	292685

Analysis Batch: 296759

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-90074-6	WS-MW-09	Total/NA	Water	6020	292685
490-90074-7	WS-MW-08	Total/NA	Water	6020	292685

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-07 — Lab Sample ID: 490-90074-1

Date Collected: 10/19/15 10:45 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	293823	10/29/15 04:51	KKK	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 13:40	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	296262	11/05/15 15:58	CME	TAL NSH

Client Sample ID: WS-MW-2R — Lab Sample ID: 490-90074-2

Date Collected: 10/19/15 12:40 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	293823	10/29/15 04:57	KKK	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 13:45	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	296262	11/05/15 16:04	CME	TAL NSH

Client Sample ID: WS-MW-05 — Lab Sample ID: 490-90074-3

Date Collected: 10/19/15 14:15 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			293111	10/27/15 10:10	ZLN	TAL NSH
Dissolved	Analysis	6020		1	294891	10/30/15 16:52	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 12:43	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	296537	11/06/15 19:46	KKK	TAL NSH

Client Sample ID: WS-MW-06 — Lab Sample ID: 490-90074-4

Date Collected: 10/19/15 16:00 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	293823	10/29/15 05:12	KKK	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 13:50	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	296262	11/05/15 16:09	CME	TAL NSH

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-QAQC-DUP-01 — Lab Sample ID: 490-90074-5

Date Collected: 10/19/15 01:00 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	293823	10/29/15 05:17	KKK	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 13:55	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	296537	11/06/15 20:11	KKK	TAL NSH

Client Sample ID: WS-MW-09 — Lab Sample ID: 490-90074-6

Date Collected: 10/20/15 09:25 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	293823	10/29/15 05:23	KKK	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 14:01	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		10	296759	11/07/15 14:26	KKK	TAL NSH

Client Sample ID: WS-MW-08 — Lab Sample ID: 490-90074-7

Date Collected: 10/20/15 11:15 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			292649	10/24/15 13:18	ZLN	TAL NSH
Dissolved	Analysis	6020		1	293823	10/29/15 05:28	KKK	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 14:06	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		10	296759	11/07/15 14:31	KKK	TAL NSH

Client Sample ID: WS-QAQC-EB-01 — Lab Sample ID: 490-90074-8

Date Collected: 10/20/15 11:45 — **Matrix: Water**
Date Received: 10/21/15 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	294891	10/30/15 14:13	CME	TAL NSH
Total/NA	Prep	3010A			292685	10/24/15 14:06	ZLN	TAL NSH
Total/NA	Analysis	6020		1	296537	11/06/15 20:37	KKK	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL NSH

Protocol References:

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

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	07-24-16
Arizona	State Program	9	AZ0473	05-05-16
Arkansas DEQ	State Program	6	88-0737	04-25-16
California	State Program	9	2938	10-31-16
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-16
Georgia	State Program	4	N/A	06-30-16
Illinois	NELAP	5	200010	12-09-15 *
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	01-31-16
Kentucky (UST)	State Program	4	19	06-30-16
Kentucky (WW)	State Program	4	90038	12-31-15
Louisiana	NELAP	6	30613	06-30-16
Maine	State Program	1	TN00032	11-03-17
Maryland	State Program	3	316	03-31-16
Massachusetts	State Program	1	M-TN032	06-30-16
Minnesota	NELAP	5	047-999-345	12-31-16
Mississippi	State Program	4	N/A	06-30-16
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-16
New Hampshire	NELAP	1	2963	10-09-16
New Jersey	NELAP	2	TN965	11-30-15
New York	NELAP	2	11342	03-31-16
North Carolina (WW/SW)	State Program	4	387	12-31-15
North Dakota	State Program	8	R-146	06-30-15 *
Ohio VAP	State Program	5	CL0033	07-10-17
Oklahoma	State Program	6	9412	08-31-16
Oregon	NELAP	10	TN200001	04-27-16
Pennsylvania	NELAP	3	68-00585	06-30-16
Rhode Island	State Program	1	LAO00268	12-30-15
South Carolina	State Program	4	84009 (001)	02-28-16
South Carolina (Do Not Use - DW)	State Program	4	84009 (002)	12-16-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-16
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-16
Virginia	NELAP	3	460152	06-14-16
Washington	State Program	10	C789	07-19-16
West Virginia DEP	State Program	3	219	02-28-16
Wisconsin	State Program	5	998020430	08-31-16
Wyoming (UST)	A2LA	8	453.07	12-31-15

* Certification renewal pending - certification considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FOR Baton Rouge

490-90074 Chain of Custody

Cooler Received/Opened On: 10/21/2015 @0930

1. **Tracking #** 6282 **(last 4 digits, FedEx)**

Courier: Fed-Ex **IR Gun ID:** 17960357

2. **Temperature of rep. sample or temp blank when opened:** 1.4 *Degrees Celsius*

3. **If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?** YES NO...NA

4. **Were custody seals on outside of cooler?** YES...NO...NA

   If yes, how many and where: 1 Front

5. **Were the seals intact, signed, and dated correctly?** YES...NO...NA

6. **Were custody papers inside cooler?** YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) HG

7. **Were custody seals on containers:** YES NO and Intact YES...NO...NA

   Were these signed and dated correctly? YES...NO...NA

8. **Packing mat'l used?** Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. **Cooling process:** Ice Ice-pack Ice (direct contact) Dry ice Other None

10. **Did all containers arrive in good condition (unbroken)?** YES...NO...NA

11. **Were all container labels complete (#, date, signed, pres., etc)?** YES...NO...NA

12. **Did all container labels and tags agree with custody papers?** YES...NO...NA

13a. **Were VOA vials received?** YES...NO...NA

   b. **Was there any observable headspace present in any VOA vial?** YES...NO...NA

14. **Was there a Trip Blank in this cooler?** YES...NO...NA **If multiple coolers, sequence #**_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) HKG

15a. **On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?** YES...NO...NA

   b. **Did the bottle labels indicate that the correct preservatives were used** YES...NO...NA

16. **Was residual chlorine present?** YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) HKG

17. **Were custody papers properly filled out (ink, signed, etc)?** YES...NO...NA

