TETRA TECH

July 30, 2014

Mr. Todd Campbell
Federal On-Scene Coordinator
U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

Subject: Final Pre-CERCLIS Screening Report
Bridgeton Municipal Athletic Complex, Bridgeton, Missouri
U.S. EPA Region 7 START 4, Contract No. EP-S7-13-06, Task Order No. 0002.023
Task Monitor: Todd Campbell, On-Scene Coordinator

Dear Mr. Campbell:

Tetra Tech, Inc. is submitting the attached Final Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Screening Report regarding the Bridgeton Municipal Athletic Complex (BMAC) in Bridgeton, Missouri. If you have any questions or comments, please call me at (816) 412-1785.

Sincerely,

Colin Willits
START Project Manager

for Ted Faile, PG, CHMM
START Program Manager

Enclosures

X9025.14.0002.023

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FINAL PRE-CERCLIS SCREENING REPORT

BRIDGETON MUNICIPAL ATHLETIC COMPLEX

BRIDGETON, MISSOURI

Superfund Technical Assessment and Response Team (START) 4 Contract

Contract No. EP-S7-13-06, Task Order 0002.023

Prepared For:

U.S. Environmental Protection Agency
Region 7
Superfund Division
11201 Renner Boulevard
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July 30, 2014

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1.0 INTRODUCTION

The Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to assist with a Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (Pre-CERCLIS) Screening at the Bridgeton Municipal Athletic Complex (BMAC) in Bridgeton, Missouri. The Pre-CERCLIS Screening was conducted to evaluate whether further Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) assessment would be warranted. The screening was in response to a request by the Missouri Attorney General to the EPA Regional Administrator after a community group reported detections of elevated radiation readings at BMAC.

Tetra Tech's tasks included, but were not limited to: (1) acquisition of real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assessment of gross gamma survey results to help select sampling locations, (3) collection of discrete and composite soil samples from BMAC and reference areas for laboratory analysis, (4) collection of discrete soil samples from BMAC for laboratory analysis collocated with samples collected by the community group, (5) completion of a Pre-CERCLIS Screening Form, and (6) documentation of site activities. This final Pre-CERCLIS screening report addresses soil sampling and analytical data, along with a review of all site activities. The gross-gamma survey was detailed in the Preliminary Pre-CERCLIS Screening report dated June 25, 2014.

Colin Willits was the START project manager for the investigation, and the EPA Region 7 On-Scene Coordinator (OSC) was Todd Campbell.

2.0 SITE LOCATION AND BACKGROUND

Section 2.0 provides information on the site location and description, and site background.

2.1 SITE LOCATION AND DESCRIPTION

The BMAC site is at 13161 Taussig Road in Bridgeton, Missouri. The Global Positioning System (GPS) coordinates of the approximate center of the site are 38.779422 degrees north latitude and 90.428224 degrees west longitude. The site encompasses approximately 70 acres, including 11 baseball fields, four tennis courts, a playground area, a handball/racquetball court, a soccer field, multiple walking trails, two large parking lots, multiple concession buildings, an operation center, and other various structures (see Appendix A, Figures 1 and 2).

Two parks, Koch and Blanchette, were selected to acquire reference data during the Pre-CERCLIS Screening. These parks were selected as reference areas because they contain surface types similar to those at BMAC (including baseball fields with grass-covered and exposed soil areas). Koch Park is 4.1 miles northeast of BMAC near the intersection of Charbonier and Howdershell Roads in Florissant, Missouri. The park encompasses 70 acres and includes several baseball fields. Blanchette Park is 3.3 miles west-northwest of BMAC at 1900 West Randolph Road in St. Charles, Missouri. The park encompasses 44 acres, including several baseball fields (see Appendix A, Figure 1). The two reference areas provide contrasting positions from BMAC relative to prevailing wind directions—that is, Koch Park is generally cross- to downwind of BMAC, and Blanchette Park is generally upwind of BMAC, given the predominant prevailing winds in the area out of the south and west.

2.2 PRESENT OWNERS

BMAC is owned and operated by the City of Bridgeton, Missouri.

2.3 SITE HISTORY

BMAC opened in 1974, encompassing 30 acres including six baseball fields, four tennis courts, four racquetball courts, a concessions building, a pavilion, and an operations storage facility. During the mid-1980s, four batting cages were installed on the south side of the complex. The batting cages were removed in 2007. In 1999, the City of Bridgeton began a phased expansion of BMAC. The 10-year expansion project added five baseball fields (2001 to 2003), a new park maintenance facility (2002), expanded north parking lot (2003 to 2004), one additional concession building (2004 to 2005), one soccer field (2005), one comfort station (2007), a 2-mile walking trail (2008), a playground (2008), and an office and entry building (2009). During construction of the baseball and soccer fields, more than 990,000 cubic feet (ft^3) of soil was brought onto the complex. Soil was acquired from and transported by Noll Construction. The baseball infields were built with a 60/40 mix of sand/silt and clay to comform with University of Missouri recommendations. The outfields were topped with an 80/20 mix of sand and peat, received from the St. Charles Sand Company. In 2012, two infields (Fields 8 and 11) were amended with mined “Granitestone” aggregate from Ironton, Missouri.

Stormwater exits the complex via a combination of storm drains, one detention pond, and surrounding retention swales (Bell 2014).

2.4 CURRENT LAND USE

BMAC currently encompasses approximately 70 acres, including 11 baseball fields, four tennis courts, a playground area, a handball/racquetball court, a soccer field, multiple walking trails, two large parking lots, multiple concession buildings, an operation center, and other various structures.

2.5 STRUCTURES AT SITE

Structures at BMAC include concession stands, restrooms, a park operation center, and an operations storage facility. The nearest residence is 0.36 mile southwest of the park (Google Earth 2014).

2.6 PAST ACTIONS

No previous investigations have occurred at the BMAC site.

2.7 GEOLOGY

The U.S. Geological Survey (USGS) 7.5-minute topographic map depicting the site and general vicinity was obtained and reviewed. The general location of the site is shown on the 1994 USGS St. Charles, Missouri quadrangle map (USGS 1994). The St. Charles quadrangle includes part of the Missouri River floodplain and loess-covered uplands. The floodplain is up to 5 miles wide in this area. The quadrangle lies within the Dissected Till Plains Section of the Central Lowland Province of the Interior Plains Physiographic Division. The St. Charles quadrangle is underlain by Paleozoic limestone and shale. The majority of the quadrangle is underlain by the Mississippian-age St. Louis, Salem, and Warsaw Formations. The site is near a boundary of Quaternary silt-capped alluvium and Quaternary terrace deposit. The Quaternary Silt-Capped Alluvium is primarily composed of clay and variable amounts of silt and organic material in the upper 15 feet. The Quaternary Terrace Deposit consists mainly of organic clays (MDNR 2011).

3.0 PRE-CERCLIS SCREENING ACTIVITES

Field activities for the Pre-CERCLIS Screening were conducted May 19 to 23, 2014. Field activities included (1) acquisition of real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assessment of gross gamma survey results to help select sampling locations, (3) collection of discrete and composite soil samples from BMAC and reference areas for laboratory analysis, (4) collection of discrete soil samples for laboratory analysis collocated with samples previously collected by the community group, and (5) documentation of site activities. START team members

included Colin Willits, Danny O'Connor, and Tom Binz. EPA personnel included Region 7 OSCs Todd Campbell and Tom Mahler and Region 5 personnel Brian Cooper and Jim Mitchell. Photographic documentation of field activities is in Appendix B. START documented field activities in the site logbook (see Appendix C).

3.1 SURFACE SOIL GAMMA SURVEY

From May 20 to 22, 2014, EPA and START field personnel conducted a survey of gross gamma activity over exterior areas of BMAC. In addition, two reference areas were surveyed from May 19 to 21, 2014, to provide comparative data (Koch Park and Blanchette Park). The survey data were generated using a Ludlum Model 2221 ratemeter with a Ludlum Model 44-20 sodium iodide (NaI) scintillation detector, coupled with a GPS unit and notebook computer running Field Analysis and Sampling Tool (FAST) software. FAST is a software program developed by the EPA Region 5 Field Environmental Decision Support (FIELDS) Team that integrates real-time data from GPS receivers and environmental monitoring instruments. FAST stores the measurement data with their GPS locations in a file and plots the results in a dynamic, two-dimensional display in real time. To ensure proper functioning of radiation detection instrumentation, a twice-daily (prior to and after field work) source check was performed by use of a cesium-137 check source. No abnormal variations in detector readings, indicating an instrument "drifting" out of calibration, were documented. Daily source check and instrument calibration records are in Appendix D.

The gross gamma survey of exterior surfaces at BMAC included collection of 58,716 data points across three surface types (grass-covered areas, exposed soil areas, and improved surfaces). No survey data acquired within BMAC were above twice the background mean, a level at which EPA Region 7 typically conducts further investigation. In addition, geographic plots of the data reveal natural differences in gamma activity exhibited by different soil types or surface materials. No unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed. The gross gamma survey is detailed further in the Preliminary Pre-CERCLIS Screening Report dated June 25, 2014 (Tetra Tech 2014).

3.2 SOIL SAMPLING ACTIVITIES

After the survey of gross gamma activity over exterior areas of BMAC and reference areas, surface soil samples were collected to quantify both gamma emitting and non-gamma emitting radionuclides. Soil sampling locations were chosen to best represent soil type variability and geographic coverage of the site because review of survey data indicated no unusual patterns of concentrated discrete areas of elevated gross gamma activity. Geographic information system (GIS) personnel used GIS software to designate

10 foot by 10 foot Decision Units (DU) across the site. The GIS software was uploaded to a hand-held digital device for field use. Field crews utilized the digital device along with flags and stakes to delineate DUs. From May 21 to 23, 2014, EPA and START personnel collected 112 soil samples. Eighty-eight surface soil samples (0 to 2 inches below ground surface [bgs]) were collected at BMAC. The samples included the following: 30 composite samples collected within grass-covered areas, 30 composite samples collected within exposed soil areas, 17 discrete samples collected within drainage areas, and 11 discrete samples collocated with samples previously collected by the community group (see Appendix A, Figure 3). Twenty-four samples were collected within the two reference areas: Koch Park and Blanchette Park (see Appendix A, Figure 4).

Composite soil samples consisted of five-aliquots of approximate equal mass collected from points distributed evenly over the DU. Samples were collected from 0 to 2 inches bgs using a disposable steel spoon or decontaminated hand-held trowel. Discrete soil samples were single aliquot samples collected from 0 to 2 inches bgs with a disposable steel spoon or decontaminated hand-held trowel. Samples were transferred to labeled sealable plastic bags and placed in coolers for transportation to the laboratory.

Soil samples were submitted for analysis to TestAmerica Laboratories, Inc. (TestAmerica), in Earth City, Missouri. Soil samples were analyzed for isotopic uranium, isotopic thorium, radium-226, and other naturally occurring radionuclides (see Table 1).

TABLE 1

SUMMARY OF ANALYTICAL METHODS

Laboratory Analysis	Analytical Method
Isotopic Thorium (including Th-230)	DOE EML Procedures Manual HASL-300 A-01-R
Isotopic Uranium (including U-238)	DOE EML Procedures Manual HASL-300 A-01-R
Gamma Spectrometry (including Ra-226)	21 day in-growth for Ra-226 daughters followed by DOE EML Procedures Manual HASL-300 Ga-01-R

Notes:

DOE EML U.S. Department of Energy Environmental Measurements Laboratory
Ra-226 Radium-226
Th-230 Thorium-230
U-238 Uranium-238

4.0 ANALYTICAL DATA SUMMARY

During Pre-CERCLIS Screening activities, 112 soil samples were collected from BMAC and reference areas. Soil samples were submitted for analysis to TestAmerica on May 22 and 23, 2014 (see Table 1). The analytical data package and corresponding chain-of-custody documents are in Appendix E. After the analytical data package had been received, a Tetra Tech chemist completed a data validation report in accord with the EPA Region 7 documents titled "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" (EPA 2010) and Chapter 8 of "Multi-Agency Radiological Laboratory Analytical Procedures Manual" (MARLAP), 402-B-04-001A (EPA 2004). In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (Tetra Tech EM, Inc. [Tetra Tech EMI] 2002) was used along with other criteria specified in the applicable methods. The data validation report concluded overall data quality is acceptable, with no unusual qualifications added. All data are usable as qualified for their intended purposes (see Appendix F).

Uranium-238, thorium-230, and radium-226 have been identified as constituents of potential concern (COPC) for the BMAC site, as they have been identified as contaminants at Formerly Utilized Sites Remedial Action Program (FUSRAP) sites in the St. Louis, Missouri, area. In addition, the community group expressed concern with lead-210 at BMAC (lead-210 is a daughter product of radium-226).

Twenty-four soil samples were collected at two reference areas (Koch and Blanchette Park) to quantify naturally occurring radioactive material (NORM) concentrations in the site vicinity. NORM were incorporated into the Earth during its formation and are still present. Rocks, soil, water, air, plants, and animal life all have varying degrees of NORM (U.S. Nuclear Regulatory Commission [NRC] 1994). Using ProUCL Version 5.0.00, reference area analytical data for the COPCs were used to calculate upper simultaneous limits (USL) to estimate background threshold values (BTV) to be used in site versus background evaluations. ProUCL is an EPA-funded and peer-reviewed software used for various basic statistical analyses, including BTVs (EPA 2013). Reference area analytical data reported with the qualifier "U", analyte not detected above the reported sample quantitation limit, were not used in the calculation of BTVs. A background data set of less than six is not large enough to characterize background population or to perform background versus site comparison (EPA 2013). Very few detectable values were reported from reference area analytical data for lead-210; therefore, the calculated BTV may not represent meaningful or reliable statistics. Radionuclide concentrations in excess of their BTV are compared with the selected risk-based standards to determine if further data review or investigation is warranted. BTV calculation spreadsheets are included in Appendix G. A summary of reference area analytical data and BTVs is listed in Table 2.

TABLE 2

SUMMARY STATISTICS FOR REFERENCE AREA DATA

Statistic	U-238*	Th-230*	Ra-226	Pb-210
Lowest Reported Value	0.512	0.636	0.794	2.73
Highest Reported Value	0.896	1.22	1.65	4.12
Mean	0.636	0.92	1.16	3.46
BTV	0.915	1.35	1.69	4.12**

Notes:

All concentrations in picoCuries per gram (pCi/g)

* Indicates isotope analyzed via alpha spectrometry. Unmarked isotopes were analyzed via gamma spectrometry.
** Indicates a value calculated without enough data to compute meaningful or reliable statistics.

BTV Background threshold value
Pb-210 Lead-210
Ra-226 Radium-226
Th-230 Thorium-230
U-238 Uranium-238

Reference area analytical data were also compared with five studies quantifying NORM in the United States. Summary statistics from the NORM studies are listed in Table 3.

TABLE 3

SUMMARY STATISTICS FOR NORM STUDIES

Study Area	U-238 (pCi/g)		Th-230 (pCi/g)		Ra-226 (pCi/g)	
	Mean	Range	Mean	Range	Mean	Range
United States[1]	0.90	0.10 - 3.8	-	-	1.1	0.20 - 4.3
United States[2]	-	0.10 - 3.8	-	-	-	-
United States[3]	1.8	-	-	-	-	-
Missouri[4]	-	0.33 - 1.7	-	-	-	0.31 - 1.4
St. Louis[5]	1.1	-	1.5	-	0.95	-

Notes:

1 Study completed by United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) (UNSCEAR 2000)
2 Study completed by Myrick and others (Myrick *et al.* 1983)
3 Study completed by Lowder and others (Lowder *et al.* 1964)
4 Study completed by Oak Ridge National Laboratory (ORNL) (ORNL 1981)
5 Study completed by U.S. Army Corps of Engineers (USACE) (USACE 2005)

NORM Naturally Occurring Radioactive Material
pCi/g picoCuries per gram
Ra-226 Radium-226
Th-230 Thorium-230
U-238 Uranium-238

The reported radionuclide concentrations for the uranium-238 series from the Koch and Blanchette Park reference areas were consistent with these studies, indicating the reference area analytical data are representative of NORM for the general site vicinity.

Two risk-based standards were used for comparison to BMAC analytical data: the EPA total exposure preliminary remediation goals (PRG) for radionuclides in residential soil at a 1 in 10,000 upper bound lifetime cancer risk to an individual, and the FUSRAP remediation goals (RG). Selection of the 1 in 10,000 upper bound lifetime cancer risk to an individual accords with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), listed in 40 *Code of Federal Regulations* (CFR) Part 300.430 (EPA 1990). The total soil PRGs account for risk from each of the four pathways considered in the PRGs: ingestion, inhalation, external exposure, and produce ingestion pathways. PRGs are generated with standard exposure route equations using EPA slope factors (SF) and exposure parameters. The calculation of the residential soil PRGs take into account the following exposure parameters: (1) 30 years of total exposure, (2) 350 days per year of exposure, and (3) 24 hours per day of exposure (EPA 2014). These assumptions do not likely represent true exposure risk for park visitors but were chosen due to their conservative nature. In instances where isotopes within a decay series were determined to be in secular equilibrium, the "+D" PRG (such as for Ra-226+D) was selected for comparison to the site data. Although it may not be possible to discern from analytical data when isotopes within a decay chain are in true secular equilibrium, for the purposes of this assessment the "+D" PRG risk-based standards were used when available for comparative purposes due to their conservative nature. The "+D" PRGs include the contributions from the parent isotope and its short-lived decay products, assuming equal activity concentrations (secular equilibrium) with the parent nuclide in the environment (EPA 2014). The FUSRAP RGs for the North St. Louis County sites were developed consistent with protective applicable or relevant and appropriate requirements (ARAR) (U.S. Army Corps of Engineers [USACE] 2005). Table 4 summarizes analytical data from BMAC along with comparing the highest value from each isotope, minus the mean reference area value, to risk-based standards. Analytical data are presented in tabular form in Appendix H.

TABLE 4

BMAC ANALYTICAL DATA COMPARISON

	U-238*	Th-230*	Ra-226	Pb-210
BMAC Analytical Data Summary (pCi/g)				
Low	0.0862	0.441	0.458	1.68
High	1.74	1.77	1.71	9.45
Number of values exceeding the BTV	5 of 88	5 of 88	1 of 88	9 of 88
Reference Area Mean Values (pCi/g)				
Mean Values	0.636	0.92	1.16	3.46
Comparative Values (pCi/g)				
Highest Comparative BMAC value**	1.10	0.850	0.550	5.99
Risk-based Standards (pCi/g)				
Residential Soil PRG (10^{-4})	69.6 (+D)	346	1.21 (+D)	33.5
FUSRAP RG	50	14	5	NE

Notes:

PRGs and FUSRAP RGs represent risk-based standards meant for comparison to sample concentrations above background; therefore, the mean reference area radionuclide concentration was subtracted from BMAC data before comparison.

*	Indicates isotope analyzed via alpha spectrometry. Unmarked isotopes were analyzed via gamma spectrometry
**	Value represents the reference area mean subtracted from the highest reported concentration from BMAC samples
(+D)	Indicates the listed value is the PRG+D value that accounts for risk from short-lived daughter products
BMAC	Bridgeton Municipal Athletic Complex
BTV	Background Threshold Value
FUSRAP	Formerly Utilized Sites Remedial Action Program
NE	No FUSRAP RG is established for lead-210.
Pb-210	Lead-210
pCi/g	picoCuries per gram
PRG	Preliminary Remediation Goal
Ra-226	Radium-226
RG	Remediation Goal
Th-230	Thorium-230
U-238	Uranium-238

A summary of data for COPCs and lead-210 follows:

Detectable uranium-238 concentrations from alpha spectrometry analysis in BMAC samples range from 0.0862 to 1.74 pCi/g. Using reference area analytical data, a BTV of 0.915 pCi/g was calculated for uranium-238 (alpha spectrometry). The uranium-238 concentration (alpha spectrometry) in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the uranium-238 reference area mean (alpha spectrometry) was subtracted from results for the samples exceeding the BTV to eliminate NORM. The remaining values were then compared with the PRG +D (69.6 pCi/g) and the FUSRAP RG (50 pCi/g). None of the values exceeded the PRG or FUSRAP RG. Uranium-238 was also reported with gamma spectrometry analysis;

although this data is considered less accurate as it does not represent a direct measurement of the isotope. No uranium-238 concentrations reported from gamma spectrometry analysis exceeded the PRG or FUSRAP RG.

Detectable thorium-230 concentrations in BMAC samples range from 0.441 to 1.77 pCi/g. Using reference area analytical data, a BTV of 1.35 pCi/g was calculated for thorium-230. The thorium-230 concentration in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the thorium-230 reference area mean was subtracted from the results for the five samples to eliminate NORM. The remaining values were then compared with the PRG (346 pCi/g) and the FUSRAP RG (14 pCi/g). None of the values exceeded the PRG or FUSRAP RG.

Detectable radium-226 concentrations in BMAC samples range from 0.458 to 1.71 pCi/g. Using reference area analytical data, a BTV of 1.69 pCi/g was calculated for radium-226. The radium-226 concentration in one sample collected from BMAC exceeded the BTV. The sample was therefore compared with the applicable risk-based standards. To begin, the radium-226 reference area mean was subtracted from the result for the sample to eliminate NORM. The remaining value was then compared with the PRG +D (1.21 pCi/g) and the FUSRAP RG (5 pCi/g). Although it may not be possible to discern if the uranium-238 decay chain (including daughter product radium-226) is in true secular equilibrium, for the purposes of this assessment the PRG +D risk-based standard was determined to be the more applicable comparative standard due to its conservative nature. The sample value did not exceed the PRG +D or FUSRAP RG.

Detectable lead-210 concentrations in BMAC samples range from 1.68 to 9.45 pCi/g. Reference area analytical data reported few detectable concentrations of lead-210; therefore, insufficient data was available to calculate a meaningful BTV. For this reason, lead-210 was compared directly to the PRG. No reported lead-210 data from BMAC samples exceeded the PRG (No FUSRAP RG is established for lead-210).

The BMAC Pre-CERCLIS Screening focused on COPCs identified as contaminants at nearby FUSRAP sites; however, many other radionuclides were reported with laboratory analysis. No significant concentrations were identified during the review of other reported radionuclide.

5.0 PATHWAY EVALUATION

5.1 GROUNDWATER MIGRATION PATHWAY

According to the USGS Groundwater Atlas of the United States, the site and nearby areas of St. Louis County are within the Mississippian aquifer. The Mississippian aquifer is in carbonate rocks stratigraphically equivalent to those composing the nearby Ozark Plateaus aquifer system (USGS 2014).

Groundwater sampling was not included with the Pre-CERCLIS Screening. However, a release to groundwater is unlikely because no significant surface soil findings resulted from the Pre-CERCLIS Screening.

5.2 SURFACE WATER MIGRATION PATHWAY

Review of the St. Charles, Missouri, quadrangle topographic map indicates site runoff is northwest, following the general site topographic gradient toward the Missouri River. According to the U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) System, no wetlands are present on the BMAC site (U.S. FWS 2014a). A surface water retention pond is visible near Prouhet Farm Road and was confirmed during site activities. Cowmire Creek is 0.16 mile east of BMAC. The Missouri River is 2.15 miles northwest of BMAC (Google Earth 2014).

Surface water sampling was not included with the Pre-CERCLIS Screening. However, a release to surface water is unlikely because no significant surface soil findings resulted from the Pre-CERCLIS Screening.

5.3 SOIL EXPOSURE PATHWAY

Soil assessment during the Pre-CERCLIS Screening included: (1) acquisition of real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assessment of gross gamma survey results to help select sampling locations, (3) collection of discrete and composite soil samples from BMAC and reference areas for laboratory analysis, and (4) collection of discrete soil samples for laboratory analysis collocated with samples collected by the community group.

No gross gamma survey data acquired within BMAC were above twice the reference area mean, a level at which EPA Region 7 typically conducts further investigation. In addition, no unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed. BMAC soil sample data

were compared to applicable risk-based standards. No radionuclide concentrations were reported above the risk-based standards plus background.

A release to soil is unlikely because there were no significant findings during the gross gamma survey or analytical data comparison.

5.4 AIR MIGRATION PATHWAY

Air sampling was not included with the Pre-CERCLIS Screening. A release to air is unlikely because no significant surface soil findings resulted from the Pre-CERCLIS Screening.

5.5 OBVIOUS POTENTIAL HUMAN AND ECOLOGICAL RECEPTORS

Facility users include on-site workers (park maintenance crew) and park visitors. No release has been identified at the BMAC site; therefore, there does not appear to be a potential threat to receptors. The BMAC Pre-CERCLIS Screening Form is in Appendix I.

6.0 SUMMARY AND CONCLUSIONS

6.1 PRE-REMEDIAL CONSIDERATIONS

The Pre-CERCLIS Screening did not indicate a release of radionuclides to surface soil. No potential exposure risk to humans or endangered or threatened species was identified during assessment activities. Further CERCLA assessment is not warranted at BMAC.

6.2 CONCLUSIONS

Pre-CERLCIS Screening activities at the BMAC site were conducted May 19 to 23, 2014. The objectives of the screening were to: (1) acquire real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assess gross gamma survey results to help select sampling locations, (3) collect discrete and composite soil samples from BMAC and reference areas for laboratory analysis, (4) collect discrete soil samples from BMAC for laboratory analysis collocated with samples collected by the community group, (5) complete a Pre-CERCLIS Screening Form, and (6) document site activities.

The gross gamma survey of exterior surfaces at BMAC included collection of 58,716 data points across three surface types (grass-covered areas, exposed soil areas, and improved surfaces). No survey data acquired within BMAC were above twice the reference area mean, a level at which EPA Region 7 typically conducts further investigation. In addition, geographic plots of the data reveal natural differences in gamma activity exhibited by different soil types or surface materials. No unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed.

After the gross gamma survey had been completed, soil samples were collected to quantify both gamma emitting and non-gamma emitting radionuclides. Soil sampling locations were chosen to best represent soil type variability and site coverage because review of survey data indicated no unusual patterns of concentrated discrete areas of elevated gross gamma activity. Soil samples were analyzed for isotopic uranium, isotopic thorium, radium-226, and other naturally occurring radionuclides. Uranium-238, thorium-230, and radium-226 have been identified as COPCs for the BMAC site, as they have been identified as contaminants at FUSRAP sites in the St. Louis, Missouri area. In addition, the community group expressed concern with lead-210 at BMAC. Analytical data were compared with the total exposure PRGs for radionuclides in residential soil at a 1 in 10,000 upper bound lifetime cancer risk to an individual. Using ProUCL Version 5.0.00, reference area analytical data for the COPCs were used to calculate USLs to estimate BTVs to be used in site versus background evaluations. Radionuclide

concentrations in excess of their BTV were compared with the selected risk-based standards to determine if further data review or investigation was warranted.

A summary of data for COPCs and lead-210 follows:

Detectable uranium-238 concentrations from alpha spectrometry analysis in BMAC samples range from 0.0862 to 1.74 pCi/g. Using reference area analytical data, a BTV of 0.915 pCi/g was calculated for uranium-238 (alpha spectrometry). The uranium-238 concentration (alpha spectrometry) in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the uranium-238 reference area mean (alpha spectrometry) was subtracted from results for the samples exceeding the BTV to eliminate NORM. The remaining values were then compared with the PRG +D (69.6 pCi/g) and the FUSRAP RG (50 pCi/g). None of the values exceeded the PRG or FUSRAP RG. Uranium-238 was also reported with gamma spectrometry analysis; although this data is considered less accurate as it does not represent a direct measurement of the isotope. No uranium-238 concentrations reported from gamma spectrometry analysis exceeded the PRG or FUSRAP RG.

Detectable thorium-230 concentrations in BMAC samples range from 0.441 to 1.77 pCi/g. Using reference area analytical data, a BTV of 1.35 pCi/g was calculated for thorium-230. The thorium-230 concentration in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the thorium-230 reference area mean was subtracted from the results for the five samples to eliminate NORM. The remaining values were then compared with the PRG (346 pCi/g) and the FUSRAP RG (14 pCi/g). None of the values exceeded the PRG or FUSRAP RG.

Detectable radium-226 concentrations in BMAC samples range from 0.458 to 1.71 pCi/g. Using reference area analytical data, a BTV of 1.69 pCi/g was calculated for radium-226. The radium-226 concentration in one sample collected from BMAC exceeded the BTV. The sample was therefore compared with the applicable risk-based standards. To begin, the radium-226 reference area mean was subtracted from the result for the sample to eliminate NORM. The remaining value was then compared with the PRG +D (1.21 pCi/g) and the FUSRAP RG (5 pCi/g). Although it may not be possible to discern if the uranium-238 decay chain (including daughter product radium-226) is in true secular equilibrium, for the purposes of this assessment the PRG +D risk-based standard was determined to be the more applicable comparative standard due to its conservative nature. The sample value did not exceed the PRG +D or FUSRAP RG.

Detectable lead-210 concentrations in BMAC samples range from 1.68 to 9.45 pCi/g. Reference area analytical data reported few detectable concentrations of lead-210; therefore, insufficient data was available to calculate a meaningful BTV. For this reason, lead-210 was compared directly to the PRG. No reported lead-210 data from BMAC samples exceeded the PRG (No FUSRAP RG is established for lead-210).

The BMAC Pre-CERCLIS Screening focused on COPCs identified as contaminants at nearby FUSRAP sites; however, many other radionuclides were reported with laboratory analysis. No significant concentrations were identified during the review of other reported radionuclide. Results from the Pre-CERCLIS Screening do not indicate need for further CERCLA assessment at the BMAC site.

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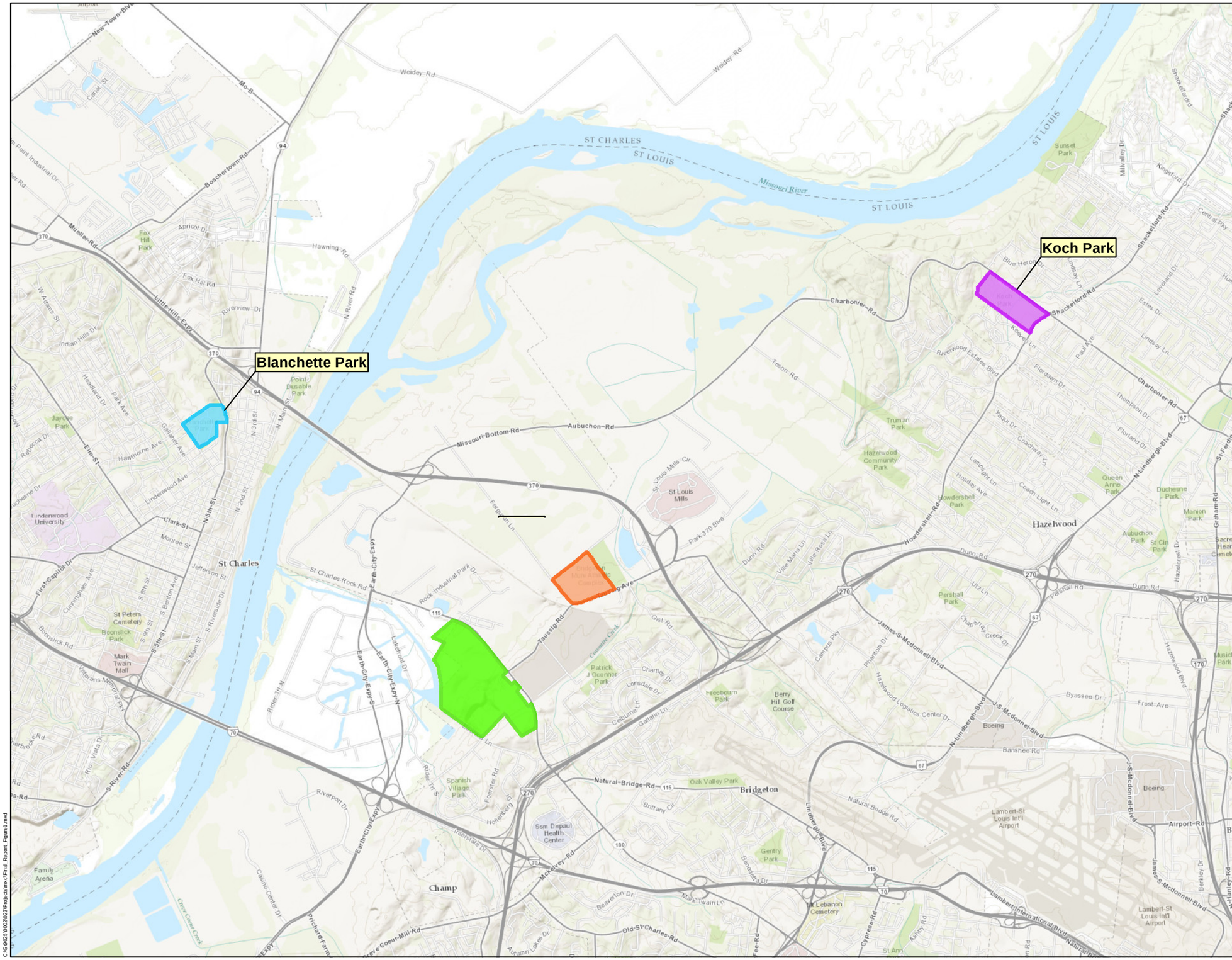
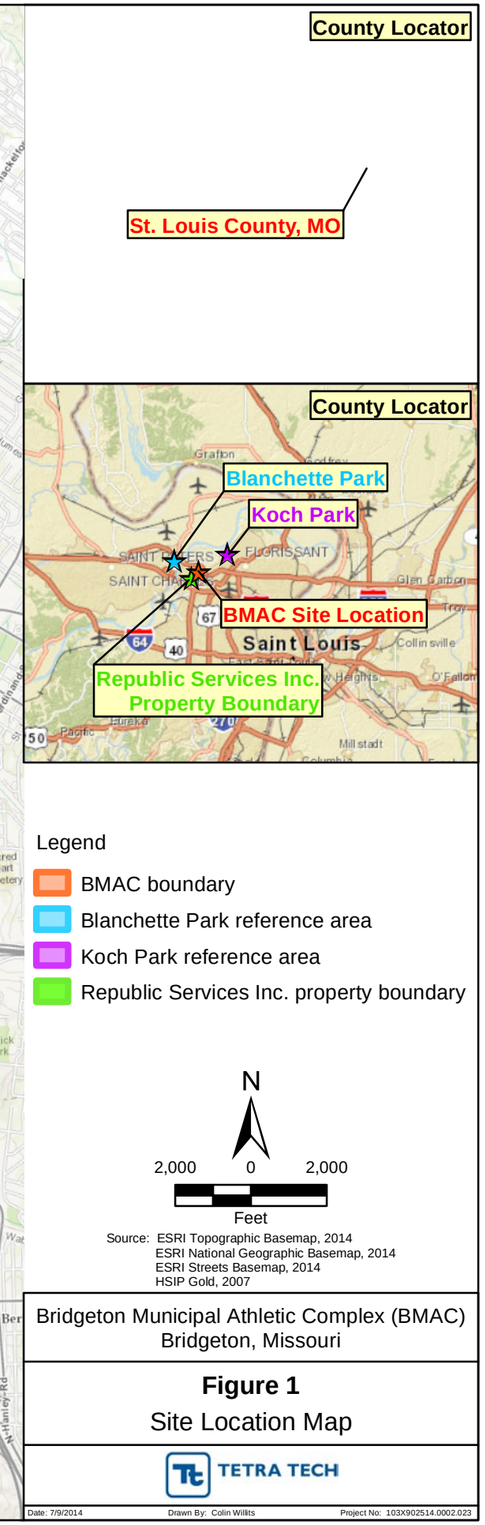
APPENDIX A

FIGURES





Bridgeton Municipal Athletic Complex (BMAC)
Bridgeton, Missouri

Figure 1

Site Location Map

TETRA TECH

Date: 7/9/2014 | Drawn By: Colin Willits | Project No: 103X902514.0002.023

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Legend

BMAC boundary

BAA - Bridgeton Athletic Association

N

100 0 100

Feet

Source: ESRI Imagery Basemap, 2014
Bridgeton Parks and Recreation, BMAC Map, 2014