18. **Did you sign the custody papers in the appropriate place?** YES...NO...NA

19. **Were correct containers used for the analysis requested?** YES...NO...NA

20. **Was sufficient amount of sample sent in each container?** YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) HKG

I certify that I attached a label with the unique LIMS number to each container (intial) HKG

21. **Were there Non-Conformance issues at login?** YES...NO **Was a NCM generated?** YES...NO...#_____

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 11/28/12

11/9/2015

Loc: 490
90074

11/9/2015

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville Division
2960 Foster Creighton
Nashville, TN 37204
Phone: 615-726-0177
Toll Free: 800-765-0980
Fax: 615-726-3404

ExxonMobil

Consultant Name: ARCADIS Cary - Exxon (10141)
Address: 801 Corporate Center Dr, Suite 300
City/State/Zip: Raleigh, NC 27607
ExxonMobil Project Mgr:
Consultant Project Mgr: Matt Pelton
Consultant Telephone Number: 919-469-1952 Fax No.: 919-469-5676
Sampler Name: (Print)
Sampler Signature:

TA Account #: 49001238 PO: B0085732.1401
Invoice To: Arcadis
Report To: Matt Pelton
Project Name: VCC Winston Salem
Retail # (MRN #):
Major Project (AFE#):
Site Address: 3000 N. Liberty
City, State, Zip: Winston-Salem, NC
Regulatory District (CA)

	Sample ID or Field ID	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Methanol	Sodium Bisulfate	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass(Yellow Label)	HNO_3 (Red Label)	None (Black Label)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: 6020 Dissolved As, Pb	6020 Total As, Pb	SUB - Total As 7062	SUB - Dissolved As 7062	6020 As with Rare Earth Correction	RUSH TAT (Pre-Schedule) *	TAT request (in Bus. Days)	Fax Results (yes or no)	Due Date of Report
1	WS-MW-07	10-19-15	1045	4	X									4		X						1	1	1	1	✓				
2	WS-MW-2R	10-19-15	1240	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05 (MS)	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05 (MSD)	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
4	WS-MW-06	10-19-15	1600	4	X									4		X						1	1	1	1	✓				
5	WS-QAQC-DUP-01	10-19-15	N/R	4	X									4		X						1	1	1	1	✓				
6	WS-MW-09	10-20-15	0925	4	X									4		X						1	1	1	1	✓				
7	WS-MW-08	10-20-15	1115	4	X									4		X						1	1	1	1	✓				
8	WS-QAQC-EB-01	10-20-15	1145	2	X									2		X							1	1						

Comments/Special Instructions:

Dissolved Parameters were field filtered using 0.45 micron filter

Relinquished by:	Date	Time	Received by:	Date	Time
DB-3 Brian Lovgren	10-20-15	1700	Fed Ex	10-20-15	1700
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time
			2/0g 1.4 TAN	10/21/15	0930

Laboratory Comments:
Temperature Upon Receipt:
Sample Containers Intact? Y N
VOCs Free of Headspace? Y N

QC Deliverables (please circle one)
Level 2 Level 3 Level 4 Other

* It will be the responsibility of ExxonMobil or its consultant to notify the TestAmerica Project Manager by phone or fax that a rush sample will be submitted.
TA Project Manager:_____ Date:_____

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 490-90074-1

Login Number: 90074
List Number: 1
Creator: Gundi, Hozar K

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ATTACHMENT 9

ExxonMobil VCC Winston Salem Data Review - April 2015

Imagine the result

ExxonMobil VCC Winston Salem

Data Review

WINSTON SALEM, NORTH CAROLINA

Total and Dissolved Metals and Miscellaneous Analyses

SDGs #490-77045-1 and 490-77045-2

Analyses Performed By:
Test America Analytical Testing Corporation
Nashville, Tennessee

And

ALS Environmental
Kelso, Washington

Report: #23188R
Review Level: Tier III
Project: B0085732.1501.00004

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) #490-77045-1 and 490-77045-2 for samples collected in association with the ExxonMobil VCC-Winston Salem site in Winston Salem, North Carolina. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG Number	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis	
						MET	MISC
490-77045-1	WS-MW-07	490-77045-1	Water	4/20/2015		X	
	WS-MW-2R	490-77045-2	Water	4/20/2015		X	
	WS-MW-05	490-77045-3	Water	4/20/2015		X	
	WS-MW-06	490-77045-4	Water	4/20/2015		X	
	WS-QAQC-DUP-01	490-77045-5	Water	4/20/2015	WS-MW-2R	X	
	WS-MW-09	490-77045-6	Water	4/21/2015		X	
	WS-MW-08	490-77045-7	Water	4/21/2015		X	
	WS-QAQC-EB-01	490-77045-8	Water	4/21/2015		X	
490-77045-2	WS-MW-09	490-77045-6	Water	4/21/2015		X	
	WS-MW-08	490-77045-7	Water	4/21/2015		X	

Note:
1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample locations WS-MW-09 and WS-MW-08.
2. Arsenic (total and dissolved) results from SDG 490-77045-2 have taken into account a inter element correction factor for samarium/neodymium.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

Note: SDG #490-77045-2; Method 6020: The samples in this report were run by a modified 6020 method that corrected for rare earth element interference in arsenic recovery. The lab analyzed the single rare earth elements Neodymium and Samarium to determine the positive interferences on Arsenic. An equation was derived to calculate the correction which would offset the interference of these rare earth elements. The individual rare earth analytes were added to the interference check sample A (ICSA) at a concentration greater than what was expected in the samples (500ppb) to verify the equation was sufficient. The instrument was then calibrated for all analytes of interest including the rare earth elements. The client samples were then analyzed using this calibration and the derived equation.

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6020 and 7062. Data were reviewed in accordance with USEPA National Functional Guidelines for Data Review for October 2004 was used for guidance.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6020	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All analytes associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the analytes listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
WS-MW-07 WS-MW-2R WS-MW-05 WS-MW-06 WS-QAQC-DUP-01	Arsenic (dissolved) (490-77045-2) (MB)	Detected sample results >RL and <BAL	"UB" at detected sample concentration

RL = reporting limit
MB = method blank

3. Mass Spectrometer Tuning

The %RSD of the absolute signals for all analytes in the tuning solution must be less than 5% for each analyte and the instrument mass resolution must be within 0.1 amu over manufacturer's specifications the range of 6-210 amu.

Mass spectrometer performance and system performance was acceptable.

4. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

4.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All initial and continuing calibration verification standard recoveries were within the control limit.

4.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

4.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

5. Internal Standard Performance (SW-846 6020 analysis only)

Internal standard performance criteria insure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

6.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analyte present in the table below.

Sample Location	Analyte	MS Recovery	MSD Recovery
WS-MW-09	Lead (total)	<LL but >30%	101%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

6.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the detection limit. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the detection limit, a

The MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

7. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/ Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
WS-MW-2R/ WS-QAQC-DUP-01	Arsenic (Total) (SDG #490-77045-1)	0.0037	0.0027	AC
	Lead (Total) (SDG #490-77045-1)	0.0125	0.011	12.7%
	Lead (Dissolved) (SDG #490-77045-1)	0.0103	0.00891	14.4%

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method

independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS/LCSD analysis exhibited recoveries within the control limits.

9. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution exhibited %D within the control limit.

10. General Assessment – Total vs. Dissolved

The calculated %D between the total and the dissolved sample results were within the control limit.

11. System Performance and Overall Assessment

Note: SDG #490-77045-2; Method 6020: The samples in this report were run by a modified 6020 method that corrected for rare earth element interference in arsenic recovery. The lab analyzed the single rare earth elements Neodymium and Samarium to determine the positive interferences on Arsenic. An equation was derived to calculate the correction which would offset the interference of these rare earth elements. The individual rare earth analytes were added to the interference check sample A (ICSA) at a concentration greater than what was expected in the samples (500ppb) to verify the equation was sufficient. The instrument was then calibrated for all analytes of interest including the rare earth elements. The client samples were then analyzed using this calibration and the derived equation.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6020	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X	X		
C. Equipment/Field Blanks					X
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved		X		X	
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7062	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table.

All CRDL standard recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instances where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory qualifier flag will be removed.

The MS/MSD analysis exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

The MS/MSD was performed in replace of the laboratory duplicate analysis. The RPD between the MS and MSD recoveries were within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/ Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
WS-MW-2R/ WS-QAQC-DUP-01	Arsenic (total and dissolved)	0.2 U	0.2 U	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120% is applied for water matrices and laboratory-established acceptance limits for soil matrices.

The LCS analysis exhibited recoveries within the control limits.

7. Method of Standard Additions (MSA)

No samples were analyzed following the method of standard additions.

8. General Assessment – Total vs. Dissolved

The calculated %D between the total and the dissolved sample results were within the control limit.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 7062	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Graphite Furnace – Atomic Absorption					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
MSA		X		X	
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

VALIDATION PERFORMED BY: Todd Church

SIGNATURE:

DATE: July 27, 2015

PEER REVIEW: Dennis Capria

DATE: July 29, 2015

DATA QUALIFIER SUMMARY

REPORT NUMBER 23984T
ANALYTICAL DATA VALIDATION SUMMARY

Sample Delivery Group No.	Sample ID	Compound	Qualifier	Reason
Inorganic Analysis				
490-77045-1	WS-MW-07	Arsenic (dissolved)	UB	Blank contamination
		Lead (total)	J	MS %R
	WS-MW-2R	Arsenic (dissolved)	UB	Blank contamination
		Lead (total)	J	MS %R
	WS-MW-05	Arsenic (dissolved)	UB	Blank contamination
		Lead (total)	J	MS %R
	WS-MW-06	Arsenic (dissolved)	UB	Blank contamination
		Lead (total)	J	MS %R
	WS-QAQC-DUP-01	Arsenic (dissolved)	UB	Blank contamination
		Lead (total)	J	MS %R
	WS-MW-09	None	--	--
	WS-MW-08	None	--	--
	WS-QAQC-EB-01	Lead (total)	UJ	MS %R
490-77045-2	WS-MW-09	None	--	--
	WS-MW-08	None	--	--

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Loc: 490
77045

5/13/2015

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Nashville Division
2960 Foster Creighton
Nashville, TN 37204
Phone: 615-726-0177
Toll Free: 800-765-0980
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ExxonMobil

Consultant Name: ARCADIS Cary - Exxon (10141)
Address: 801 Corporate Center Dr, Suite 300
City/State/Zip: Raleigh, NC 27607
ExxonMobil Project Mgr:
Consultant Project Mgr: Matt Pelton
Consultant Telephone Number: 919-469-1952 Fax No.: 919-469-5676
Sampler Name: (Print) Brian Lovgren
Sampler Signature:

TA Account #: 49001238 PO: B0085732.1401
Invoice To: Arcadis
Report To: Matt Pelton
Project Name: VCC Winston Salem
Retail # (MRN #):
Major Project (AFE#):
Site Address 3000 N. Liberty Street
City, State, Zip Winston-Salem, NC
Regulatory District (CA)

	Sample ID or Field ID	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Methanol	Sodium Bisulfate	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass (Yellow Label)	HNO_3 (Red Label)	None (Black Label)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: 6010 Dissolved As, Pb	6010 Total As, Pb	6010 TAL Metals	6010 TCLP Metals	pH	RUSH TAT (Pre-Schedule) *	TAT request (in Bus. Days)	Fax Results (yes or no)	Due Date of Report
1	WS-MW-07	4-20-15	1310	2	X									2		X						1	1							
2	WS-MW-2R	4-20-15	1435	2	X									2		X						1	1							
3	WS-MW-05	4-20-15	1630	2	X									2		X						1	1							
4	WS-MW-06	4-20-15	1740	2	X									2		X						1	1							
5	WS-QAQC-DUP-01	4-20-15	N/R	2	X									2		X						1	1							
6	WS-MW-09	4-21-15	0850	2	X									2		X						1	1							
1	WS-MW-09 (MS)	4-21-15	0850	2	X									2		X						1	1							
1	WS-MW-09 (MSD)	4-21-15	0850	2	X									2		X						1	1							
7	WS-MW-08	4-21-15	1050	2	X									2		X						1	1							
8	WS-QAQC-FB-01	4-21-15	1120	1	X									1		X							1							