Bridgeton Municipal Athletic Complex (BMAC)
Bridgeton, Missouri

Figure 2

Site Layout Map

TETRA TECH

Date: 7/9/2014 Drawn By: Colin Willits Project No: 103X902514.0002.023

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Sample Information					
Sample ID	Sample Date	U-238*	Th-230*	Ra-226	Pb-210
BMAC Discrete Samples (pCi/g)					
BMAC-Discrete-00	5/21/2014	0.704	0.960	1.08	0.387 U
BMAC-Discrete-01	5/21/2014	0.831	1.23	1.41	6.55
BMAC-Discrete-02	5/21/2014	0.808	1.05	1.26	4.34
BMAC-Discrete-03	5/21/2014	0.562	0.792	1.14	2.77
BMAC-Discrete-04	5/21/2014	0.593	0.899	0.943	9.45
BMAC-Discrete-05	5/21/2014	0.400 J+	0.637	0.772	0.988 U
BMAC-Discrete-06	5/21/2014	0.579	0.784	1.23	2.13 U
BMAC-Discrete-07	5/21/2014	0.448 J+	0.720	0.891	2.32 U
BMAC-Discrete-08	5/21/2014	0.539 J+	0.918	1.14	3.94
BMAC-Discrete-09	5/21/2014	0.500 J+	0.887	0.844	2.91
BMAC-Discrete-10	5/21/2014	0.621	0.792	1.13	2.18 U
BMAC-Outfall-2	5/23/2014	0.669	1.04	1.22	3.32
BMAC-Outfall-3	5/23/2014	0.625	1.14	1.21	6.53
BMAC-Outfall-4	5/23/2014	0.748	1.00	1.10	3.67
BMAC-Outfall-5	5/23/2014	0.595	0.985	1.14	1.55 U
BMAC-Outfall-6	5/23/2014	0.507	0.797	0.728	2.91
BMAC-Outfall-7	5/23/2014	0.553	0.845	0.777	3.83
BMAC-Outfall-8	5/23/2014	0.689	1.03	0.787	6.60
BMAC-Outfall-9	5/23/2014	0.569	1.18	1.08	3.50
BMAC-Outfall-10	5/23/2014	0.786	1.01	0.916	1.40 U
BMAC-Outfall-11	5/23/2014	0.520	1.08	1.09	2.24
BMAC-Outfall-14	5/23/2014	0.614	1.48	1.03	2.86 U
BMAC-Outfall-15	5/23/2014	0.657	1.02	0.978	2.88
BMAC-Outfall-16	5/23/2014	0.651	1.13	1.17	2.24 U
BMAC-Outfall-17	5/23/2014	0.690	0.855	0.740	-0.885 U
BMAC-Outfall-18	5/23/2014	0.694	0.742	0.918	3.40
BMAC-Outfall-19	5/23/2014	0.544	0.958	1.04	4.99
BMAC-Outfall-20	5/23/2014	0.644	0.853	1.12	4.46
BMAC Composite Samples (pCi/g)					
BMAC-Grass-1	5/23/2014	0.652	0.994 J+	1.16	1.83 U
BMAC-Grass-2	5/23/2014	0.546	0.906 J+	0.791	3.59
BMAC-Grass-3	5/23/2014	0.684	0.965 J+	1.18	2.29 U
BMAC-Grass-4	5/23/2014	0.639	1.11	1.13	1.18 U
BMAC-Grass-5	5/23/2014	0.606	1.08	1.39	4.44
BMAC-Grass-6	5/23/2014	0.529	0.686 J+	0.665	0.944 U
BMAC-Grass-7	5/23/2014	0.778	1.08	1.14	1.78 U
BMAC-Grass-8	5/23/2014	0.409	0.566 J+	0.625	1.36 U
BMAC-Grass-9	5/23/2014	0.472	0.766 J+	0.458	0.0377 U
BMAC-Grass-10	5/23/2014	0.898	1.18	1.35	3.44
BMAC-Grass-11	5/23/2014	0.682	0.918 J+	0.950	0.843 U
BMAC-Grass-12	5/23/2014	0.540	0.999 J+	0.883	1.30 U
BMAC-Grass-13	5/23/2014	0.672	0.883 J+	0.929	2.34 U
BMAC-Grass-14	5/23/2014	0.466	0.676 J+	0.467	0.938 U
BMAC-Grass-15	5/23/2014	0.580	0.806 J+	1.20	0.604 U
BMAC-Grass-16	5/23/2014	0.323	0.441 J+	0.606	1.68
BMAC-Grass-17	5/23/2014	0.457	0.831 J+	0.580	-0.156 U
BMAC-Grass-18	5/23/2014	0.453	0.752 J+	0.954	1.61 U
BMAC-Grass-19	5/23/2014	0.674	0.959 J+	1.18	2.18 U
BMAC-Grass-20	5/23/2014	0.845	0.945 J+	1.08	2.63
BMAC-Grass-21	5/23/2014	0.286	0.963	0.551	1.06 U
BMAC-Grass-22	5/23/2014	0.615	1.03	1.04	3.05
BMAC-Grass-23	5/23/2014	0.657	0.884 J+	0.962	0.436 U
BMAC-Grass-24	5/23/2014	0.506	1.08	1.23	3.27 U
BMAC-Grass-25	5/23/2014	0.635	1.17	0.890	0.902 U
BMAC-Grass-26	5/23/2014	0.677	0.985	1.09	3.08
BMAC-Grass-27	5/23/2014	0.520	0.856 J+	1.39	2.47
BMAC-Grass-28	5/23/2014	0.557	1.02	1.20	1.20 U
BMAC-Grass-29	5/23/2014	0.873	0.902 J+	0.990	2.23
BMAC-Grass-30	5/23/2014	0.826	1.12	1.11	3.42 U
BMAC-Soil-1	5/23/2014	0.386	0.602 J+	0.652	1.11 U
BMAC-Soil-2	5/23/2014	0.438	0.597 J+	0.588	3.18
BMAC-Soil-3	5/23/2014	0.348	0.547 J+	0.585	0.703 U
BMAC-Soil-4	5/23/2014	1.04	1.37	1.20	1.58 U
BMAC-Soil-5	5/23/2014	0.952	1.17	1.36	2.77
BMAC-Soil-6	5/23/2014	0.686	1.10	1.28	0.901 U
BMAC-Soil-7	5/23/2014	0.327	0.583 J+	0.819	1.91 U
BMAC-Soil-8	5/23/2014	0.498	0.587 J+	0.701	1.15 U
BMAC-Soil-9	5/23/2014	0.467	0.726 J+	0.771	0.278 U
BMAC-Soil-10	5/23/2014	0.882	1.24 J+	1.45	1.46 U
BMAC-Soil-11	5/23/2014	0.318	0.566 J+	0.602	0.612 U
BMAC-Soil-12	5/23/2014	1.11	1.36 J+	1.58	2.08 U
BMAC-Soil-13	5/23/2014	1.74	1.77 J+	1.22	0.500 U
BMAC-Soil-14	5/23/2014	1.00	1.35 J+	1.71	1.92 U
BMAC-Soil-15	5/23/2014	0.774	1.02 J+	1.28	3.04
BMAC-Soil-16	5/23/2014	0.647	0.985 J+	1.02	3.25
BMAC-Soil-17	5/23/2014	0.629	1.02 J+	0.761	2.17 U
BMAC-Soil-18	5/23/2014	0.521	0.855 J+	0.983	1.61 U
BMAC-Soil-19	5/23/2014	0.531	0.690 J+	0.766	3.74
BMAC-Soil-20	5/23/2014	0.569	0.633 J+	0.847	0.852 U
BMAC-Soil-21	5/23/2014	0.464	0.641 J+	0.883	-0.257 U
BMAC-Soil-22	5/23/2014	0.726	0.844 J+	0.966	2.79 U
BMAC-Soil-23	5/23/2014	0.562	0.881 J+	0.869	0.637 U
BMAC-Soil-24	5/23/2014	0.140	0.170 U	0.208 U	7.79
BMAC-Soil-25	5/23/2014	0.0862	0.179 U	0.00541 U	3.68 U
BMAC-Soil-26	5/23/2014	0.482	0.563 J+	0.686	2.56
BMAC-Soil-27	5/23/2014	0.589	0.703 J+	0.909	0.977 U
BMAC-Soil-28	5/23/2014	0.618	0.714	0.742	0.00836 U
BMAC-Soil-29	5/23/2014	0.513	0.706	0.783	1.36 U
BMAC-Soil-30	5/23/2014	0.529	0.851	0.803	2.57 U

Notes:	
*	Indicates isotope analyzed via alpha spectrometry. Unmarked isotopes were analyzed via gamma spectrometry.
BMAC	Bridgeton Municipal Athletic Complex
J+	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased high.
Pb-210	Lead-210
pCi/g	picoCuries per gram
Ra-226	Radium-226
Th-230	Thorium-230
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
U-238	Uranium-238
UJ	The analyte was analyzed for, but was not detected above the reported sample quantitation limit, which is estimated.

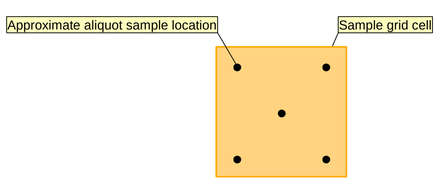
Legend

- Discrete soil sample location
- Outfall sample location
- Exposed soil area composite sample location
- Grass-covered area composite sample location

Source: ESRI Imagery Basemap, 2014

Note: Shaded cells depict the 10 meter by 10 meter areas where composite soil samples were collected. From each cell, a five aliquot soil sample was collected, homogenized, and submitted for laboratory analysis. The adjacent graphic depicts the typical aliquot sampling pattern.

Discrete soil samples BMAC-Discrete-00 through BMAC-Discrete-10 were collocated with community group samples BMAC0000 through BMAC0010 consecutively.



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Feet

Bridgeton Municipal Athletic Complex (BMAC)
Bridgeton, Missouri

Figure 3

BMAC Soil Sampling Summary

TETRA TECH

Date: 7/30/2014 Drawn By: Colin Willits Project No: 103X902514.0002.023

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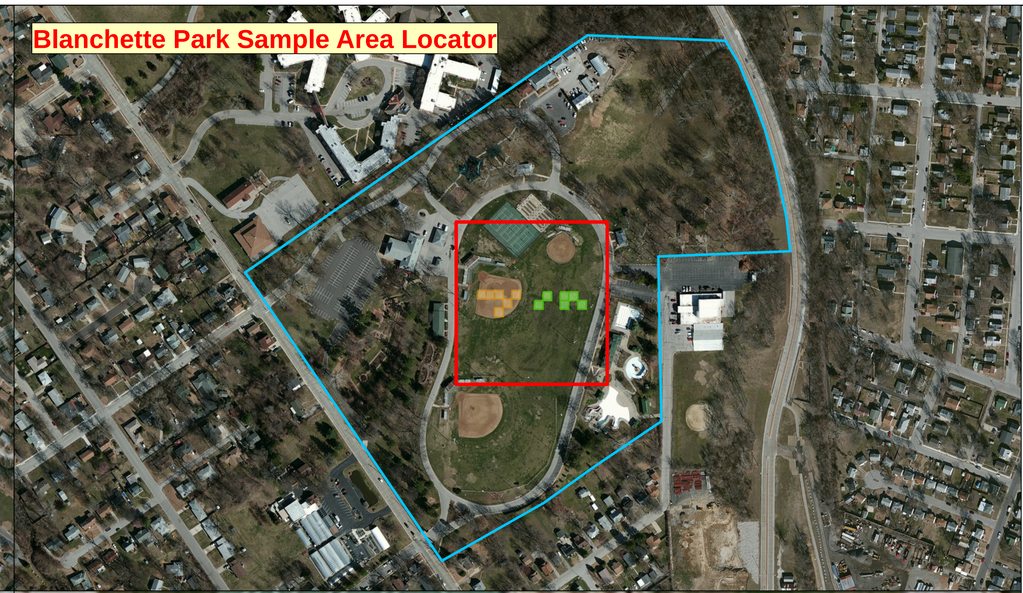


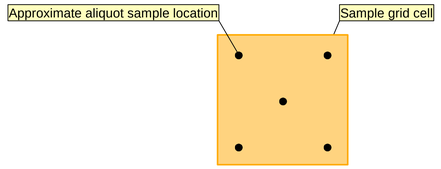
Sample Information					
Sample ID	Sample Date	U-238*	Th-230*	Ra-226	Pb-210
Blanchette Park Composite Samples (pCi/g)					
Blanchette-Grass-1	5/22/2014	0.896	0.823	1.32	2.69 U
Blanchette-Grass-2	5/22/2014	0.659	0.968	1.28	3.34 U
Blanchette-Grass-3	5/22/2014	0.613	0.986	1.16	2.65 U
Blanchette-Grass-4	5/22/2014	0.541	0.772	1.15	1.53 U
Blanchette-Grass-5	5/22/2014	0.707	0.779	1.14	0.359 U
Blanchette-Grass-6	5/22/2014	0.512	1.08	1.04	3.24 U
Blanchette-Soil-1	5/22/2014	0.847	0.636	0.935	0.402 U
Blanchette-Soil-2	5/22/2014	0.819	0.769	1.09	1.06 U
Blanchette-Soil-3	5/22/2014	0.549	0.734	1.01	1.47 U
Blanchette-Soil-4	5/22/2014	0.584	0.720	0.843	0.793 U
Blanchette-Soil-5	5/22/2014	0.641	0.857	0.794	1.81 U
Blanchette-Soil-6	5/22/2014	0.520	0.764	0.804	2.50 U
Koch Park Compsite Samples (pCi/g)					
Koch-Grass-1	5/22/2014	0.610	0.906	1.19	2.79
Koch-Grass-2	5/22/2014	0.567	1.12	1.29	2.14 U
Koch-Grass-3	5/22/2014	0.664	1.16	1.19	3.34 U
Koch-Grass-4	5/22/2014	0.613	0.947	1.32	4.12
Koch-Grass-5	5/22/2014	0.523	1.19	1.30	1.53 U
Koch-Grass-6	5/22/2014	0.745	0.932	1.13	2.16 U
Koch-Soil-1	5/22/2014	0.555 J+	1.03	1.36	0.724 U
Koch-Soil-2	5/22/2014	0.529 J+	1.22	1.34	2.17 U
Koch-Soil-3	5/22/2014	0.667	0.904	0.986	2.73
Koch-Soil-4	5/22/2014	0.686	0.850	1.65	2.74 U
Koch-Soil-5	5/22/2014	0.582	1.12	1.21	-0.0589 U
Koch-Soil-6	5/22/2014	0.635	0.824	1.26	1.04 U

Notes:	
*	Indicates isotope analyzed via alpha spectrometry. Unmarked isotopes were analyzed via gamma spectrometry.
J+	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased high.
Pb-210	Lead-210
pCi/g	picoCuries per gram
Ra-226	Radium-226
Th-230	Thorium-230
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
U-238	Uranium-238

Legend
- Exposed soil area composite sample location
- Grass-covered area composite sample location
- Blanchette Park reference area
- Koch Park reference area

Source: ESRI Imagery Basemap, 2014

Note: Shaded cells depict the 10 meter by 10 meter areas where composite soil samples were collected. From each cell, a five aliquot soil sample was collected, homogenized, and submitted for laboratory analysis. The adjacent graphic depicts the typical aliquot sampling pattern.



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Bridgeton Municipal Athletic Complex (BMAC)
Bridgeton, Missouri

Figure 4

Reference Area Soil Sampling Summary

TETRA TECH

Date: 7/30/2014 Drawn By: Colin Willits Project No: 103X902514.0002.023

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APPENDIX B

PHOTOGRAPHIC DOCUMENTATION

Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows the entrance sign at the Bridgeton Municipal Athletic Complex (BMAC).	1
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: North	PHOTOGRAPHER	Colin Willits	5/23/2014

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows the BMAC entry building.	2
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: North	PHOTOGRAPHER	Danny O'Connor	5/23/2014

Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows the southwest portion of BMAC looking northwest.	3
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: Northwest	PHOTOGRAPHER	Colin Willits	5/23/2014

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows the southwest parking lot.	4
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: North	PHOTOGRAPHER	Colin Willits	5/23/2014

Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows a baseball field at Blanchette Park where reference samples were collected. Analytical data from reference area samples was used to calculate a 95 percent upper confidence limit (UCL) for each radionuclide to represent Naturally Occurring Radioactive Material (NORM).	5
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: East	PHOTOGRAPHER	Danny O'Connor	5/21/2014

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows the area of Koch Park where reference area soil samples were collected.	6
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: Southeast	PHOTOGRAPHER	Colin Willits	5/19/2014

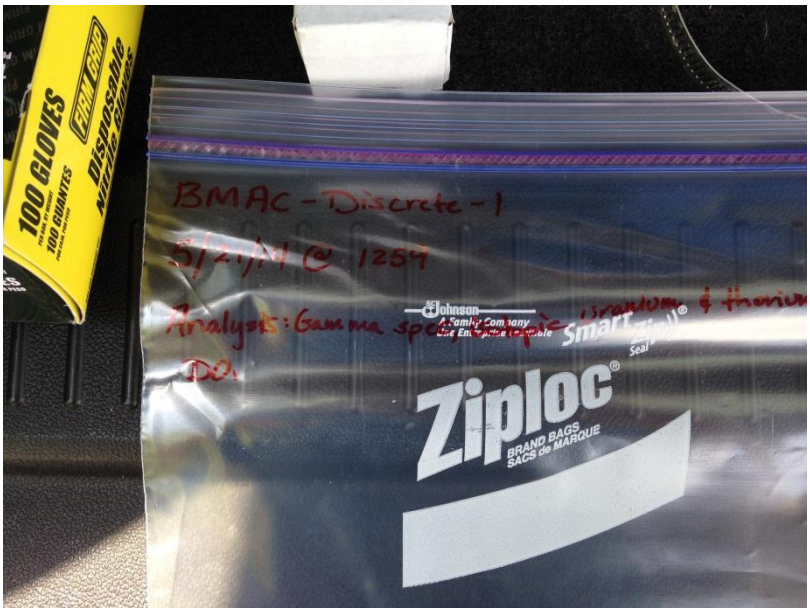
Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows the three gross gamma survey setups used to conduct the gross gamma survey at BMAC and the reference areas.	7
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: North	PHOTOGRAPHER	Colin Willits	5/21/2014

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows field personnel conducting a gross gamma survey near the southeast BMAC parking lot.	8
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: North	PHOTOGRAPHER	Danny O'Connor	5/21/14

Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows soil sampling supplies, including bags, gloves, and spoons.	9
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: NA	PHOTOGRAPHER	Danny O'Connor	5/22/2014



TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows a labeled sampling bag. Sample aliquots were transferred directly to their sampling bag.	10
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: NA	PHOTOGRAPHER	Danny O'Connor	5/22/2014

Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows personnel collecting one aliquot of a composite soil sample from a grassy area of BMAC. Composite soil samples consisted of five aliquots of equal mass spread evenly across the Decision Unit (DU).	11
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: NA	PHOTOGRAPHER	Danny O'Connor	5/23/2014

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows personnel collecting a composite soil sample from a reference area, Koch Park.	12
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: NA	PHOTOGRAPHER	Danny O'Connor	5/22/2014

Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows a discrete soil sample collected from BMAC. START collected 11 discrete samples collocated with samples collected by the community group.	13
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: NA	PHOTOGRAPHER	Danny O'Connor	5/22/2014

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows a discrete soil sample, BMAC-Discrete-04, collected near a culvert at BMAC.	14
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: NA	PHOTOGRAPHER	Danny O'Connor	5/22/2014

Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex
Bridgeton, Missouri

TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows soil samples being prepared for delivery to TestAmerica Laboratories, LLC.	15
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
Direction: NA	PHOTOGRAPHER	Colin Willits	5/23/2014

APPENDIX C

LOG BOOK

5-19-14 BMAC Pre-CERCLIS Screening

0745 STMs Danny O'Connor & Colin Willits load rental vehicle and depart for site

1230 Arrive @ site. STM Tom Benz on site
- Meet with Bridgeton, MO officials to discuss site uses
- Provided map of site
- South side of park built in mid 70s
- Major expansion 99-02 to add north fields
- Parks crew will write up summary of site history

Meet with EPA Campbell and local citizen that collected samples from BMAC (Dawn Chapman)
Randy Hein, Donna, Dakin, + Coach (City Council)
Discuss site activities
Concerned citizens concerned about background concentrations
- Want samples taken outside West Lake Area - Cliff Cave Park suggested for background
- Want EPA to contact FUSRAP
- EPA Mahler discussing scanning

5-19-14 BMAC Pre-CERCLIS Screening

process of surface soils
- Concerned about Thorium-230

38.77836, -90.43125
38.77830, -90.43129

Both drainage ditches - Sampling locations
11 total samples collected by citizens
Field # 1 between home and 3rd
Grassy area
Total Gamma 190 Bq/ml → 5.13 pCi/g
Bridgeton Parks official
Door code 1313

1740 Arrive @ Koch Park in Florissant, MO to collect background readings
Run all three FUST system setups over grass areas and infield dirt.
No readings collected from ditch.