Comments/Special Instructions:

Laboratory Comments:
Temperature Upon Receipt: 2.7c
Sample Containers Intact? Y N
VOCs Free of Headspace? Y N
QC Deliverables (please circle one)
Level 2 Level 3 Level 4 Other

Relinquished by:	Date	Time	Received by:	Date	Time
Brian Lovgren	4-21-15	1700	FedEx	4-21-15	1700
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time
			TAN	4-22-15	0830

* It will be the responsibility of ExxonMobil or its consultant to notify the TestAmerica Project Manager by phone or fax that a rush sample will be submitted.
TA Project Manager:_____ Date:_____

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-07

Lab Sample ID: 490-77045-1

Date Collected: 04/20/15 13:10

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00852		0.00200	0.000500	mg/L		04/23/15 11:08	04/24/15 17:21	1
Lead	0.00116	J	0.00200	0.000200	mg/L		04/23/15 11:08	04/24/15 17:21	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00762	~~B~~ UB	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:38	1
Lead	0.00110	J	0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:38	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-2R

Lab Sample ID: 490-77045-2

Date Collected: 04/20/15 14:35

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00370		0.00200	0.000500	mg/L		04/23/15 11:08	04/24/15 17:27	1
Lead	0.0125	J	0.00200	0.000200	mg/L		04/23/15 11:08	04/24/15 17:27	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00417	~~B~~ UB	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:43	1
Lead	0.0103		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:43	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-05

Lab Sample ID: 490-77045-3

Date Collected: 04/20/15 16:30

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00398		0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 17:54	1
Lead	0.00225	J	0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 17:54	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00591	~~B~~ UB	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:49	1
Lead	0.00191	J	0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:49	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-06

Lab Sample ID: 490-77045-4

Date Collected: 04/20/15 17:40

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00101	J	0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 17:59	1
Lead	0.0354	J	0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 17:59	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00241	~~B~~ UB	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 14:06	1
Lead	0.0317		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 14:06	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-QAQC-DUP-01

Lab Sample ID: 490-77045-5

Date Collected: 04/20/15 01:00

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00270		0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 18:04	1
Lead	0.0110	J	0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 18:04	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00344	~~B~~ UB	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 14:11	1
Lead	0.00891		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 14:11	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-09

Lab Sample ID: 490-77045-6

Date Collected: 04/21/15 08:50

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0245		0.0100	0.00250	mg/L		04/23/15 16:45	04/28/15 11:09	5
Lead	0.000647	J ~~F1~~	0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 18:09	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0284	~~B~~	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 13:10	1
Lead	0.000948	J	0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 13:10	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-MW-08

Lab Sample ID: 490-77045-7

Date Collected: 04/21/15 10:50

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0609		0.0200	0.00500	mg/L		04/23/15 16:45	04/28/15 11:25	10
Lead	0.00492	J	0.0200	0.00200	mg/L		04/23/15 16:45	04/28/15 11:25	10

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0791	~~B~~	0.00200	0.000500	mg/L		04/22/15 16:58	04/24/15 14:17	1
Lead	0.00593		0.00200	0.000200	mg/L		04/22/15 16:58	04/24/15 14:17	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-1

Client Sample ID: WS-QAQC-EB-01

Lab Sample ID: 490-77045-8

Date Collected: 04/21/15 11:20

Matrix: Ground Water

Date Received: 04/22/15 08:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		04/23/15 16:45	04/27/15 18:39	1
Lead	ND	UJ	0.00200	0.000200	mg/L		04/23/15 16:45	04/27/15 18:39	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		04/24/15 09:18	04/27/15 20:27	1
Lead	ND		0.00200	0.000200	mg/L		04/24/15 09:18	04/27/15 20:27	1

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

K1504200

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Lovgren	Lab PM: Wagner, Heather	Carrier Tracking No(s):	COC No: 490-37961-12845.2
Client Contact: Matt Pelton	Phone: 919-604-4557	E-Mail: heather.wagner@testamericainc.com		Page: Page 2 of 2
Company: ARCADIS U.S., Inc.				Job #: B0085732.1501
Address: 801 Corporate Center Drive Suite 300	Due Date Requested:			
City: Raleigh	TAT Requested (days):			
State, Zip: NC, 27607-5073				
Phone: 919-415-2308	Purchase Order Requested			
Email: matthew.pelton@arcadis-us.com	WO #:			
Project Name: Winston Salem VCC Semi Annual	TestAmerica Project #: 49001238			
Site: Winston Salem, NC	Non-ENFOS			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT - Total Arsenic by 7062	SUBCONTRACT - Dissolved Arsenic by 7062	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D		
WS-MW-07	4-20-15	1310	G	Water	X		1	1		
WS-MW-2R	4-20-15	1435	G		X		1	1		
WS-MW-05	4-20-15	1630	G		X		1	1		
WS-MW-06	4-20-15	1740	G		X		1	1		
WS-QAQC-DUP-01	4-20-15	NIR	G		X		1	1		
WS-MW-09	4-21-15	0850	G		X		1	1		
WS-MW-09 (MS)	4-21-15	0850	G		X		1	1		
WS-MW-09 (MSD)	4-21-15	0850	G		X		1	1		
WS-MW-08	4-21-15	1050	G		X		1	1		
WS-QAQC-EB-01	4-21-15	1120	G		X		1			

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Brian Lovgren	4-21-15/1700	Arcadis	FedEx	4-21-15/1700	FedEx
			ARS	4/22/15 1000	ARS

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1504200-001**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1504200-001DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1504200-002**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1504200-002DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1504200-003**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1504200-003DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1504200-004**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1504200-004DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1504200-005**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/20/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1504200-005DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1504200-006**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1504200-006DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1504200-007**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1504200-007DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1504200
Project No.:	49001238	**Date Collected:**	04/21/15
Project Name:	Winston Salem VCC Semi Annual	**Date Received:**	04/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-EB-01** **Lab Code:** **K1504200-008**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.2	2.0	04/23/15	05/04/15	0.2	U	

Comments:

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Client Sample ID: WS-MW-09

Date Collected: 04/21/15 08:50
Date Received: 04/22/15 08:30

Lab Sample ID: 490-77045-6

Matrix: Ground Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00254		0.00200	0.000500	mg/L		07/07/15 11:51	07/13/15 19:26	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00191	J	0.00200	0.000500	mg/L		07/09/15 09:27	07/13/15 18:30	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-77045-2

Client Sample ID: WS-MW-08

Date Collected: 04/21/15 10:50
Date Received: 04/22/15 08:30

Lab Sample ID: 490-77045-7

Matrix: Ground Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00755		0.00200	0.000500	mg/L		07/07/15 11:51	07/13/15 19:00	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00583		0.00200	0.000500	mg/L		07/09/15 09:27	07/13/15 18:04	1

ATTACHMENT 10

ExxonMobil VCC Winston Salem Data Review - October 2015

Imagine the result

ExxonMobil VCC Winston Salem

Data Review

WINSTON SALEM, NORTH CAROLINA

Total and Dissolved Metals and Miscellaneous Analyses

SDGs #490-90074-1 and 490-90074-2

Analyses Performed By:
Test America Analytical Testing Corporation
Nashville, Tennessee

And

ALS Environmental
Kelso, Washington

Report: #24698R
Review Level: Tier III
Project: B0085732.1501.00004

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) #490-90074-1 and 490-90074-2 for samples collected in association with the ExxonMobil VCC-Winston Salem site in Winston Salem, North Carolina. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

SDG Number	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis	
						MET	MISC
490-90074-1	WS-MW-07	490-90074-1	Water	10/19/2015		X	
	WS-MW-2R	490-90074-2	Water	10/19/2015		X	
	WS-MW-05	490-90074-3	Water	10/19/2015		X	
	WS-MW-06	490-90074-4	Water	10/19/2015		X	
	WS-QAQC-DUP-01	490-90074-5	Water	10/19/2015	WS-MW-2R	X	
	WS-MW-09	490-90074-6	Water	10/20/2015		X	
	WS-MW-08	490-90074-7	Water	10/20/2015		X	
	WS-QAQC-EB-01	490-90074-8	Water	10/20/2015		X	
490-90074-2	WS-MW-07	490-90074-1	Water	10/19/2015		X	
	WS-MW-2R	490-90074-2	Water	10/19/2015		X	
	WS-MW-05	490-90074-3	Water	10/19/2015		X	
	WS-MW-06	490-90074-4	Water	10/19/2015		X	
	WS-QAQC-DUP-01	490-90074-5	Water	10/19/2015	WS-MW-2R	X	
	WS-MW-09	490-90074-6	Water	10/20/2015		X	
	WS-MW-08	490-90074-7	Water	10/20/2015		X	

Note:
1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample locations WS-MW-05.
2. Arsenic (total and dissolved) results from SDG 490-90074-2 have taken into account a inter element correction factor for samarium/neodymium.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

Note: SDG #490-90074-2; Method 6020: The samples in this report were run by a modified 6020 method that corrected for rare earth element interference in arsenic recovery. The lab analyzed the single rare earth elements Neodymium and Samarium to determine the positive interferences on Arsenic. An equation was derived to calculate the correction which would offset the interference of these rare earth elements. The individual rare earth analytes were added to the interference check sample A (ICSA) at a concentration greater than what was expected in the samples (500ppb) to verify the equation was sufficient. The instrument was then calibrated for all analytes of interest including the rare earth elements. The client samples were then analyzed using this calibration and the derived equation.

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6020 and 7062. Data were reviewed in accordance with USEPA National Functional Guidelines for Data Review for October 2004 was used for guidance.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.

  B The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

  E The reported value is estimated due to the presence of interference.

  N Spiked sample recovery is not within control limits.

  * Duplicate analysis is not within control limits.

- Validation Qualifiers

  J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.

  UB Analyte considered non-detect at the listed value due to associated blank contamination.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6020	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

The %RSD of the absolute signals for all analytes in the tuning solution must be less than 5% for each analyte and the instrument mass resolution must be within 0.1 amu over manufacturer‘s specifications the range of 6-210 amu.

Mass spectrometer performance and system performance was acceptable.

4. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument’s continuing performance is satisfactory.

4.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 for all non-ICP analytes and all initial calibration verification standard recoveries were within control limits.

All initial and continuing calibration verification standard recoveries were within the control limit.

4.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The CRDL standard is not required for the analysis of aluminum (Al), barium (Ba), calcium (Ca), iron (Fe), magnesium (Mg), sodium (Na), and potassium (K). The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table (if applicable).

All CRDL standard recoveries were within control limits.

4.3 ICP Interference Control Sample (ICS)

The ICS verifies the laboratories interelement and background correction factors.

All ICS exhibited recoveries within the control limits.

5. Internal Standard Performance (SW-846 6020 analysis only)

Internal standard performance criteria insure that the ICP/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard analytes associated with the metals must exhibit a percent recovery within the established acceptance limits of 60% to 125%

All internal standard responses were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

6.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

All analytes associated with MS/MSD recoveries were within control limits

6.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the detection limit. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the detection limit, a

The MS/MSD analysis was performed in replacement of the laboratory duplicate analysis. The MS/MSD recoveries exhibited acceptable RPD.

7. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/ Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
WS-MW-2R / WS-QAQC-DUP-01	Arsenic (Total) (SDG #490-90074-1)	3.5	2.25	AC
	Lead (Total) (SDG #490-90074-1)	15.8	16.1	1.8%
	Arsenic (Dissolved) (SDG #490-90074-1)	1.71 J	2.02	AC
	Lead (Dissolved) (SDG #490-90074-1)	10.8	10.9	0.9%

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS/LCSD analysis exhibited recoveries within the control limits.

9. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution exhibited %D within the control limit.

10. General Assessment – Total vs. Dissolved

The calculated %D between the total and the dissolved sample results were within the control limit.

11. System Performance and Overall Assessment

Note: SDG #490-90074-2; Method 6020: The samples in this report were run by a modified 6020 method that corrected for rare earth element interference in arsenic recovery. The lab analyzed the single rare earth elements Neodymium and Samarium to determine the positive interferences on Arsenic. An equation was derived to calculate the correction which would offset the interference of these rare earth elements. The individual rare earth analytes were added to the interference check sample A (ICSA) at a concentration greater than what was expected in the samples (500ppb) to verify the equation was

sufficient. The instrument was then calibrated for all analytes of interest including the rare earth elements. The client samples were then analyzed using this calibration and the derived equation.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 6020	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
ICP Serial Dilution %D		X		X	
Total vs. Dissolved		X		X	
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
ICP Interference Check		X		X	
ICP-MS Internal Standards		X		X	
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 7062	Water	180 days from collection to analysis	Cool to <6 °C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool to <6 °C.

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Calibration

Satisfactory instrument calibration is established to provide that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument's continuing performance is satisfactory.

3.1 Initial Calibration and Continuing Calibration

The correct number and type of standards were analyzed. The correlation coefficient of the initial calibration was greater than 0.995 and all initial calibration verification standard recoveries were within control limits.

All continuing calibration verification standard recoveries were within the control limit.

3.2 CRDL Check Standard

The CRDL check standard serves to verify the linearity of calibration of the analysis at the CRDL. The criteria used to evaluate the CRDL standard analysis are presented below in the CRDL standards evaluation table.

All CRDL standard recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

4.1 MS/MSD Analysis

All metal analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instances where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory qualifier flag will be removed.

The MS/MSD analysis exhibited recoveries within the control limits.

4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the CRDL. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the CRDL, a control limit of one times the CRDL is applied for water matrices and two times the CRDL for soil matrices.

The MS/MSD was performed in replace of the laboratory duplicate analysis. The RPD between the MS and MSD recoveries were within the control limit.

5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/ Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
WS-MW-2R / WS-QAQC-DUP-01	Arsenic (total and dissolved)	0.4 U	0.4 U	AC

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120% is applied for water matrices and laboratory-established acceptance limits for soil matrices.

The LCS analysis exhibited recoveries within the control limits.

7. Method of Standard Additions (MSA)

No samples were analyzed following the method of standard additions.

8. General Assessment – Total vs. Dissolved

The calculated %D between the total and the dissolved sample results were within the control limit.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METAL

METALS; SW-846 7062	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Graphite Furnace – Atomic Absorption					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Instrument Blanks		X		X	
B. Method Blanks		X		X	
C. Equipment/Field Blanks		X		X	
Laboratory Control Sample (LCS)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Reporting Limit Verification		X		X	
Tier III Validation					
Initial Calibration Verification		X		X	
Continuing Calibration Verification		X		X	
CRDL Standard Recovery		X		X	
MSA		X		X	
Transcription/calculations acceptable		X		X	
Raw Data		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

%R Percent recovery
RPD Relative percent difference

VALIDATION PERFORMED BY: Andrew Korycinski

SIGNATURE: _____

DATE: November 29, 2015

PEER REVIEW: Todd Church

DATE: December 4, 2015

DATA QUALIFIER SUMMARY

REPORT NUMBER 24698T
ANALYTICAL DATA VALIDATION SUMMARY

Sample Delivery Group No.	Sample ID	Compound	Qualifier	Reason
Inorganic Analysis				
490-90074-1	WS-MW-07	None	--	--
	WS-MW-2R	None	--	--
	WS-MW-05	None	--	--
	WS-MW-06	None	--	--
	WS-QAQC-DUP-01	None	--	--
	WS-MW-09	None	--	--
	WS-MW-08	None	--	--
	WS-QAQC-EB-01	None	--	--
490-90074-2	WS-MW-07	None	--	--
	WS-MW-2R	None	--	--
	WS-MW-05	None	--	--
	WS-MW-06	None	--	--
	WS-QAQC-DUP-01	None	--	--
	WS-MW-09	None	--	--
	WS-MW-08	None	--	--

CHAIN OF CUSTODY/
CORRECTED SAMPLE ANALYSIS DATA SHEETS

Loc: 490
90074

11/9/2015

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville Division
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Nashville, TN 37204
Phone: 615-726-0177
Toll Free: 800-765-0980
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ExxonMobil

Consultant Name: ARCADIS Cary - Exxon (10141)
Address: 801 Corporate Center Dr, Suite 300
City/State/Zip: Raleigh, NC 27607
ExxonMobil Project Mgr:
Consultant Project Mgr: Matt Pelton
Consultant Telephone Number: 919-469-1952 Fax No.: 919-469-5676
Sampler Name: (Print)
Sampler Signature:

TA Account #: 49001238 PO: B0085732.1401
Invoice To: Arcadis
Report To: Matt Pelton
Project Name: VCC Winston Salem
Retail # (MRN #):
Major Project (AFE#):
Site Address: 3000 N. Liberty
City, State, Zip: Winston-Salem, NC
Regulatory District (CA)

	Sample ID or Field ID	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Methanol	Sodium Bisulfate	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass(Yellow Label)	HNO_3 (Red Label)	None (Black Label)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: 6020 Dissolved As, Pb	6020 Total As, Pb	SUB - Total As 7062	SUB - Dissolved As 7062	6020 As with Rare Earth Correction	RUSH TAT (Pre-Schedule) *	TAT request (in Bus. Days)	Fax Results (yes or no)	Due Date of Report
1	WS-MW-07	10-19-15	1045	4	X									4		X						1	1	1	1	✓				
2	WS-MW-2R	10-19-15	1240	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05 (MS)	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
3	WS-MW-05 (MSD)	10-19-15	1415	4	X									4		X						1	1	1	1	✓				
4	WS-MW-06	10-19-15	1600	4	X									4		X						1	1	1	1	✓				
5	WS-QAQC-DUP-01	10-19-15	N/R	4	X									4		X						1	1	1	1	✓				
6	WS-MW-09	10-20-15	0925	4	X									4		X						1	1	1	1	✓				
7	WS-MW-08	10-20-15	1115	4	X									4		X						1	1	1	1	✓				
8	WS-QAQC-EB-01	10-20-15	1145	2	X									2		X							1	1						

Comments/Special Instructions:

Dissolved Parameters were field filtered using 0.45 micron filter

Relinquished by:	Date	Time	Received by:	Date	Time
DB-3 Brian Lovgren	10-20-15	1700	Fed Ex	10-20-15	1700
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time
			2/0g 1.4 TAN	10/21/15	0930