1915 Complete background screening

1950 Arrive back @ West Lake Field trailer

2045 Depart site. End day

Danny O.
5-19-14

Rite in the Rain

5-20-14 BMAC Pre-CERCLIS Screening

0600 STMs. O'Connor and Willits arrive on site. STM Bénz on site
Weather: Sunny mid to upper 80s
- Will complete surface scan of soils @ Koch Park then move to BMAC to begin surface soil scanning of gross gamma radiation with Ludlum 2221 ratemeter with 44-20 detector

0713 Arrive @ Koch Park. Complete background survey of grass & dirt

0839 Arrive @ BMAC. STMs O'Connor & Willits work as Team 3 on gross gamma survey

1200 Lunch

1243 Continue FAST survey of north areas

1852 Drop off equipment @ West Lake office trailer

1910 STMs depart site. End day

5-20-14
Danny O.

5-21-14 BMAC Pre-CERCLIS Screening

0700 STMs O'Connor & Willits arrive @ West Lake Field Trailer. STM Bénz on site.
Weather: Sunny & hot. High 91°F, 30% chance of afternoon storms
- Will collect reference area data from blanchet park and continue surface soil assessment of BMAC

0745 Arrive @ Blanchette Park
- Collect reference gross gamma readings using FAST

0929 Arrive @ BMAC, begin FAST survey

1200 Lunch

1249 STM O'Connor arrives in southwest parking lot to collect discrete soil samples from same location as Bridgeton citizens

1259 BMAC - Discrete - 1
38.77782, -90.43053

1310 BMAC - Discrete - 3
38.77777, -90.43070

1325 BMAC - Discrete - 4
38.77824, -90.43130

1335 BMAC - Discrete - 2
38.77868, -90.43040

5-21-14 BMAC Pre-CERCLIS Screening

1355 BMAC-Discrete-10
38.77963, -90.43098

1400 BMAC-Discrete-9
38.77953, -90.43041

1420 BMAC-Discrete-8
38.77936, -90.43054

1435 BMAC-Discrete-~~5~~ 11 00
D.O.
38.77835, -90.42966

1448 BMAC-Discrete-5
38.77779, -90.42970

1455 BMAC-Discrete-6
38.77790, -90.42923

1501 BMAC-Discrete-7
38.77872, -90.42991

1520 Prep COC. Rain delay in survey
STM Willits and O'Connor continue surface soil scan on steep slope on southeast hill along
- Readings consistently above background (18-21 Kcpm). Check area already surveyed, readings similar to southeast hill. Rain may have caused elevated readings - Radon concentrated by rain

1820 STMs Willits, O'Connor, and Benz depart

Danny O.
5-21-14

5-22-14 BMAC Pre-CERCLIS Screening

0720 STMs O'Connor & Willits arrive on site. STM Benz on site.
Weather: 82°F with 30% chance of afternoon storms
- Planned activities include Finishing FAST survey and sampling @ reference areas and BMAC

0800 STM O'Connor, EPA Mahler, & EPA Campbell work to finish FAST survey of southeast hillside

0920 All FAST survey for Team 3 is complete
STM Benz continues FAST survey in central area of complex

1030 STM O'Connor and EPA Mahler depart for Koch park

1048 Arrive @ Koch Park, prep to collect dirt and grass samples

1054 Collect Koch-Soil-1

1102 Collect Koch-Soil-2

1105 Collect Koch-Soil-3

1109 Collect Koch-Soil-4

1114 Collect Koch-Soil-5

1118 Collect Koch-Soil-6

1123 Collect Koch-~~Soil~~ Grass -1
D.O.

5-22-14 BMAC Pre-CERCLIS Screening

1130 Collect Koch-Grass-2

1135 Collect Koch-Grass-3

1141 Collect Koch-Grass-4

1147 Collect Koch-Grass-5

1150 Collect Koch-Grass-6

Use Victoreen Model 451 ion-chamber to collect dose readings

-Check with 5μCi Cs-137 (4.5 μSv/hr) reads 4.6 μSv/hr

Readings:

~~0.8~~ 0.08 D.O. - 0.13 μSv/hr

38.80781, -90.36276

0.09 - 0.15 μSv/hr

38.80777, -90.36280

0.07 - 0.16 μSv/hr

38.80779, -90.36240

1225 Arrive back @ BMAC

Complete COC

-STM Willits working on Arcpad application for soil sampling @ BMAC and Blanchette Park

1320 Arrive @ Blanchette Park

1331 Collect Blanchette-Soil-1

1340 Collect Blanchette-Soil-2

5-22-14 BMAC Pre-CERCLIS Screening

1345 Collect Blanchette-Soil-3

1350 Collect Blanchette-Soil-4

1355 Collect Blanchette-Soil-5

1400 Collect Blanchette-Soil-6

1408 Collect Blanchette-Grass-1

1415 Collect Blanchette-Grass-2

1425 Collect Blanchette-Grass-3

~~1435~~ 1430 D.O. Collect Blanchette-Grass-4

1435 Collect Blanchette-Grass-5

1445 Collect Blanchette-Grass-6

1507 Collect dose reading Blanchette Park Victoreen Model 451 05-RAD 451P-A

- 0.07 uSv/hr to 0.14 uSv/hr GPS 38.79867 N x 90.48353 W
- 0.07 uSv/hr to 0.15 uSv/hr GPS 38.79852 N x 90.48325 W

1525 Arrive back @ BMAC. Finish COCs

1605 Test America picks up samples

1700 STM O'Connor departs site

1730 STM Willits departs site

Danny O.
5-22-14

5-23-14 BMAC Pre-CERCLIS screening

0657 STM O'Connor & Willits arrive on site.
STM Binz already on site
Weather: 79°F & Sunny
- Will complete surface soil sampling
@ BMAC
STM O'Connor & EPA Campbell begin
sampling as team A

0745 BMAC-Grass-29
0752 ~~0758~~ BMAC-Grass-30
D.O.
0805 BMAC-Grass-28

0815 BMAC-Soil-30
0825 BMAC-Soil-29
0832 BMAC-Soil-28
0835 BMAC-Soil-27
0840 BMAC-Soil-26
0845 BMAC-~~Soil~~ Grass 25
D.O.
0857 BMAC-Grass-24
0903 BMAC-Soil-21
0907 BMAC-Soil-23
0912 BMAC-Soil-22
0918 BMAC-Soil-25. Playground area has mulch to > 1' bgs. Will collect surface mulch sample
0925 BMAC-Soil-24. Also mulch

5-23-14 BMAC Pre-CERCLIS screening

0932 BMAC-Soil-20
0934 BMAC-Soil-19
0940 BMAC-Grass-20
0947 BMAC-Grass-19
1000 BMAC-Grass-12
1008 BMAC-Soil-15
1023 BMAC-Grass-13
1035 BMAC-Grass-18
1045 BMAC-Grass-22
1100 BMAC-Soil-17
1105 BMAC-Soil-16
1108 BMAC-Soil-18

1150 EPA Campbell & Mahler meet with city administrators to give site update.
- EPA Campbell shares powerpoint with group
- 68 acres -> more than 60k data points
City Concerns
- July 4th - will they have results by then?
- 21-day ingrowth process explained by EPA Mahler
- Waste concentration @ West Lake
- Analysis will look for radionuclides

5-23-14 BMAC Pre-CERCLIS Screening
specific to West Lake (Ra-226, Th-230, U-238)
- Explains Gamma scan @ BMAC
correlates with reference areas
EPA maintanes position that all
scientific information indicates BMAC
is suitable for use
- City wants EPA to release statement
- Prep samples for lab
1340 Test America picks up samples
STM Willits and O'Connor depart for
KC, STM Binz leaves site
1750 Arrive in Kansas City. Unload vehicle
1815 End day

Danny O.
5-23-14

5-23-14 BMAC BMAC

- STM Willits, STM Binz, and OSC Mahler begin sampling Team B area

- 0743	collected	BMAC-SOIL-11
- 0747	collected	BMAC-SOIL-9
- 0752	collected	BMAC-GRASS-14
- 0805	collected	BMAC-GRASS-16
- 0817	collected	BMAC-SOIL-14
- 0821	collected	BMAC-SOIL-12
- 0826	collected	BMAC-SOIL-10
- 0829	collected	BMAC-SOIL-13
- 0838	collected	BMAC-SOIL-8
- 0841	collected	BMAC-SOIL-7
- 0844	collected	BMAC-GRASS-9
- 0858	collected	BMAC-GRASS-6
- 0907	collected	BMAC-SOI-1
~~0913~~	~~collected~~	~~BMAC-SOIL-13~~ CW
0913	collected	BMAC-SOIL-3
0928	collected	BMAC-GRASS-8
0933	collected	BMAC-SOIL-5
0935	collected	BMAC-SOIL-4
0939	collected	BMAC-SOIL-6
~~0952~~	~~collected~~	~~BMAC-SOIL-2~~ CW
0952	collected	BMAC-GRASS-23

5-23-14 BMAC BMAC

- 0958	collected	BMAC-GRASS-26
- 10:03	collected	BMAC-GRASS-27
- 10:10	collected	BMAC-GRASS-21
- 10:14	collected	BMAC-GRASS-17
- 10:20	collected	BMAC-GRASS-15
- 10:30	collected	BMAC-GRASS-11
- 10:38	collected	BMAC-GRASS-4
~~10:44~~	~~collected~~	~~BMAC-GRASS-2~~ CW
- 10:47	collected	BMAC-GRASS-3
- 10:51	collected	BMAC-GRASS-2
- 10:57	collected	BMAC-GRASS-1
- 11:02	collected	BMAC-GRASS-5
- 11:06	collected	BMAC-GRASS-7
- 11:12	collected	BMAC-GRASS-10
- 11:29	collected	BMAC-OUTFALL-17
- 11:33	collected	BMAC-OUTFALL-18
- 11:40	collected	BMAC-OUTFALL-16
- 11:44	collected	BMAC-OUTFLL-15
- 11:49	collected	BMAC-OUTFALL-14
- 12:03	collected	BMAC-OUTFALL-10

encountered non-native material in sample BMAC-OUTFALL-10

~~12:12~~	~~collected~~	~~BMAC-OUTFALL-13~~ CW
12:12	collected	BMAC-OUTFALL-11

5-23-14 BMAC

- 12:24 collected BMAC-OUTFALL-2
- 12:40 collected BMAC-OUTFALL-3
- 12:42 collected BMAC-OUTFALL-4
- 12:47 collected BMAC-OUTFALL-9
- 12:51 collected BMAC-OUTFALL-8
- 12:55 collected BMAC-OUTFALL-7
- 12:59 collected BMAC-OUTFALL-6
- 13:02 collected BMAC-OUTFALL-5
- 13:09 collected BMAC-OUTFALL-19
- 13:11 collected BMAC-OUTFALL-20
- 13:15 sampling complete
- 13:56 demobilize from site

C. Willits
5-23-14

APPENDIX D

INSTRUMENT CALIBRATION AND DAILY CHECK SOURCE RECORDS

RSSI

CERTIFICATE OF CALIBRATION

6312 West Oakton Street
Morton Grove, IL 60053-2723
Telephone: 847-965-1999
Fax: 847-965-1991
www.rssi.us

Certificate No. 048602

US EPA
Attention: Eugene Jablonowski
77 W. Jackson Blvd.
Chicago, IL 60604

Manufacturer: LUDLUM
Model: 2221
Serial No.: 105939
Probe(s): LUDLUM 44-20, Sn: PR334952

CALIBRATION DATA

SOURCE*	SCALE	FIELD (cpm)	READING (cpm)	FIELD (cpm)	READING (cpm)
5	x1	100	100	400	400
5	x10	1 K	1 K	4 K	4 K
5	x100	10 K	10 K	40 K	40 K
5	x1000	100 K	100 K	400 K	400 K
5	Log	250	250	2.5 K	2.5 K
5		25 K	25 K	250 K	225 K
	Scaler	counts	counts	counts	counts
5	0 - 1 K	50	*	500	*
5	0 - 100 K	5 K	*	50 K	*
5	0 - 1 M	500 K	*		

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Check Source: Cs-137 **Reading:** 150 kcpm

Temperature: 21.5 °C **Relative Humidity**: 45 % **Barometric Pressure**: 998 mbar

Comments: 0.1 mR = 288 kcpm, 0.15 mR/hr = 405 kcpm
* The scaler has not been calibrated, because the count time switch is not working properly.

Calibrated by: Timothy Hall **Date**: 5/14/14

Calibration Frequency: Annual **Recalibrate by**: 5/14/15

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham	LUDLUM	
Model	CCs-D-20E	64-764	AMC 13446	100	500	
Serial Number	69036EZ	722	7510 LA	FTC-CF-001	32789	
Activity	15 Ci	100 mCi	100 mCi	1801 µg	NONE	
Date	4/2009	5/2/78	6/3/84	10/8/85	11/18/09	

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.
Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

PREVENTIVE MAINTENANCE PERFORMED

BATTERIES/CONTACTS CHECKED	✓	
HIGH VOLTAGE MEASURED	✓	984 VOLTS
SENSITIVITY MEASURED	✓	20 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

REPAIR AND PART INFORMATION

Quantity	Description

Repair Time: _____ hours

Comments: _____

Lab Reference: 23

RSSI

CERTIFICATE OF CALIBRATION

6312 West Oakton Street
Morton Grove, IL 60053-2723
Telephone: 847-965-1999
Fax: 847-965-1991
www.rssi.us

Certificate No. 048600

US EPA
Attention: Eugene Jablonowski
77 W. Jackson Blvd.
Chicago, IL 60604

Manufacturer: LUDLUM
Model: 2221
Serial No.: 106667
Probe(s): LUDLUM 44-20, Sn: PR334950

CALIBRATION DATA

SOURCE*	SCALE	FIELD (cpm)	READING (cpm)	FIELD (cpm)	READING (cpm)
5	x1	100	100	400	400
5	x10	1 K	1 K	4 K	4 K
5	x100	10 K	10 K	40 K	40 K
5	x1K	100 K	100 K	400 K	400 K
5	Log Scale	250	250	2.5 K	2.5 K
5		25 K	25 K	250 K	250 K
	SCALER	counts	counts	counts	counts
5	0 - 1K	50	51	500	503
5	0 - 100K	5 K	5032	50 K	50355
5	0 - 1M	500 K	503534		

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Check Source: Cs-137 **Reading:** 146 kcpm

Temperature: 23.5 °C **Relative Humidity**: 54 % **Barometric Pressure**: 986 mbar

Comments: 0.1 mR/hr = 310 kcpm
0.15 mR/hr = 406 kcpm

Calibrated by: Timothy Hall **Date**: 5/12/14

Calibration Frequency: Annual **Recalibrate by**: 5/12/15

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham	LUDLUM	
Model	CCs-D-20E	64-764	AMC 13446	100	500	
Serial Number	69036EZ	722	7510 LA	FTC-CF-001	32789	
Activity	15 Ci	100 mCi	100 mCi	1801 µg	NONE	
Date	4/2009	5/2/78	6/3/84	10/8/85	11/18/09	

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.
Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

PREVENTIVE MAINTENANCE PERFORMED

BATTERIES/CONTACTS CHECKED	✓	REPLACED
HIGH VOLTAGE MEASURED	✓	907 VOLTS
SENSITIVITY MEASURED	✓	20 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

REPAIR AND PART INFORMATION

Quantity	Description
4	D Batteries

Lab Reference: 7

RSSI

CERTIFICATE OF CALIBRATION

6312 West Oakton Street
Morton Grove, IL 60053-2723
Telephone: 847-965-1999
Fax: 847-965-1991
www.rssi.us

Certificate No. 048601

US EPA
Attention: Eugene Jablonowski
77 W. Jackson Blvd.
Chicago, IL 60604

Manufacturer: LUDLUM
Model: 2221
Serial No.: 102047
Probe(s): LUDLUM 44-20, Sn: PR205404

CALIBRATION DATA

SOURCE*	SCALE	FIELD	READING	FIELD	READING
5	x1	100	100	400	400
5	x10	1 K	1 K	4 K	4 K
5	x100	10 K	10 K	40 K	40 K
5	x1K	100 K	100 K	400 K	400 K
5	Log Scale	250	250	2.5 K	2.5 K
5		25 K	25 K	250 K	250 K
	SCALER	counts	counts	counts	counts
5	0 - 1K	50	50	500	504
5	0 - 100 K	5 K	5037	50 K	50369
5	0 - 1 M	500 K	503586		

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Check Source: Cs-137 **Reading:** 129 kcpm