Laboratory Comments:
Temperature Upon Receipt:
Sample Containers Intact? Y N
VOCs Free of Headspace? Y N

QC Deliverables (please circle one)
Level 2 Level 3 Level 4 Other

* It will be the responsibility of ExxonMobil or its consultant to notify the TestAmerica Project Manager by phone or fax that a rush sample will be submitted.
TA Project Manager:_____ Date:_____

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-07

Lab Sample ID: 490-90074-1

Date Collected: 10/19/15 10:45
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00474		0.00200	0.000500	mg/L		10/24/15 14:06	11/05/15 15:58	1
Lead	0.000651	J	0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:40	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00336		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 04:51	1
Lead	0.000655	J	0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 04:51	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-2R

Lab Sample ID: 490-90074-2

Date Collected: 10/19/15 12:40
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00350		0.00200	0.000500	mg/L		10/24/15 14:06	11/05/15 16:04	1
Lead	0.0158		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:45	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00171	J	0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 04:57	1
Lead	0.0108		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 04:57	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-05

Lab Sample ID: 490-90074-3

Date Collected: 10/19/15 14:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00373		0.00200	0.000500	mg/L		10/24/15 14:06	11/06/15 19:46	1
Lead	0.00202		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 12:43	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00496		0.00200	0.000500	mg/L		10/27/15 10:10	10/30/15 16:52	1
Lead	0.00125	J	0.00200	0.000200	mg/L		10/27/15 10:10	10/30/15 16:52	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-06

Lab Sample ID: 490-90074-4

Date Collected: 10/19/15 16:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00175	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/05/15 16:09	1
Lead	0.0458		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:50	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000963	J	0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:12	1
Lead	0.0315		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:12	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-QAQC-DUP-01

Lab Sample ID: 490-90074-5

Date Collected: 10/19/15 01:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00225		0.00200	0.000500	mg/L		10/24/15 14:06	11/06/15 20:11	1
Lead	0.0161		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 13:55	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00202		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:17	1
Lead	0.0109		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:17	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-09

Lab Sample ID: 490-90074-6

Date Collected: 10/20/15 09:25
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00971	J	0.0200	0.00500	mg/L		10/24/15 14:06	11/07/15 14:26	10
Lead	0.000374	J	0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 14:01	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00904		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:23	1
Lead	0.000227	J	0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:23	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-MW-08

Lab Sample ID: 490-90074-7

Date Collected: 10/20/15 11:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0204		0.0200	0.00500	mg/L		10/24/15 14:06	11/07/15 14:31	10
Lead	0.00382		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 14:06	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0129		0.00200	0.000500	mg/L		10/24/15 13:18	10/29/15 05:28	1
Lead	0.00269		0.00200	0.000200	mg/L		10/24/15 13:18	10/29/15 05:28	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-1

Client Sample ID: WS-QAQC-EB-01

Lab Sample ID: 490-90074-8

Date Collected: 10/20/15 11:45
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 14:06	11/06/15 20:37	1
Lead	ND		0.00200	0.000200	mg/L		10/24/15 14:06	10/30/15 14:13	1

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

K1512005

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Wagner, Heather	Carrier Tracking No(s):	COC No: 490-37889.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: heather.wagner@testamericainc.com		Page: Page 1 of 1
Company: ALS Laboratory Group				Job #: 490-90074-2
Address: 1317 S. 13th Avenue, ,	Due Date Requested: 11/2/2015			
City: Kelso	TAT Requested (days):			
State, Zip: WA, 98626				
Phone:	PO #:			
Email:	WO #:			
Project Name: VCC Winston Salem	Project #: 49001238			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification - Client ID		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Total Arsenic by 7062)/ Total Arsenic by 7062	SUB (Dissolved Arsenic by 7062)/ Dissolved Arsenic by 7062	Total Number of containers	Special Instructions/Note:
				Preservation Code:							
WS-MW-07	1	10/19/15	10:45 Eastern		Water			X	X	2	
WS-MW-2R	2	10/19/15	12:40 Eastern		Water			X	X	2	
WS-MW-05	3	10/19/15	14:15 Eastern		Water			X	X	2	
WS-MW-05		10/19/15	14:15 Eastern	MS	Water			X	X	2	
WS-MW-05		10/19/15	14:15 Eastern	MSD	Water			X	X	2	
WS-MW-06	4	10/19/15	16:00 Eastern		Water			X	X	2	
WS-QAQC-DUP-01	5	10/19/15	01:00 Eastern		Water			X	X	2	
WS-MW-09	6	10/20/15	09:25 Eastern		Water			X	X	2	
WS-MW-08	7	10/20/15	11:15 Eastern		Water			X	X	2	
WS-QAQC-EB-01	8	10/20/15	11:45 Eastern		Water			X		1	

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 10/21/15 16:58	Company: NASHtenn	Received by: [signature]	Date/Time: 10/22/15 0930	Company: ALS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-07

Lab Sample ID: 490-90074-1

Date Collected: 10/19/15 10:45
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00185	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 13:24	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00149	J	0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:03	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-2R

Lab Sample ID: 490-90074-2

Date Collected: 10/19/15 12:40
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000880	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:43	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000859	J	0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:09	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-05

Lab Sample ID: 490-90074-3

Date Collected: 10/19/15 14:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00157	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 12:58	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00106	J	0.00200	0.000500	mg/L		10/27/15 10:10	11/13/15 17:11	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-06

Lab Sample ID: 490-90074-4

Date Collected: 10/19/15 16:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.000533**	**J**	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:48	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:14	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-QAQC-DUP-01

Lab Sample ID: 490-90074-5

Date Collected: 10/19/15 01:00
Matrix: Water
Date Received: 10/21/15 09:30

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000983	J	0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:53	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000929	J	0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:29	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-09

Lab Sample ID: 490-90074-6

Date Collected: 10/20/15 09:25
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00425		0.00200	0.000500	mg/L		10/24/15 14:06	11/13/15 14:58	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00370		0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:35	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: VCC Winston Salem