Temperature: 23 °C **Relative Humidity**: 63 % **Barometric Pressure**: 984 mbar

Comments: 0.1 mR/hr = 255 kcpm
0.15 mR/hr = 359 kcpm

Calibrated by: Timothy Hall **Date**: 5/13/14

Calibration Frequency: Annual **Recalibrate by**: 5/13/15

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham	LUDLUM	
Model	CCs-D-20E	64-764	AMC 13446	100	500	
Serial Number	69036EZ	722	7510 LA	FTC-CF-001	32789	
Activity	15 Ci	100 mCi	100 mCi	1801 µg	NONE	
Date	4/2009	5/2/78	6/3/84	10/8/85	11/18/09	

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.
Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

PREVENTIVE MAINTENANCE PERFORMED

BATTERIES/CONTACTS CHECKED	✓	
HIGH VOLTAGE MEASURED	✓	1056 VOLTS
SENSITIVITY MEASURED	✓	20 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

Lab Reference: 16

U.S. EPA Region 5 Emergency Response Functional Check Sheet

TEAM 1 Configuration

Instrument	Model	Serial #
Meter	Ludlum 2221	105939
Detector	Ludlum 44-10	PR334952
Check Source	0.25 uCi	161
HV	1000	
Threshold	100	
Window	4030	

BMAC Daily Functional Checks

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
5/16/2014 at 1140 Initial Willowbrook Warehouse Willowbrook, IL				
1	11,995	91,985	79,990	Initial Check Source Calibration
2	11,021	92,708	81,687	
3	10063	91,631	81,568	
Average	11,026	92,108	**81,082**	
5/19/2014 at 1440 CST Westlake Landfill Site Trailer				
1	15,201	96,927	81,726	Yes
2	15,322	96,809	81,487	Yes
3	15,132	96,204	81,072	Yes
Average	15,218	96,647	**81,428**	Yes
5/19/2014 at 2035 CST				
1	15130	95629	80,499	Yes
2	15509	98677	83,168	Yes
3	15601	97773	82,172	Yes
Average	15413	97360	**81,946**	Yes
5/20/2014 at 0605 CST Westlake Landfill Site Trailer				
1	15270	98212	82,942	Yes
2	15659	97983	82,324	Yes
3	15581	98545	82,964	Yes
Average	15503	98247	**82,743**	Yes
5/20/2014 at 1915 CST				
1	15499	97473	81,974	Yes
2	15211	90018	74,807	Yes
3	15352	98524	83,172	Yes
Average	15354	95338	**79,984**	Yes
5/21/2014 at 0730 CST Westlake Landfill Site Trailer				
1	14829	99511	84,682	Yes
2	16008	99207	83,199	Yes
3	14957	99499	84,542	Yes
Average	15265	99406	**84,141**	Yes

U.S. EPA Region 5 Emergency Response Functional Check Sheet

TEAM 1 Configuration

Instrument	Model	Serial #
Meter	Ludlum 2221	105939
Detector	Ludlum 44-10	PR334952
Check Source	0.25 uCi	161
HV	1000	
Threshold	100	
Window	4030	

BMAC Daily Functional Checks

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
5/21/2014 at 1820				
1	15566	99877	84,311	Yes
2	15877	98132	82,255	Yes
3	15390	99709	84,319	Yes
Average	15611	99239	**83,628**	Yes
5/22/2014 at 0730 CST Westlake Landfill Site Trailer				
1	15321	98211	82,890	Yes
2	15001	97556	82,555	Yes
3	15231	97909	82,678	Yes
Average	15184	97892	**82,708**	Yes
5/22/2014 at 1640 CST				
1	15945	97346	81,401	Yes
2	15328	98445	83,117	Yes
3	15274	97448	82,174	Yes
Average	15516	97746	**82,231**	Yes

Notes:

%	percent
µCi	MicroCurie
cpm	Counts per minute
CST	Central Standard Time
HV	High voltage
NA	Not applicable

U.S. EPA Region 5 Emergency Response Functional Check Sheet

TEAM 2 Configuration

Instrument	Model	Serial #
Scaler/Ratemeter	Ludlum 2221	106667
Detector	Ludlum 44-10	PR334950
Check Source	0.25 uCi	158
HV	917	
Threshold	101	
Window	3797	

BMAC Daily Functional Checks

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
5/16/2014 at 1240 CST Initial Willowbrook Warehouse				
1	10,525	89,495	78,970	NA
2	10,646	89,577	78,931	
3	10,540	89,884	79,344	
Average	10,570	89,652	**79,082**	
5/19/2014 at 1440 CST Westlake Landfill Site Trailer				
1	15,175	94,106	78,931	Yes
2	15,170	94,670	79,500	Yes
3	15,174	94,096	78,922	Yes
Average	15,173	94,291	**79,118**	Yes
5/19/2014 at 2035 CST				
1	15,161	90,538	75,377	Yes
2	15,067	90,984	75,917	Yes
3	15,155	90,965	75,810	Yes
Average	15,128	90,829	**75,701**	Yes
5/20/2014 at 0605 CST Westlake Landfill Site Trailer				
1	14599	90265	75,666	Yes
2	14507	90579	76,072	Yes
3	14516	90859	76,343	Yes
Average	14541	90568	**76,027**	Yes
5/20/2014 at 1915 CST				
1	13908	93532	79,624	Yes
2	13801	93275	79,474	Yes
3	13708	93206	79,498	Yes
Average	13806	93338	**79,532**	Yes
5/21/2014 at 0730 CST Westlake Landfill Site Trailer				
1	13959	92543	78,584	Yes
2	13801	93001	79,200	Yes
3	13900	92409	78,509	Yes
Average	13887	92651	**78,764**	Yes

U.S. EPA Region 5 Emergency Response Functional Check Sheet

TEAM 2 Configuration

Instrument	**Model**	**Serial #**
Scaler/Ratemeter	Ludlum 2221	106667
Detector	Ludlum 44-10	PR334950
Check Source	0.25 uCi	158
HV	917	
Threshold	101	
Window	3797	

BMAC Daily Functional Checks

Reading number	**Background measurements (one minute)**	**Check Source Readings (one minute measurements with source on shelf 1)**	**Net CPM**	**Within Operating Limits (+-) 10% of initial calibration?**
5/21/2014 at 1820 CST				
1	14694	91988	77,294	Yes
2	14533	92202	77,669	Yes
3	14544	93059	78,515	Yes
Average	14590	92416	**77,826**	Yes
5/22/2014 at 0730 CST Westlake Landfill Site Trailer				
1	14363	92223	77,860	Yes
2	14567	91976	77,409	Yes
3	14345	93004	78,659	Yes
Average	14425	92401	**77,976**	Yes
5/22/2014 at 1640 CST				
1	14328	93447	79,119	Yes
2	14134	93151	79,017	Yes
3	14301	93249	78,948	Yes
Average	14254	93282	**79,028**	Yes

Notes:

%	percent
µCi	MicroCurie
cpm	Counts per minute
CST	Central Standard Time
HV	High voltage
NA	Not applicable

U.S. EPA Region 5 Emergency Response Functional Check Sheet

TEAM 3 Configuration

Instrument	Model	Serial #
Scaler/Ratemeter	Ludlum 2221	102047
Detector	Ludlum 44-20	PR205404
Check Source	0.25 uCi	149
HV	1057	
Threshold	100	
Window	4105	

BMAC Daily Functional Check

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
5/16/2014 at 1240 CST Initial Willowbrook Warehouse				
1	7,681	78,348	70,667	N/A
2	7,535	78,248	70,713	
3	7681	78,610	70,929	
Average	7,632	78,402	**70,770**	
5/19/2014 at 1440 CST Westlake Landfill Site Trailer				
1	10864	78,619	67,755	Yes
2	10858	79,382	68,524	Yes
3	10829	79,243	68,414	Yes
Average	10,850	79,081	**68,231**	Yes
5/19/2014 at 2035 CST				
1	11088	80,604	69,516	Yes
2	11099	80,913	69,814	Yes
3	11302	81,127	69,825	Yes
Average	11,163	80,881	**69,718**	Yes
5/20/2014 at 0605 CST Westlake Landfill Site Trailer				
1	10712	80191	69,479	Yes
2	10813	80198	69,385	Yes
3	10578	80251	69,673	Yes
Average	10701	80213	**69,512**	Yes
5/20/2014 at 1915 CST				
1	10665	80988	70,323	Yes
2	10625	80171	69,546	Yes
3	10382	80349	69,967	Yes
Average	10557	80503	**69,945**	Yes
5/21/2014 at 0730 CST Westlake Landfill Site Trailer				
1	10001	81002	71,001	Yes
2	10234	80198	69,964	Yes
3	10667	80321	69,654	Yes
Average	10301	80507	**70,206**	Yes

U.S. EPA Region 5 Emergency Response Functional Check Sheet

TEAM 3 Configuration

Instrument	Model	Serial #
Scaler/Ratemeter	Ludlum 2221	102047
Detector	Ludlum 44-20	PR205404
Check Source	0.25 uCi	149
HV	1057	
Threshold	100	
Window	4105	

BMAC Daily Functional Check

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
5/21/2014 at 1820 CST				
1	10665	80988	70,323	Yes
2	10625	80171	69,546	Yes
3	10382	80349	69,967	Yes
Average	10557	80503	**69,945**	Yes
5/22/2014 at 0730 CST Westlake Landfill Site Trailer				
1	10001	81002	71,001	Yes
2	10234	80198	69,964	Yes
3	10667	80321	69,654	Yes
Average	10301	80507	**70,206**	Yes
5/22/2014 at 1640 CST				
1	11382	81002	69,620	Yes
2	11371	80301	68,930	Yes
3	11415	80344	68,929	Yes
Average	11389	80549	**69,160**	Yes

Notes:

%	percent
µCi	MicroCurie
cpm	Counts per minute
CST	Central Standard Time
HV	High voltage
NA	Not applicable

APPENDIX E

ANALYTICAL DATA PACK AND CHAIN-OF-CUSTODY DOCUMENTS

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
~~8030 Flint Street~~
~~Lenexa, Kansas 66214~~
~~(913) 894-2600~~

Date: 05 21 -> 22 - 2014
Page: 1 of 2
Project No: X9025140002.023
Shipment Method: Courier
Number of Coolers Shipped:

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Turn-around Time Requested: Standard

Sample Number:	Date:	Time:	Gamma Spec 21-day ingrowth	Isotopic Uranium	Isotopic Thorium							Matrix Type	No. of Containers	Laboratory Comments:
BMAC-Discrete-00	5/21/14	1435	X	X	X							S	1	
BMAC-Discrete-1	5/21/14	1259										S	1	
BMAC-Discrete-2	5/21/14	1335										S	1	
BMAC-Discrete-3	5/21/14	1310										S	1	
BMAC-Discrete-4	5/21/14	1325										S	1	
BMAC-Discrete-5	5/21/14	1448										S	1	
BMAC-Discrete-6	5/21/14	1455										S	1	
BMAC-Discrete-7	5/21/14	1501										S	1	
BMAC-Discrete-8	5/21/14	1420										S	1	
BMAC-Discrete-9	5/21/14	1400										S	1	
BMAC-Discrete-10	5/21/14	1355										S	1	
Koch-Soil-1	5/22/14	1054										S	1	
Koch-Soil-2		1102										S	1	
Koch-Soil-3		1105										S	1	
Koch-Soil-4		1109										S	1	
Koch-Soil-5		1114										S	1	
Koch-Soil-6		1118										S	1	
Koch-Grass-1		1123										S	1	
Koch-Grass-2		1130										S	1	
Koch-Grass-3		1135										S	1	
Koch-Grass-4		1141										S	1	
Koch-Grass-5		1147										S	1	
Koch-Grass-6		1150										S	1	
Blanchette-Soil-1		1331										S	1	

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/22/14	1605
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
~~8030 Flint Street~~
~~Lenexa, Kansas 66214~~
~~(913) 894-2600~~

Date: 05-21->22-2014
Page: 2 of 2
Project No: X9025140002.023
Shipment Method: Courier
Number of Coolers Shipped:

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Sample Number:	Date:	Time:	Gamma Spec 21-day ingrowth	Isotopic Uranium	Isotopic Thorium								Matrix Type	No. of Containers	Laboratory Comments:
Blanchette-Soil-2	5/22/14	1340	X	X	X								S	1	
Blanchette-Soil-3		1345													
Blanchette-Soil-4		1350													
Blanchette-Soil-5		1355													
Blanchette-Soil-6		1400													
Blanchette-Grass-1		1408													
Blanchette-Grass-2		1415													
Blanchette-Grass-3		1425													
Blanchette-Grass-4		1430													
Blanchette-Grass-5		1435													
Blanchette-Grass-6		1445													

Turn-around Time Requested: Standard

Danny O. 5-22-14

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/22/14	1605
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
~~8030 Flint Street~~
~~Lenexa, Kansas 66214~~
~~(913) 894-2600~~

Date: 5-23-2014
Page: 1 of 4
Project No: X9025140002.023
Shipment Method: Courier
Number of Coolers Shipped: 6

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Turn-around Time Requested: Standard

Sample Number:	Date:	Time:	Gamma Spec 21-day ingrowth	Isotopic U	Isotopic Th								Matrix Type	No. of Containers	Laboratory Comments:
BMAC-Grass-1	5/23/14	1057	X	X	X								S	1	
BMAC-Grass-2		1051													
BMAC-Grass-3		1047													
BMAC-Grass-4		1038													
BMAC-Grass-5		1102													
BMAC-Grass-6		0858													
BMAC-Grass-7		1106													
BMAC-Grass-8		0928													
BMAC-Grass-9		0844													
BMAC-Grass-10		1112													
BMAC-Grass-11		1030													
BMAC-Grass-12		1000													
BMAC-Grass-13		1023													
BMAC-Grass-14		0752													
BMAC-Grass-15		1020													
BMAC-Grass-16		0805													
BMAC-Grass-17		1014													
BMAC-Grass-18		1035													
BMAC-Grass-19		0947													
BMAC-Grass-20		0940													
BMAC-Grass-21		1010													
BMAC-Grass-22		1045													
BMAC-Grass-23		0952													
BMAC-Grass-24		0857													

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/23/14	1340
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
8030 Flint Street
Lenexa, Kansas 66214
(913) 894-2600

Date: 5-23-2014
Page: 2 of 4
Project No: x9025140002.023
Shipment Method: Courier
Number of Coolers Shipped: 6

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Turn-around Time Requested: Standard

Sample Number:	Date:	Time:	Gamma Spec 21-day ingrowth	Isotopic U	Isotopic Th	Matrix Type	No. of Containers	Laboratory Comments:
BMAC-Grass-25	5/23/14	0845	✓	✓	✓	S	1	
BMAC-Grass-26		0958	✓	✓	✓	✓	✓	
BMAC-Grass-27		1003	✓	✓	✓	✓	✓	
BMAC-Grass-28		0805	✓	✓	✓	✓	✓	
BMAC-Grass-29		0745	✓	✓	✓	✓	✓	
BMAC-Grass-30		0752	✓	✓	✓	✓	✓	
BMAC-Soil-1		0907	✓	✓	✓	✓	✓	
BMAC-Soil-2		0911	✓	✓	✓	✓	✓	
BMAC-Soil-3		0913	✓	✓	✓	✓	✓	
BMAC-Soil-4		0935	✓	✓	✓	✓	✓	
BMAC-Soil-5		0933	✓	✓	✓	✓	✓	
BMAC-Soil-6		0939	✓	✓	✓	✓	✓	
BMAC-Soil-7		0841	✓	✓	✓	✓	✓	
BMAC-Soil-8		0838	✓	✓	✓	✓	✓	
BMAC-Soil-9		0747	✓	✓	✓	✓	✓	
BMAC-Soil-10		0826	✓	✓	✓	✓	✓	
BMAC-Soil-11		0743	✓	✓	✓	✓	✓	
BMAC-Soil-12		0821	✓	✓	✓	✓	✓	
BMAC-Soil-13		0829	✓	✓	✓	✓	✓	
BMAC-Soil-14		0817	✓	✓	✓	✓	✓	
BMAC-Soil-15		1008	✓	✓	✓	✓	✓	
BMAC-Soil-16		1105	✓	✓	✓	✓	✓	
BMAC-Soil-17		1100	✓	✓	✓	✓	✓	
BMAC-Soil-18		1108	✓	✓	✓	✓	✓	

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/23/14	1540
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
~~8030 Flint Street~~
~~Lenexa, Kansas 66214~~
~~(913) 894-2600~~

Date: 5-23-2014
Page: 3 of 4
Project No: X9025140002.023
Shipment Method: Courier
Number of Coolers Shipped: 6

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Turn-around Time Requested: Standard

Sample Number:	Date:	Time:	Gamma Spec 21-day ingrowth	Isotopic U	Isotopic Th							Matrix Type	No. of Containers	Laboratory Comments:
BMAC-Soil-19	5-23-14	0934	X	X	X							S	1	
BMAC-Soil-20		0932												
BMAC-Soil-21		0903												
BMAC-Soil-22		0912												
BMAC-Soil-23		0907												
BMAC-Soil-24		0925												
BMAC-Soil-25		0918												
BMAC-Soil-26		0840												
BMAC-Soil-27		0835												
BMAC-Soil-28		0832												
BMAC-Soil-29		0825												
BMAC-Soil-30		0815												
BMAC-Outfall-2		1224												
BMAC-Outfall-3		1240												
BMAC-Outfall-4		1242												
BMAC-Outfall-5		1302												
BMAC-Outfall-6		1259												
BMAC-Outfall-7		1255												
BMAC-Outfall-8		1251												
BMAC-Outfall-9		1247												
BMAC-Outfall-10		1203												
BMAC-Outfall-11		1212												
BMAC-Outfall-14		1149												
BMAC-Outfall-15		1144												

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/23/14	1340
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
~~8030 Flint Street~~
~~Lenexa, Kansas 66214~~
~~(913) 894-2600~~

Date: 5-23-2014
Page: 4 of 4
Project No: X9025140002.023
Shipment Method: Courier
Number of Coolers Shipped: 6

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Sample Number:	Date:	Time:	Gamma Spec 21-day Ingrowth	Isotopic U	Isotopic Th							Matrix Type	No. of Containers	Laboratory Comments:
BMAC-Outfall-16	5/23/14	1140	X	X	X							S	1	
BMAC-Outfall-17		1129	↓	↓	↓							↓	↓	
BMAC-Outfall-18		1133	↓	↓	↓							↓	↓	
BMAC-Outfall-19		1309	↓	↓	↓							↓	↓	
BMAC-Outfall-20		1311	↓	↓	↓							↓	↓	

Turn-around Time Requested: Standard

Danny O. 5-23-14

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/23/14	1340
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-6793-1
Client Project/Site: Bridgeton Municipal Athletic Complex

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
6/22/2014 6:53:21 AM

Erika Gish, Project Manager II
(314)298-8566
erika.gish@testamericainc.com

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

Job ID: 160-6793-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: Bridgeton Municipal Athletic Complex

Report Number: 160-6793-1

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

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 5/23/2014 1:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 8 coolers at receipt time were 21.0º C, 21.0º C, 21.0º C, 21.0º C, 21.0º C, 21.0º C, 21.0º C and 21.0º C.