TestAmerica Job ID: 490-90074-2

Client Sample ID: WS-MW-08

Lab Sample ID: 490-90074-7

Date Collected: 10/20/15 11:15
Date Received: 10/21/15 09:30

Matrix: Water

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00813		0.00400	0.00100	mg/L		10/24/15 14:06	11/13/15 17:42	2

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00557		0.00200	0.000500	mg/L		10/24/15 13:18	11/13/15 16:40	1

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1512005-001**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-07** **Lab Code:** **K1512005-001DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1512005-002**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-2R** **Lab Code:** **K1512005-002DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1512005-003**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-05** **Lab Code:** **K1512005-003DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1512005-004**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-06** **Lab Code:** **K1512005-004DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1512005-005**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/19/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-DUP-01** **Lab Code:** **K1512005-005DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1512005-006**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-09** **Lab Code:** **K1512005-006DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1512005-007**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-MW-08** **Lab Code:** **K1512005-007DISS**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Test America, Incorporated	**Service Request:**	K1512005
Project No.:	49001238	**Date Collected:**	10/20/15
Project Name:	VCC Winston Salem	**Date Received:**	10/22/15
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **WS-QAQC-EB-01** **Lab Code:** **K1512005-008**

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	7062	1.0	0.4	2.0	10/26/15	11/05/15	0.4	U	

Comments:

ATTACHMENT 11

Letter from William Anckner (Arcadis) to Harry Zinn (NC DEQ) – July 12, 2016

Division of Waste Management – Federal Remediation Branch
Mr. Harry Zinn
1646 Mail Service Center
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Subject:
Response to NCDEQ Comments
Re: Arsenic and Rare Earth Elements at former VCC Sites

ENVIRONMENT

Date:
July 12, 2016

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William Anckner

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Dear Mr. Zinn:

On behalf of ExxonMobil Environmental Services Company (EMES), Arcadis U.S., Inc. (Arcadis) has prepared this letter in response to comments received from the North Carolina Department of Environmental Quality (NCDEQ) in a letter dated June 3, 2016 regarding the presence of rare earth elements (REEs) at former VCC Sites in North Carolina.

The potential presence of REEs at former VCC sites was initially discovered during treatability testing of groundwater samples collected from the Gurley Pesticide Burial Site located in Selma, North Carolina (Gurley Site). As described in previous correspondence, certain isotopes of select REEs (namely, lanthanum, neodymium and samarium) can result in false positive results for arsenic when samples are analyzed via USEPA Methods 6010C or 6020A. In order to eliminate false positive results, EMES proposed the use of an alternative USEPA method (USEPA Method 7062) to quantify arsenic. Under this alternative method, samples are prepared differently and thus are not subject to interferences from REEs. This alternative method has been approved for use by both USEPA and NCDEQ in separate correspondences.

In your letter dated June 3, 2016, NCDEQ suggested that the source of REEs came from “ore that was cracked on [the former VCC] sites” and that the contaminants of concern (COCs) for the Gurley Site and other applicable former VCC sites in North Carolina be expanded to include REEs, specifically the lanthanides. Among the listed concerns included the potential radioactivity of certain isotopes of REEs for the ingestion pathway. At this time, the potential source of REEs at former VCC sites has not been specifically identified. According to the United States Geological Survey (USGS), while some phosphate ores used in the production of phosphate fertilizers may have contained elevated concentrations of REEs, REEs are also naturally abundant in portions of the

Carolinas including those areas where former VCC sites are present (USGS 2010). Regardless of the source of REEs, EMES does not believe that REEs identified at the Gurley Site pose unique risks to human health or the environment based on the radioactivity of certain isotopes.

As described in your letter, there are many naturally-occurring isotopes of neodymium and samarium, including those that may be radioactive. However, the radioactive isotopes have very long half-lives (10^{11} to more than 10^{15} years). Based on the highest concentrations of these REEs in groundwater at the Gurley Site, and the corresponding radioactivity of the specific isotopes (which is inversely related to their half-lives), the potential concentration of gross alpha particles is below the USEPA Maximum Contaminant Level (MCL) for drinking water (15 picocuries per liter [pCi/L]). A derivation of the overall activity of alpha particles based on data collected from the Gurley Site will be presented in a case for closure/risk evaluation discussed below.

EMES understands that NCDEQ may require additional information in order to obtain closure for sites where REEs may be present at concentrations above background levels. In fact, this was discussed in March 2016 during a conference call with Arcadis, NCDEQ and USEPA. During the call, Arcadis indicated that there were no promulgated standards for REEs, limited toxicological data for which to develop interim risk-based standards, and no agency-approved analytical methods for REE quantification. NCDEQ recognized these concerns and suggested using the new risk-based closure regulations to achieve closure. NCDEQ suggested that since there was no universally accepted method for REE quantification, other lines of evidence (e.g., groundwater pH, REE solubility, site geometry) be used to make a case for closure. At this time, EMES is in the process of evaluating available information and will present a case for closure on a site-specific basis in the near future. As part of this evaluation, EMES will consider potential receptors that may have access to groundwater containing REEs.

With respect to the Gurley Site, the potential risk of exposure to REE-containing groundwater is minimal. First, an environmental covenant was placed on the property in 2014 which prevents the future use of groundwater for consumptive use. In addition, the area in the vicinity of the Gurley Site is currently served by the public water supply system for the Town of Selma making use of groundwater for human consumption unlikely. Finally, the remedy that is currently being implemented is addressing dissolved lead and the low pH conditions in groundwater. Upon completion of the remedy, the low pH conditions, and hence the driving force for REE dissolution, will have been addressed.

If you have any questions or comments, or wish to discuss this further, please let me know.

Sincerely,

Arcadis G&M of North Carolina, Inc.

William Anckner
Principal Engineer

Enclosures:

Copies:
Randolph Bryant, USEPA
Ken Mallary, USEPA
James Bateson, NCDEQ
David Lown, NCDEQ
David Mattison, NCDEQ
Bruce Frink, EMES
Corrie Chwalek, Arcadis

References:

USGS 2010. *The Principal Rare Earth Elements Deposits of the United States – A Summary of Domestic Deposits and a Global Perspective*. Scientific Investigation Report 2010-5220.