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), BMAC-DISCRETE-10 (160-6793-11), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BMAC-GRASS-1 (160-6793-36), BMAC-GRASS-2

Job ID: 160-6793-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

(160-6793-37), BMAC-GRASS-3 (160-6793-38), BMAC-GRASS-4 (160-6793-39), BMAC-GRASS-5 (160-6793-40), BMAC-GRASS-6 (160-6793-41), BMAC-GRASS-7 (160-6793-42), BMAC-GRASS-8 (160-6793-43), BMAC-GRASS-9 (160-6793-44), BMAC-GRASS-10 (160-6793-45), BMAC-GRASS-11 (160-6793-46), BMAC-GRASS-12 (160-6793-47), BMAC-GRASS-13 (160-6793-48), BMAC-GRASS-14 (160-6793-49), BMAC-GRASS-15 (160-6793-50), BMAC-GRASS-16 (160-6793-51), BMAC-GRASS-17 (160-6793-52), BMAC-GRASS-18 (160-6793-53), BMAC-GRASS-19 (160-6793-54), BMAC-GRASS-20 (160-6793-55), BMAC-GRASS-21 (160-6793-56), BMAC-GRASS-22 (160-6793-57), BMAC-GRASS-23 (160-6793-58), BMAC-GRASS-24 (160-6793-59), BMAC-GRASS-25 (160-6793-60), BMAC-GRASS-26 (160-6793-61), BMAC-GRASS-27 (160-6793-62), BMAC-GRASS-28 (160-6793-63), BMAC-GRASS-29 (160-6793-64), BMAC-GRASS-30 (160-6793-65), BMAC-SOIL-1 (160-6793-66), BMAC-SOIL-2 (160-6793-67), BMAC-SOIL-3 (160-6793-68), BMAC-SOIL-4 (160-6793-69), BMAC-SOIL-5 (160-6793-70), BMAC-SOIL-6 (160-6793-71), BMAC-SOIL-7 (160-6793-72), BMAC-SOIL-8 (160-6793-73), BMAC-SOIL-9 (160-6793-74), BMAC-SOIL-10 (160-6793-75), BMAC-SOIL-11 (160-6793-76), BMAC-SOIL-12 (160-6793-77), BMAC-SOIL-13 (160-6793-78), BMAC-SOIL-14 (160-6793-79), BMAC-SOIL-15 (160-6793-80), BMAC-SOIL-16 (160-6793-81), BMAC-SOIL-17 (160-6793-82), BMAC-SOIL-18 (160-6793-83), BMAC-SOIL-19 (160-6793-84), BMAC-SOIL-20 (160-6793-85), BMAC-SOIL-21 (160-6793-86), BMAC-SOIL-22 (160-6793-87), BMAC-SOIL-23 (160-6793-88), BMAC-SOIL-24 (160-6793-89), BMAC-SOIL-25 (160-6793-90), BMAC-SOIL-26 (160-6793-91), BMAC-SOIL-27 (160-6793-92), BMAC-SOIL-28 (160-6793-93), BMAC-SOIL-29 (160-6793-94), BMAC-SOIL-30 (160-6793-95), BMAC-OUTFALL-2 (160-6793-96), BMAC-OUTFALL-3 (160-6793-97), BMAC-OUTFALL-4 (160-6793-98), BMAC-OUTFALL-5 (160-6793-99), BMAC-OUTFALL-6 (160-6793-100), BMAC-OUTFALL-7 (160-6793-101), BMAC-OUTFALL-8 (160-6793-102), BMAC-OUTFALL-9 (160-6793-103), BMAC-OUTFALL-10 (160-6793-104), BMAC-OUTFALL-11 (160-6793-105), BMAC-OUTFALL-14 (160-6793-106), BMAC-OUTFALL-15 (160-6793-107), BMAC-OUTFALL-16 (160-6793-108), BMAC-OUTFALL-17 (160-6793-109), BMAC-OUTFALL-18 (160-6793-110), BMAC-OUTFALL-19 (160-6793-111) and BMAC-OUTFALL-20 (160-6793-112) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R_Th. The samples were dried on 05/23/2014 and 05/27/2014, prepared on 05/27/2014, 05/29/2014 and 06/03/2014 and analyzed on 05/30/2014, 06/02/2014, 06/05/2014, 06/09/2014, 06/10/2014, 06/11/2014, 06/12/2014, 06/13/2014 and 06/18/2014.

Samples contain rocks and are not homogeneous. Possible matrix interference: (160-6793-1 DU), BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-10 (160-6793-11), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), (160-6793-21 DU), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23).

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

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), BMAC-DISCRETE-10 (160-6793-11), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BMAC-GRASS-1 (160-6793-36), BMAC-GRASS-2 (160-6793-37), BMAC-GRASS-3 (160-6793-38), BMAC-GRASS-4 (160-6793-39), BMAC-GRASS-5 (160-6793-40), BMAC-GRASS-6 (160-6793-41), BMAC-GRASS-7 (160-6793-42), BMAC-GRASS-8 (160-6793-43), BMAC-GRASS-9 (160-6793-44), BMAC-GRASS-10 (160-6793-45), BMAC-GRASS-11 (160-6793-46), BMAC-GRASS-12 (160-6793-47), BMAC-GRASS-13 (160-6793-48), BMAC-GRASS-14 (160-6793-49), BMAC-GRASS-15 (160-6793-50), BMAC-GRASS-16 (160-6793-51), BMAC-GRASS-17 (160-6793-52), BMAC-GRASS-18 (160-6793-53), BMAC-GRASS-19 (160-6793-54), BMAC-GRASS-20 (160-6793-55), BMAC-GRASS-21 (160-6793-56), BMAC-GRASS-22 (160-6793-57), BMAC-GRASS-23 (160-6793-58), BMAC-GRASS-24 (160-6793-59), BMAC-GRASS-25 (160-6793-60), BMAC-GRASS-26 (160-6793-61), BMAC-GRASS-27 (160-6793-62), BMAC-GRASS-28 (160-6793-63), BMAC-GRASS-29 (160-6793-64), BMAC-GRASS-30

Job ID: 160-6793-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

(160-6793-65), BMAC-SOIL-1 (160-6793-66), BMAC-SOIL-2 (160-6793-67), BMAC-SOIL-3 (160-6793-68), BMAC-SOIL-4 (160-6793-69), BMAC-SOIL-5 (160-6793-70), BMAC-SOIL-6 (160-6793-71), BMAC-SOIL-7 (160-6793-72), BMAC-SOIL-8 (160-6793-73), BMAC-SOIL-9 (160-6793-74), BMAC-SOIL-10 (160-6793-75), BMAC-SOIL-11 (160-6793-76), BMAC-SOIL-12 (160-6793-77), BMAC-SOIL-13 (160-6793-78), BMAC-SOIL-14 (160-6793-79), BMAC-SOIL-15 (160-6793-80), BMAC-SOIL-16 (160-6793-81), BMAC-SOIL-17 (160-6793-82), BMAC-SOIL-18 (160-6793-83), BMAC-SOIL-19 (160-6793-84), BMAC-SOIL-20 (160-6793-85), BMAC-SOIL-21 (160-6793-86), BMAC-SOIL-22 (160-6793-87), BMAC-SOIL-23 (160-6793-88), BMAC-SOIL-24 (160-6793-89), BMAC-SOIL-25 (160-6793-90), BMAC-SOIL-26 (160-6793-91), BMAC-SOIL-27 (160-6793-92), BMAC-SOIL-28 (160-6793-93), BMAC-SOIL-29 (160-6793-94), BMAC-SOIL-30 (160-6793-95), BMAC-OUTFALL-2 (160-6793-96), BMAC-OUTFALL-3 (160-6793-97), BMAC-OUTFALL-4 (160-6793-98), BMAC-OUTFALL-5 (160-6793-99), BMAC-OUTFALL-6 (160-6793-100), BMAC-OUTFALL-7 (160-6793-101), BMAC-OUTFALL-8 (160-6793-102), BMAC-OUTFALL-9 (160-6793-103), BMAC-OUTFALL-10 (160-6793-104), BMAC-OUTFALL-11 (160-6793-105), BMAC-OUTFALL-14 (160-6793-106), BMAC-OUTFALL-15 (160-6793-107), BMAC-OUTFALL-16 (160-6793-108), BMAC-OUTFALL-17 (160-6793-109), BMAC-OUTFALL-18 (160-6793-110), BMAC-OUTFALL-19 (160-6793-111) and BMAC-OUTFALL-20 (160-6793-112) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 05/23/2014 and 05/27/2014, prepared on 05/27/2014 and 05/29/2014 and analyzed on 05/30/2014, 06/02/2014, 06/05/2014, 06/09/2014 and 06/12/2014.

Samples contain rocks and are not homogeneous. Possible matrix interference: (160-6793-1 DU), BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-10 (160-6793-11), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), (160-6793-21 DU), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23).

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

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), BMAC-DISCRETE-10 (160-6793-11), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BMAC-GRASS-1 (160-6793-36), BMAC-GRASS-2 (160-6793-37), BMAC-GRASS-3 (160-6793-38), BMAC-GRASS-4 (160-6793-39), BMAC-GRASS-5 (160-6793-40), BMAC-GRASS-6 (160-6793-41), BMAC-GRASS-7 (160-6793-42), BMAC-GRASS-8 (160-6793-43), BMAC-GRASS-9 (160-6793-44), BMAC-GRASS-10 (160-6793-45), BMAC-GRASS-11 (160-6793-46), BMAC-GRASS-12 (160-6793-47), BMAC-GRASS-13 (160-6793-48), BMAC-GRASS-14 (160-6793-49), BMAC-GRASS-15 (160-6793-50), BMAC-GRASS-16 (160-6793-51), BMAC-GRASS-17 (160-6793-52), BMAC-GRASS-18 (160-6793-53), BMAC-GRASS-19 (160-6793-54), BMAC-GRASS-20 (160-6793-55), BMAC-GRASS-21 (160-6793-56), BMAC-GRASS-22 (160-6793-57), BMAC-GRASS-23 (160-6793-58), BMAC-GRASS-24 (160-6793-59), BMAC-GRASS-25 (160-6793-60), BMAC-GRASS-26 (160-6793-61), BMAC-GRASS-27 (160-6793-62), BMAC-GRASS-28 (160-6793-63), BMAC-GRASS-29 (160-6793-64), BMAC-GRASS-30 (160-6793-65), BMAC-SOIL-1 (160-6793-66), BMAC-SOIL-2 (160-6793-67), BMAC-SOIL-3 (160-6793-68), BMAC-SOIL-4 (160-6793-69), BMAC-SOIL-5 (160-6793-70), BMAC-SOIL-6 (160-6793-71), BMAC-SOIL-7 (160-6793-72), BMAC-SOIL-8 (160-6793-73), BMAC-SOIL-9 (160-6793-74), BMAC-SOIL-10 (160-6793-75), BMAC-SOIL-11 (160-6793-76), BMAC-SOIL-12 (160-6793-77), BMAC-SOIL-13 (160-6793-78), BMAC-SOIL-14 (160-6793-79), BMAC-SOIL-15 (160-6793-80), BMAC-SOIL-16 (160-6793-81), BMAC-SOIL-17 (160-6793-82), BMAC-SOIL-18 (160-6793-83), BMAC-SOIL-19 (160-6793-84), BMAC-SOIL-20 (160-6793-85), BMAC-SOIL-21 (160-6793-86), BMAC-SOIL-22 (160-6793-87), BMAC-SOIL-23 (160-6793-88), BMAC-SOIL-24 (160-6793-89), BMAC-SOIL-25 (160-6793-90), BMAC-SOIL-26 (160-6793-91), BMAC-SOIL-27 (160-6793-92), BMAC-SOIL-28 (160-6793-93), BMAC-SOIL-29

Job ID: 160-6793-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

(160-6793-94), BMAC-SOIL-30 (160-6793-95), BMAC-OUTFALL-2 (160-6793-96), BMAC-OUTFALL-3 (160-6793-97), BMAC-OUTFALL-4 (160-6793-98), BMAC-OUTFALL-5 (160-6793-99), BMAC-OUTFALL-6 (160-6793-100), BMAC-OUTFALL-7 (160-6793-101), BMAC-OUTFALL-8 (160-6793-102), BMAC-OUTFALL-9 (160-6793-103), BMAC-OUTFALL-10 (160-6793-104), BMAC-OUTFALL-11 (160-6793-105), BMAC-OUTFALL-14 (160-6793-106), BMAC-OUTFALL-15 (160-6793-107), BMAC-OUTFALL-16 (160-6793-108), BMAC-OUTFALL-17 (160-6793-109), BMAC-OUTFALL-18 (160-6793-110), BMAC-OUTFALL-19 (160-6793-111) and BMAC-OUTFALL-20 (160-6793-112) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 05/23/2014 and 05/27/2014, prepared on 05/28/2014 and 05/29/2014 and analyzed on 06/19/2014 and 06/20/2014.

Lead-214 analyzed by gamma spectroscopy was detected above the MDA in the blank. Variations in Compton backgrounds and statistical analyses allowed for small area counts in the ROIs of this nuclide. Other Thorium decay chain products are not present in the blank to support Lead 214 identification. The data is reported.

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

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
~~8030 Flint Street~~
~~Lenexa, Kansas 66214~~
~~(913) 894-2600~~

160-6793 Chain of Custody

Date: 05 21-7 22 - 2014
Page: 1 of 2
Project No: X9025140002.023
Shipment Method: Courier
Number of Coolers Shipped:

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Turn-around Time Requested: Standard

Sample Number:	Date:	Time:	Gamma Spec 21-day ingrowth	Isotopic Uranium	Isotopic Thorium								Matrix Type	No. of Containers	Laboratory Comments:
BMAC-Discrete-00	5/21/14	1435	X	X	X								S	1	
BMAC-Discrete-1	5/21/14	1259											S	1	
BMAC-Discrete-2	5/21/14	1335											S	1	
BMAC-Discrete-3	5/21/14	1310											S	1	
BMAC-Discrete-4	5/21/14	1325											S	1	
BMAC-Discrete-5	5/21/14	1448											S	1	
BMAC-Discrete-6	5/21/14	1455											S	1	
BMAC-Discrete-7	5/21/14	1501											S	1	
BMAC-Discrete-8	5/21/14	1420											S	1	
BMAC-Discrete-9	5/21/14	1400											S	1	
BMAC-Discrete-10	5/21/14	1355											S	1	
Koch-Soil-1	5/22/14	1054											S	1	
Koch-Soil-2		1102											S	1	
Koch-Soil-3		1105											S	1	
Koch-Soil-4		1109											S	1	
Koch-Soil-5		1114											S	1	
Koch-Soil-6		1118											S	1	
Koch-Grass-1		1123											S	1	
Koch-Grass-2		1130											S	1	
Koch-Grass-3		1135											S	1	
Koch-Grass-4		1141											S	1	
Koch-Grass-5		1147											S	1	
Koch-Grass-6		1150											S	1	
Blanchette-Soil-1		1331											S	1	

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/22/14	1605
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

CHAIN-OF-CUSTODY RECORD

TETRA TECH EM INC.
~~8030 Flint Street~~
~~Lenexa, Kansas 66214~~
~~(913) 894-2600~~

Date: 05-21->22-2014
Page: 2 of 2
Project No: X902514.0002.023
Shipment Method: Courier
Number of Coolers Shipped:

Project Name: BMAC
Project Manager: Danny O'Connor
Sampler: (Signature)

Analyses (Preservative): Gamma Spec 21-day ingrowth; Isotopic Uranium; Isotopic Thorium

Turn-around Time Requested: Standard

Sample Number:	Date:	Time:	Gamma Spec 21-day ingrowth	Isotopic Uranium	Isotopic Thorium	Matrix Type	No. of Containers	Laboratory Comments:
Blanchette-Soil-2	5/22/14	1340	X	X	X	S	1	
Blanchette-Soil-3	↓	1345	↓	↓	↓	↓	↓	
Blanchette-Soil-4	↓	1350	↓	↓	↓	↓	↓	
Blanchette-Soil-5	↓	1355	↓	↓	↓	↓	↓	
Blanchette-Soil-6	↓	1400	↓	↓	↓	↓	↓	
Blanchette-Grass-1	↓	1408	↓	↓	↓	↓	↓	
Blanchette-Grass-2	↓	1415	↓	↓	↓	↓	↓	
Blanchette-Grass-3	↓	1425	↓	↓	↓	↓	↓	
Blanchette-Grass-4	↓	1430	↓	↓	↓	↓	↓	
Blanchette-Grass-5	↓	1435	↓	↓	↓	↓	↓	
Blanchette-Grass-6	↓	1445	↓	↓	↓	↓	↓	

Danny O. 5-22-14

Matrix: S = Soil M = Sediment W = Water A = Air
Preservatives: 1 = Ice 2 = HCl 3 = H_2SO_4 4 = NaOH 5 = HNO_3

Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
		5/22/14	1605
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Received By: (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-6793-1

Login Number: 6793

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

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	Samples collected on 5/23 have custody seals
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.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	Samples were rec'd on 5/22 and 5/23 - per client all samples in one job.
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.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

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)

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6793-1	BMAC-DISCRETE-00	Solid	05/21/14 14:35	05/23/14 13:40
160-6793-2	BMAC-DISCRETE-1	Solid	05/21/14 12:59	05/23/14 13:40
160-6793-3	BMAC-DISCRETE-2	Solid	05/21/14 13:35	05/23/14 13:40
160-6793-4	BMAC-DISCRETE-3	Solid	05/21/14 13:10	05/23/14 13:40
160-6793-5	BMAC-DISCRETE-4	Solid	05/21/14 13:25	05/23/14 13:40
160-6793-6	BMAC-DISCRETE-5	Solid	05/21/14 14:48	05/23/14 13:40
160-6793-7	BMAC-DISCRETE-6	Solid	05/21/14 14:55	05/23/14 13:40
160-6793-8	BMAC-DISCRETE-7	Solid	05/21/14 15:01	05/23/14 13:40
160-6793-9	BMAC-DISCRETE-8	Solid	05/21/14 14:20	05/23/14 13:40
160-6793-10	BMAC-DISCRETE-9	Solid	05/21/14 14:00	05/23/14 13:40
160-6793-11	BMAC-DISCRETE-10	Solid	05/21/14 13:55	05/23/14 13:40
160-6793-12	KOCH-SOIL-1	Solid	05/22/14 10:54	05/23/14 13:40
160-6793-13	KOCH-SOIL-2	Solid	05/22/14 11:02	05/23/14 13:40
160-6793-14	KOCH-SOIL-3	Solid	05/22/14 11:05	05/23/14 13:40
160-6793-15	KOCH-SOIL-4	Solid	05/22/14 11:09	05/23/14 13:40
160-6793-16	KOCH-SOIL-5	Solid	05/22/14 11:14	05/23/14 13:40
160-6793-17	KOCH-SOIL-6	Solid	05/22/14 11:18	05/23/14 13:40
160-6793-18	KOCH-GRASS-1	Solid	05/22/14 11:23	05/23/14 13:40
160-6793-19	KOCH-GRASS-2	Solid	05/22/14 11:30	05/23/14 13:40
160-6793-20	KOCH-GRASS-3	Solid	05/22/14 11:35	05/23/14 13:40
160-6793-21	KOCH-GRASS-4	Solid	05/22/14 11:41	05/23/14 13:40
160-6793-22	KOCH-GRASS-5	Solid	05/22/14 11:47	05/23/14 13:40
160-6793-23	KOCH-GRASS-6	Solid	05/22/14 11:50	05/23/14 13:40
160-6793-24	BLANCHETTE-SOIL-1	Solid	05/22/14 13:31	05/23/14 13:40
160-6793-25	BLANCHETTE-SOIL-2	Solid	05/22/14 13:40	05/23/14 13:40
160-6793-26	BLANCHETTE-SOIL-3	Solid	05/22/14 13:45	05/23/14 13:40
160-6793-27	BLANCHETTE-SOIL-4	Solid	05/22/14 13:50	05/23/14 13:40
160-6793-28	BLANCHETTE-SOIL-5	Solid	05/22/14 13:55	05/23/14 13:40
160-6793-29	BLANCHETTE-SOIL-6	Solid	05/22/14 14:00	05/23/14 13:40
160-6793-30	BLANCHETTE-GRASS-1	Solid	05/22/14 14:08	05/23/14 13:40
160-6793-31	BLANCHETTE-GRASS-2	Solid	05/22/14 14:15	05/23/14 13:40
160-6793-32	BLANCHETTE-GRASS-3	Solid	05/22/14 14:25	05/23/14 13:40
160-6793-33	BLANCHETTE-GRASS-4	Solid	05/22/14 14:30	05/23/14 13:40
160-6793-34	BLANCHETTE-GRASS-5	Solid	05/22/14 14:35	05/23/14 13:40
160-6793-35	BLANCHETTE-GRASS-6	Solid	05/22/14 14:45	05/23/14 13:40
160-6793-36	BMAC-GRASS-1	Solid	05/23/14 10:57	05/23/14 13:40
160-6793-37	BMAC-GRASS-2	Solid	05/23/14 10:51	05/23/14 13:40
160-6793-38	BMAC-GRASS-3	Solid	05/23/14 10:47	05/23/14 13:40
160-6793-39	BMAC-GRASS-4	Solid	05/23/14 10:38	05/23/14 13:40
160-6793-40	BMAC-GRASS-5	Solid	05/23/14 11:02	05/23/14 13:40
160-6793-41	BMAC-GRASS-6	Solid	05/23/14 08:58	05/23/14 13:40
160-6793-42	BMAC-GRASS-7	Solid	05/23/14 11:06	05/23/14 13:40
160-6793-43	BMAC-GRASS-8	Solid	05/23/14 09:28	05/23/14 13:40
160-6793-44	BMAC-GRASS-9	Solid	05/23/14 08:44	05/23/14 13:40
160-6793-45	BMAC-GRASS-10	Solid	05/23/14 11:12	05/23/14 13:40
160-6793-46	BMAC-GRASS-11	Solid	05/23/14 10:30	05/23/14 13:40
160-6793-47	BMAC-GRASS-12	Solid	05/23/14 10:00	05/23/14 13:40
160-6793-48	BMAC-GRASS-13	Solid	05/23/14 10:23	05/23/14 13:40
160-6793-49	BMAC-GRASS-14	Solid	05/23/14 07:52	05/23/14 13:40
160-6793-50	BMAC-GRASS-15	Solid	05/23/14 10:20	05/23/14 13:40
160-6793-51	BMAC-GRASS-16	Solid	05/23/14 08:05	05/23/14 13:40
160-6793-52	BMAC-GRASS-17	Solid	05/23/14 10:14	05/23/14 13:40
160-6793-53	BMAC-GRASS-18	Solid	05/23/14 10:35	05/23/14 13:40

Sample Summary

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6793-54	BMAC-GRASS-19	Solid	05/23/14 09:47	05/23/14 13:40
160-6793-55	BMAC-GRASS-20	Solid	05/23/14 09:40	05/23/14 13:40
160-6793-56	BMAC-GRASS-21	Solid	05/23/14 10:10	05/23/14 13:40
160-6793-57	BMAC-GRASS-22	Solid	05/23/14 10:45	05/23/14 13:40
160-6793-58	BMAC-GRASS-23	Solid	05/23/14 09:52	05/23/14 13:40
160-6793-59	BMAC-GRASS-24	Solid	05/23/14 08:57	05/23/14 13:40
160-6793-60	BMAC-GRASS-25	Solid	05/23/14 08:45	05/23/14 13:40
160-6793-61	BMAC-GRASS-26	Solid	05/23/14 09:58	05/23/14 13:40
160-6793-62	BMAC-GRASS-27	Solid	05/23/14 10:03	05/23/14 13:40
160-6793-63	BMAC-GRASS-28	Solid	05/23/14 08:05	05/23/14 13:40
160-6793-64	BMAC-GRASS-29	Solid	05/23/14 07:45	05/23/14 13:40
160-6793-65	BMAC-GRASS-30	Solid	05/23/14 07:52	05/23/14 13:40
160-6793-66	BMAC-SOIL-1	Solid	05/23/14 09:07	05/23/14 13:40
160-6793-67	BMAC-SOIL-2	Solid	05/23/14 09:11	05/23/14 13:40
160-6793-68	BMAC-SOIL-3	Solid	05/23/14 09:13	05/23/14 13:40
160-6793-69	BMAC-SOIL-4	Solid	05/23/14 09:35	05/23/14 13:40
160-6793-70	BMAC-SOIL-5	Solid	05/23/14 09:33	05/23/14 13:40
160-6793-71	BMAC-SOIL-6	Solid	05/23/14 09:39	05/23/14 13:40
160-6793-72	BMAC-SOIL-7	Solid	05/23/14 08:41	05/23/14 13:40
160-6793-73	BMAC-SOIL-8	Solid	05/23/14 08:38	05/23/14 13:40
160-6793-74	BMAC-SOIL-9	Solid	05/23/14 07:47	05/23/14 13:40
160-6793-75	BMAC-SOIL-10	Solid	05/23/14 08:26	05/23/14 13:40
160-6793-76	BMAC-SOIL-11	Solid	05/23/14 07:43	05/23/14 13:40
160-6793-77	BMAC-SOIL-12	Solid	05/23/14 08:21	05/23/14 13:40
160-6793-78	BMAC-SOIL-13	Solid	05/23/14 08:29	05/23/14 13:40
160-6793-79	BMAC-SOIL-14	Solid	05/23/14 08:17	05/23/14 13:40
160-6793-80	BMAC-SOIL-15	Solid	05/23/14 10:08	05/23/14 13:40
160-6793-81	BMAC-SOIL-16	Solid	05/23/14 11:05	05/23/14 13:40
160-6793-82	BMAC-SOIL-17	Solid	05/23/14 11:00	05/23/14 13:40
160-6793-83	BMAC-SOIL-18	Solid	05/23/14 11:08	05/23/14 13:40
160-6793-84	BMAC-SOIL-19	Solid	05/23/14 09:34	05/23/14 13:40
160-6793-85	BMAC-SOIL-20	Solid	05/23/14 09:32	05/23/14 13:40
160-6793-86	BMAC-SOIL-21	Solid	05/23/14 09:03	05/23/14 13:40
160-6793-87	BMAC-SOIL-22	Solid	05/23/14 09:12	05/23/14 13:40
160-6793-88	BMAC-SOIL-23	Solid	05/23/14 09:07	05/23/14 13:40
160-6793-89	BMAC-SOIL-24	Solid	05/23/14 09:25	05/23/14 13:40
160-6793-90	BMAC-SOIL-25	Solid	05/23/14 09:18	05/23/14 13:40
160-6793-91	BMAC-SOIL-26	Solid	05/23/14 08:40	05/23/14 13:40
160-6793-92	BMAC-SOIL-27	Solid	05/23/14 08:35	05/23/14 13:40
160-6793-93	BMAC-SOIL-28	Solid	05/23/14 08:32	05/23/14 13:40
160-6793-94	BMAC-SOIL-29	Solid	05/23/14 08:25	05/23/14 13:40
160-6793-95	BMAC-SOIL-30	Solid	05/23/14 08:15	05/23/14 13:40
160-6793-96	BMAC-OUTFALL-2	Solid	05/23/14 12:24	05/23/14 13:40
160-6793-97	BMAC-OUTFALL-3	Solid	05/23/14 12:40	05/23/14 13:40
160-6793-98	BMAC-OUTFALL-4	Solid	05/23/14 12:42	05/23/14 13:40
160-6793-99	BMAC-OUTFALL-5	Solid	05/23/14 13:02	05/23/14 13:40
160-6793-100	BMAC-OUTFALL-6	Solid	05/23/14 12:59	05/23/14 13:40
160-6793-101	BMAC-OUTFALL-7	Solid	05/23/14 12:55	05/23/14 13:40
160-6793-102	BMAC-OUTFALL-8	Solid	05/23/14 12:51	05/23/14 13:40
160-6793-103	BMAC-OUTFALL-9	Solid	05/23/14 12:47	05/23/14 13:40
160-6793-104	BMAC-OUTFALL-10	Solid	05/23/14 12:03	05/23/14 13:40
160-6793-105	BMAC-OUTFALL-11	Solid	05/23/14 12:12	05/23/14 13:40
160-6793-106	BMAC-OUTFALL-14	Solid	05/23/14 11:49	05/23/14 13:40

Sample Summary

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6793-107	BMAC-OUTFALL-15	Solid	05/23/14 11:44	05/23/14 13:40
160-6793-108	BMAC-OUTFALL-16	Solid	05/23/14 11:40	05/23/14 13:40
160-6793-109	BMAC-OUTFALL-17	Solid	05/23/14 11:29	05/23/14 13:40
160-6793-110	BMAC-OUTFALL-18	Solid	05/23/14 11:33	05/23/14 13:40
160-6793-111	BMAC-OUTFALL-19	Solid	05/23/14 13:09	05/23/14 13:40
160-6793-112	BMAC-OUTFALL-20	Solid	05/23/14 13:11	05/23/14 13:40

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-00

Lab Sample ID: 160-6793-1

Date Collected: 05/21/14 14:35
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.05**		0.154	0.177	1.00	0.0168	pCi/g	05/27/14 09:22	06/02/14 01:42	1
Thorium-230	**0.960**		0.147	0.167	1.00	0.0168	pCi/g	05/27/14 09:22	06/02/14 01:42	1
Thorium-232	**0.894**		0.142	0.160	1.00	0.0309	pCi/g	05/27/14 09:22	06/02/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*77.9*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:42*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.722**		0.191	0.201	1.00	0.0380	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-235/236	0.0315	U	0.0446	0.0447	1.00	0.0473	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-238	**0.704**		0.189	0.198	1.00	0.0657	pCi/g	05/27/14 09:22	05/30/14 18:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*76.4*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:30*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.855	U	0.821	0.829		1.34	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Actinium 228	**1.62**		0.331	0.370		0.171	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Bismuth-212	0.643	U	0.969	0.971		1.63	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Bismuth-214	**1.08**		0.267	0.289		0.242	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Lead-210	0.387	U	2.12	2.12		3.81	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Lead-212	**1.08**		0.211	0.253		0.209	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Lead-214	**1.34**		0.219	0.260		0.140	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Potassium-40	**19.8**		2.77	3.44		1.07	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Protactinium-231	0.589	U	0.683	0.686		3.06	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Radium-226	**1.08**		0.267	0.289	1.00	0.242	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Radium-228	**1.62**		0.331	0.370		0.171	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Thorium-232	**1.62**		0.331	0.370		0.171	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Thorium-234	1.07	U	1.79	1.79		3.08	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Thallium-208	**0.348**		0.103	0.109		0.0680	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Uranium-235	0.0282	U	0.0713	0.0713		0.729	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Uranium-238	1.07	U	1.79	1.79		3.08	pCi/g	05/28/14 15:58	06/19/14 02:22	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 02:22*	*1*

Client Sample ID: BMAC-DISCRETE-1

Lab Sample ID: 160-6793-2

Date Collected: 05/21/14 12:59

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.636		0.166	0.175	1.00	0.0913	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-230	1.23		0.226	0.249	1.00	0.0590	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-232	0.646		0.164	0.173	1.00	0.0536	pCi/g	05/27/14 09:22	05/30/14 18:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.2*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.883		0.210	0.223	1.00	0.0568	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-235/236	0.0310	U	0.0439	0.0440	1.00	0.0465	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-238	0.831		0.204	0.215	1.00	0.0566	pCi/g	05/27/14 09:22	05/30/14 18:30	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.5*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:30*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0703	U	0.242	0.242		0.471	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Actinium 228	1.05		0.238	0.261		0.119	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-212	1.39		0.669	0.685		0.586	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-214	1.41		0.226	0.269		0.149	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-210	6.55		2.29	2.41		3.10	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-212	0.743		0.145	0.174		0.174	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-214	1.37		0.219	0.262		0.152	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Potassium-40	13.8		1.86	2.34		0.464	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Protactinium-231	0.599	U	0.474	0.478		2.21	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-226	1.41		0.226	0.269	1.00	0.149	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-228	1.05		0.238	0.261		0.119	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-232	1.05		0.238	0.261		0.119	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-234	0.600	U	0.733	0.736		2.59	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thallium-208	0.335		0.0857	0.0925		0.0607	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-235	0.180	U	0.276	0.277		0.461	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-238	0.600	U	0.733	0.736		2.59	pCi/g	05/28/14 15:58	06/19/14 02:23	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 02:23*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-2

Lab Sample ID: 160-6793-3

Date Collected: 05/21/14 13:35
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.654		0.175	0.183	1.00	0.105	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-230	1.05		0.215	0.232	1.00	0.0568	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-232	0.683		0.173	0.183	1.00	0.0567	pCi/g	05/27/14 09:22	06/02/14 19:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.1*		*30 - 110*	*05/27/14 09:22*	*06/02/14 19:24*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.699		0.195	0.203	1.00	0.0614	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0671		0.0671	0.0674	1.00	0.0503	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.808		0.209	0.219	1.00	0.0404	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*72.3*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.575	U	0.969	0.972		1.62	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Actinium 228	0.748		0.309	0.318		0.523	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-212	-0.00916	U	1.22	1.22		2.33	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-214	1.26		0.303	0.330		0.202	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-210	4.34		2.44	2.49		3.60	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-212	0.980		0.209	0.244		0.206	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-214	1.17		0.263	0.290		0.190	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Potassium-40	11.2		2.80	3.03		1.93	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Protactinium-231	1.03	U	1.72	1.73		3.89	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-226	1.26		0.303	0.330	1.00	0.202	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-228	0.748		0.309	0.318		0.523	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-232	0.748		0.309	0.318		0.523	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-234	1.11	U	1.04	1.05		3.54	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thallium-208	0.250		0.127	0.130		0.175	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-235	0.223	U	0.436	0.437		0.741	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-238	1.11	U	1.04	1.05		3.54	pCi/g	05/28/14 15:58	06/19/14 16:46	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:46*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-3

Lab Sample ID: 160-6793-4

Date Collected: 05/21/14 13:10
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.836**		0.196	0.208	1.00	0.0907	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-230	**0.792**		0.190	0.201	1.00	0.0759	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-232	**0.707**		0.179	0.189	1.00	0.0789	pCi/g	05/27/14 09:22	05/30/14 18:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.9*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:35*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.625**		0.181	0.188	1.00	0.0734	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0291	U	0.0458	0.0459	1.00	0.0731	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	**0.562**		0.171	0.177	1.00	0.0669	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*73.8*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.241	U	0.258	0.260		0.418	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Actinium 228	**1.31**		0.287	0.316		0.140	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-212	0.723	U	0.820	0.824		1.33	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-214	**1.14**		0.244	0.271		0.181	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-210	**2.77**		1.74	1.77		2.43	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-212	**1.11**		0.157	0.213		0.155	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-214	**1.26**		0.183	0.225		0.162	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Potassium-40	**19.1**		2.46	3.14		0.583	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Protactinium-231	0.172	U	0.273	0.273		2.36	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-226	**1.14**		0.244	0.271	1.00	0.181	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-228	**1.31**		0.287	0.316		0.140	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-232	**1.31**		0.287	0.316		0.140	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-234	0.942	U	1.38	1.38		2.37	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thallium-208	**0.374**		0.0925	0.100		0.0677	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-235	0.105	U	0.247	0.247		0.404	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-238	0.942	U	1.38	1.38		2.37	pCi/g	05/28/14 15:58	06/19/14 16:46	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:46*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-4

Date Collected: 05/21/14 13:25
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-5

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.546**		0.161	0.168	1.00	0.0852	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-230	**0.899**		0.210	0.223	1.00	0.118	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-232	**0.528**		0.163	0.169	1.00	0.115	pCi/g	05/27/14 09:22	06/02/14 01:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.7*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:38*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.561**		0.162	0.168	1.00	0.0600	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0287	U	0.0406	0.0407	1.00	0.0431	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	**0.593**		0.166	0.174	1.00	0.0655	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.1*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.400	U	0.591	0.593		0.980	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Actinium 228	**0.851**		0.260	0.274		0.150	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Bismuth-212	0.914	U	0.775	0.781		1.17	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Bismuth-214	**0.943**		0.216	0.237		0.142	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Lead-210	**9.45**		2.14	2.41		2.28	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Lead-212	**0.660**		0.153	0.175		0.162	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Lead-214	**0.876**		0.178	0.200		0.153	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Potassium-40	**14.0**		2.17	2.60		0.864	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Protactinium-231	0.279	U	0.762	0.762		2.83	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Radium-226	**0.943**		0.216	0.237	1.00	0.142	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Radium-228	**0.851**		0.260	0.274		0.150	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Thorium-232	**0.851**		0.260	0.274		0.150	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Thorium-234	0.705	U	0.826	0.829		2.61	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Thallium-208	**0.367**		0.109	0.115		0.0813	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Uranium-235	0.241	U	0.298	0.299		0.550	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Uranium-238	0.705	U	0.826	0.829		2.61	pCi/g	05/28/14 15:58	06/19/14 16:47	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:47*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-5

Lab Sample ID: 160-6793-6

Date Collected: 05/21/14 14:48
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.475**		0.145	0.151	1.00	0.0621	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-230	**0.637**		0.171	0.179	1.00	0.0940	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-232	**0.487**		0.148	0.153	1.00	0.0758	pCi/g	05/27/14 09:22	06/02/14 01:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.3*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:38*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.338**		0.116	0.120	1.00	0.0559	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0420	U	0.0495	0.0496	1.00	0.0695	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	**0.400**		0.126	0.130	1.00	0.0446	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*94.5*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0765	U	0.158	0.158		0.924	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Actinium 228	**0.751**		0.251	0.263		0.294	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Bismuth-212	0.710	U	0.564	0.569		0.851	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Bismuth-214	**0.772**		0.151	0.171		0.121	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Lead-210	0.988	U	1.16	1.17		1.91	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Lead-212	**0.787**		0.111	0.150		0.0865	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Lead-214	**0.718**		0.159	0.176		0.143	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Potassium-40	**14.4**		1.73	2.27		0.813	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Protactinium-231	0.214	U	0.198	0.199		2.33	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Radium-226	**0.772**		0.151	0.171	1.00	0.121	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Radium-228	**0.751**		0.251	0.263		0.294	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Thorium-232	**0.751**		0.251	0.263		0.294	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Thorium-234	0.928	U	0.887	0.892		1.43	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Thallium-208	**0.265**		0.0709	0.0760		0.0496	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Uranium-235	0.298	U	0.226	0.228		0.365	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Uranium-238	0.928	U	0.887	0.892		1.43	pCi/g	05/28/14 15:58	06/19/14 16:48	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:48*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-6

Lab Sample ID: 160-6793-7

Date Collected: 05/21/14 14:55
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.710**		0.188	0.197	1.00	0.0860	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	**0.784**		0.196	0.207	1.00	0.0770	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	**0.726**		0.188	0.198	1.00	0.0735	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.0*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.457**		0.156	0.161	1.00	0.0685	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.000	U	0.00615	0.00615	1.00	0.0492	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	**0.579**		0.175	0.181	1.00	0.0395	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*73.1*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0500	U	0.342	0.342		0.635	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Actinium 228	**1.43**		0.301	0.334		0.134	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-212	0.893	U	0.716	0.722		1.06	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-214	**1.23**		0.235	0.268		0.192	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-210	2.13	U	2.08	2.10		3.16	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-212	**1.03**		0.197	0.238		0.198	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-214	**1.15**		0.237	0.266		0.239	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Potassium-40	**14.6**		2.05	2.54		0.800	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Protactinium-231	0.120	U	0.395	0.396		2.60	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-226	**1.23**		0.235	0.268	1.00	0.192	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-228	**1.43**		0.301	0.334		0.134	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-232	**1.43**		0.301	0.334		0.134	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-234	0.737	U	0.841	0.844		2.88	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thallium-208	**0.228**		0.0855	0.0887		0.115	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-235	0.233	U	0.355	0.356		0.604	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-238	0.737	U	0.841	0.844		2.88	pCi/g	05/28/14 15:58	06/19/14 16:49	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:49*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-7

Lab Sample ID: 160-6793-8

Date Collected: 05/21/14 15:01
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.545**		0.163	0.169	1.00	0.130	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	**0.720**		0.180	0.190	1.00	0.109	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	**0.479**		0.143	0.149	1.00	0.0694	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.7*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.477**		0.145	0.151	1.00	0.0568	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	**0.0408**		0.0472	0.0473	1.00	0.0408	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	**0.448**		0.140	0.145	1.00	0.0328	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.0*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0709	U	0.160	0.160		1.45	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Actinium 228	**0.657**		0.176	0.189		0.281	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-212	0.285	U	0.716	0.716		1.25	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-214	**0.891**		0.199	0.219		0.185	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-210	2.32	U	1.82	1.84		2.62	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-212	**0.779**		0.155	0.185		0.154	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-214	**0.823**		0.164	0.185		0.148	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Potassium-40	**12.9**		1.82	2.25		1.03	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Protactinium-231	0.573	U	0.763	0.765		2.17	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-226	**0.891**		0.199	0.219	1.00	0.185	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-228	**0.657**		0.176	0.189		0.281	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-232	**0.657**		0.176	0.189		0.281	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-234	0.171	U	0.359	0.359		2.01	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thallium-208	**0.276**		0.0686	0.0743		0.0609	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-235	-0.0257	U	0.0666	0.0666		0.549	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-238	0.171	U	0.359	0.359		2.01	pCi/g	05/28/14 15:58	06/19/14 16:49	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:49*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-8

Lab Sample ID: 160-6793-9

Date Collected: 05/21/14 14:20
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.739		0.188	0.198	1.00	0.0860	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	0.918		0.209	0.222	1.00	0.0793	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.711		0.183	0.192	1.00	0.0686	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.8*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.480		0.167	0.171	1.00	0.0983	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0936	U	0.0851	0.0854	1.00	0.0979	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.539		0.175	0.181	1.00	0.0893	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*69.9*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.269		0.153	0.157		0.224	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Actinium 228	1.10		0.238	0.263		0.188	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Bismuth-212	0.607	U	0.771	0.774		1.27	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Bismuth-214	1.14		0.222	0.252		0.203	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Lead-210	3.94		2.49	2.54		3.19	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Lead-212	1.07		0.161	0.213		0.172	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Lead-214	1.27		0.223	0.259		0.197	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Potassium-40	15.5		2.06	2.60		1.07	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Protactinium-231	0.138	U	0.264	0.264		2.96	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Radium-226	1.14		0.222	0.252	1.00	0.203	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Radium-228	1.10		0.238	0.263		0.188	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Thorium-232	1.10		0.238	0.263		0.188	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Thorium-234	0.980	U	0.832	0.838		2.73	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Thallium-208	0.420		0.0892	0.0993		0.0691	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Uranium-235	0.295	U	0.322	0.324		0.527	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Uranium-238	0.980	U	0.832	0.838		2.73	pCi/g	05/28/14 15:58	06/19/14 16:50	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:50*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-DISCRETE-9

Lab Sample ID: 160-6793-10

Date Collected: 05/21/14 14:00
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.753**		0.189	0.199	1.00	0.0931	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	**0.887**		0.204	0.217	1.00	0.0843	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	**0.523**		0.156	0.162	1.00	0.0754	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.5*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.442**		0.144	0.149	1.00	0.0901	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0112	U	0.0280	0.0280	1.00	0.0627	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	**0.500**		0.152	0.158	1.00	0.0845	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.0*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0205	U	0.0686	0.0686		0.405	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Actinium 228	**0.751**		0.232	0.244		0.133	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-212	0.446	U	0.722	0.723		1.22	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-214	**0.844**		0.226	0.242		0.212	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-210	**2.91**		1.82	1.85		2.58	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-212	**0.659**		0.136	0.161		0.161	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-214	**0.887**		0.180	0.202		0.132	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Potassium-40	**14.9**		2.19	2.67		1.19	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Protactinium-231	0.954	U	0.807	0.814		2.03	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-226	**0.844**		0.226	0.242	1.00	0.212	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-228	**0.751**		0.232	0.244		0.133	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-232	**0.751**		0.232	0.244		0.133	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-234	0.636	U	0.601	0.605		2.01	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thallium-208	**0.312**		0.0754	0.0821		0.0545	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-235	0.0954	U	0.193	0.194		0.548	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-238	0.636	U	0.601	0.605		2.01	pCi/g	05/28/14 15:58	06/19/14 16:51	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:51*	*1*

Client Sample ID: BMAC-DISCRETE-10

Lab Sample ID: 160-6793-11

Date Collected: 05/21/14 13:55

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.944**		0.214	0.228	1.00	0.0624	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	**0.792**		0.197	0.208	1.00	0.0817	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	**0.891**		0.207	0.220	1.00	0.0655	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*77.6*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.641**		0.174	0.182	1.00	0.0709	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0262	U	0.0412	0.0413	1.00	0.0658	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	**0.621**		0.170	0.178	1.00	0.0602	pCi/g	05/27/14 09:22	05/30/14 18:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.2*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:28*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0257	U	0.502	0.502		0.865	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Actinium 228	**0.589**		0.272	0.279		0.336	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-212	0.426	U	0.822	0.823		1.41	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-214	**1.13**		0.225	0.254		0.182	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-210	2.18	U	1.79	1.81		2.36	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-212	**0.792**		0.142	0.175		0.154	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-214	**0.960**		0.182	0.208		0.178	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Potassium-40	**11.6**		1.91	2.25		0.864	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Protactinium-231	0.671	U	1.25	1.25		2.13	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-226	**1.13**		0.225	0.254	1.00	0.182	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-228	**0.589**		0.272	0.279		0.336	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-232	**0.589**		0.272	0.279		0.336	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-234	0.920	U	1.32	1.32		2.28	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thallium-208	**0.263**		0.0936	0.0975		0.0789	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-235	0.185	U	0.337	0.337		0.577	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-238	0.920	U	1.32	1.32		2.28	pCi/g	05/28/14 15:58	06/19/14 16:51	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:51*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: KOCH-SOIL-1

Date Collected: 05/22/14 10:54
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-12

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.724		0.199	0.208	1.00	0.0940	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	1.03		0.234	0.249	1.00	0.0688	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.822		0.209	0.220	1.00	0.0749	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*73.2*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.574		0.168	0.175	1.00	0.0909	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0979		0.0786	0.0790	1.00	0.0768	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.555		0.165	0.171	1.00	0.0806	pCi/g	05/27/14 09:22	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*78.8*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.188	U	0.156	0.158		1.94	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Actinium 228	1.30		0.294	0.323		0.202	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Bismuth-212	0.661	U	0.761	0.764		1.23	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Bismuth-214	1.36		0.238	0.277		0.166	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Lead-210	0.724	U	1.82	1.82		3.35	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Lead-212	1.20		0.171	0.231		0.174	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Lead-214	1.49		0.207	0.259		0.166	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Potassium-40	15.8		2.15	2.69		0.851	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Protactinium-231	0.878	U	1.18	1.18		2.37	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Radium-226	1.36		0.238	0.277	1.00	0.166	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Radium-228	1.30		0.294	0.323		0.202	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Thorium-232	1.30		0.294	0.323		0.202	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Thorium-234	0.876	U	0.813	0.818		2.58	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Thallium-208	0.389		0.0997	0.108		0.0751	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Uranium-235	0.242	U	0.320	0.321		0.478	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Uranium-238	0.876	U	0.813	0.818		2.58	pCi/g	05/28/14 15:58	06/19/14 16:52	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 16:52*	*1*

Client Sample ID: KOCH-SOIL-2

Lab Sample ID: 160-6793-13

Date Collected: 05/22/14 11:02

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.851		0.216	0.227	1.00	0.0950	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	1.22		0.257	0.276	1.00	0.0910	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.800		0.210	0.221	1.00	0.105	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*69.6*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.515		0.162	0.168	1.00	0.0762	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0466		0.0538	0.0539	1.00	0.0466	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.529		0.164	0.169	1.00	0.0709	pCi/g	05/27/14 09:22	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*75.4*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.614	U	0.685	0.690		1.12	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Actinium 228	0.910		0.295	0.309		0.200	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Bismuth-212	1.58		0.879	0.894		0.894	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Bismuth-214	1.34		0.268	0.302		0.164	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Lead-210	2.17	U	2.04	2.06		3.31	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Lead-212	1.14		0.166	0.222		0.152	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Lead-214	1.37		0.228	0.269		0.184	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Potassium-40	17.6		2.44	3.03		0.867	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Protactinium-231	0.678	U	1.28	1.29		2.56	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Radium-226	1.34		0.268	0.302	1.00	0.164	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Radium-228	0.910		0.295	0.309		0.200	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Thorium-232	0.910		0.295	0.309		0.200	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Thorium-234	3.48		2.39	2.42		2.84	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Thallium-208	0.448		0.0976	0.108		0.0520	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Uranium-235	0.128	U	0.374	0.375		0.608	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Uranium-238	3.48		2.39	2.42		2.84	pCi/g	05/28/14 15:58	06/19/14 17:41	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:41*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: KOCH-SOIL-3

Lab Sample ID: 160-6793-14

Date Collected: 05/22/14 11:05
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.654		0.156	0.166	1.00	0.0818	pCi/g	05/27/14 09:22	06/18/14 16:25	1
Thorium-230	0.904		0.180	0.195	1.00	0.0492	pCi/g	05/27/14 09:22	06/18/14 16:25	1
Thorium-232	0.714		0.160	0.170	1.00	0.0489	pCi/g	05/27/14 09:22	06/18/14 16:25	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*48.9*		*30 - 110*	*05/27/14 09:22*	*06/18/14 16:25*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.614		0.152	0.161	1.00	0.0679	pCi/g	05/27/14 09:22	06/02/14 01:35	1
Uranium-235/236	0.0315	U	0.0487	0.0488	1.00	0.0845	pCi/g	05/27/14 09:22	06/02/14 01:35	1
Uranium-238	0.667		0.157	0.167	1.00	0.0508	pCi/g	05/27/14 09:22	06/02/14 01:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*45.9*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:35*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.434		0.188	0.196		0.220	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Actinium 228	1.28		0.197	0.236		0.231	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-212	0.902	U	0.646	0.653		0.964	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-214	0.986		0.201	0.226		0.172	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-210	2.73		1.40	1.43		1.69	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-212	1.07		0.145	0.200		0.147	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-214	1.44		0.195	0.246		0.176	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Potassium-40	15.5		1.80	2.40		0.823	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Protactinium-231	0.479	U	0.826	0.828		2.15	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-226	0.986		0.201	0.226	1.00	0.172	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-228	1.28		0.197	0.236		0.231	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-232	1.28		0.197	0.236		0.231	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-234	1.48	U	1.43	1.44		2.33	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thallium-208	0.486		0.101	0.113		0.0674	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-235	0.230	U	0.304	0.305		0.489	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-238	1.48	U	1.43	1.44		2.33	pCi/g	05/28/14 15:58	06/19/14 17:38	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:38*	*1*

Client Sample ID: KOCH-SOIL-4

Lab Sample ID: 160-6793-15

Date Collected: 05/22/14 11:09

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.919**		0.221	0.234	1.00	0.119	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-230	**0.850**		0.208	0.220	1.00	0.0654	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-232	**0.533**		0.165	0.171	1.00	0.0715	pCi/g	05/27/14 09:22	06/02/14 19:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*76.0*		*30 - 110*	*05/27/14 09:22*	*06/02/14 19:24*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.442**		0.151	0.156	1.00	0.0663	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	**0.0477**		0.0550	0.0552	1.00	0.0477	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	**0.686**		0.187	0.196	1.00	0.0580	pCi/g	05/27/14 09:22	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*74.6*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.000380	U	0.000754	0.000756		0.843	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Actinium 228	**1.31**		0.238	0.273		0.190	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-212	0.177	U	0.772	0.772		1.38	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-214	**1.65**		0.256	0.308		0.168	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-210	2.74	U	2.36	2.39		3.32	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-212	**1.29**		0.192	0.254		0.215	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-214	**1.28**		0.218	0.255		0.261	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Potassium-40	**16.6**		2.14	2.73		0.761	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Protactinium-231	-0.227	U	1.68	1.68		2.95	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-226	**1.65**		0.256	0.308	1.00	0.168	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-228	**1.31**		0.238	0.273		0.190	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-232	**1.31**		0.238	0.273		0.190	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-234	1.08	U	1.62	1.62		2.81	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thallium-208	**0.405**		0.107	0.115		0.0998	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-235	0.415	U	0.346	0.348		0.606	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-238	1.08	U	1.62	1.62		2.81	pCi/g	05/28/14 15:58	06/19/14 17:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:39*	*1*

Client Sample ID: KOCH-SOIL-5

Lab Sample ID: 160-6793-16

Date Collected: 05/22/14 11:14

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.617		0.171	0.179	1.00	0.0753	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	1.12		0.229	0.248	1.00	0.0678	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.814		0.195	0.207	1.00	0.0707	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.2*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.594		0.163	0.170	1.00	0.0669	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0409		0.0472	0.0473	1.00	0.0409	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.582		0.161	0.168	1.00	0.0667	pCi/g	05/27/14 09:22	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.9*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.123	U	0.215	0.215		1.72	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Actinium 228	0.928		0.230	0.249		0.370	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-212	1.14	U	0.795	0.804		1.18	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-214	1.21		0.226	0.259		0.197	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-210	-0.0589	U	2.22	2.22		3.71	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-212	1.22		0.171	0.232		0.177	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-214	1.24		0.189	0.229		0.195	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Potassium-40	15.8		2.04	2.60		1.07	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Protactinium-231	0.775	U	0.518	0.525		2.65	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-226	1.21		0.226	0.259	1.00	0.197	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-228	0.928		0.230	0.249		0.370	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-232	0.928		0.230	0.249		0.370	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-234	2.67		0.992	1.03		2.58	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thallium-208	0.449		0.104	0.114		0.0871	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-235	0.137	U	0.240	0.241		0.601	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-238	2.67		0.992	1.03		2.58	pCi/g	05/28/14 15:58	06/19/14 17:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:39*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: KOCH-SOIL-6

Date Collected: 05/22/14 11:18
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-17

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.576**		0.173	0.180	1.00	0.103	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	**0.824**		0.204	0.215	1.00	0.0840	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	**0.636**		0.177	0.185	1.00	0.0559	pCi/g	05/27/14 09:22	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.0*		*30 - 110*	*05/27/14 09:22*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.405**		0.144	0.147	1.00	0.0709	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0310	U	0.0439	0.0440	1.00	0.0466	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	**0.635**		0.178	0.186	1.00	0.0373	pCi/g	05/27/14 09:22	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*75.9*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0696	U	0.183	0.183		1.38	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Actinium 228	**1.30**		0.236	0.271		0.167	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Bismuth-212	0.386	U	0.667	0.668		1.13	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Bismuth-214	**1.26**		0.259	0.291		0.203	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Lead-210	1.04	U	1.93	1.93		3.39	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Lead-212	**0.911**		0.154	0.194		0.182	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Lead-214	**1.17**		0.181	0.218		0.201	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Potassium-40	**15.3**		2.04	2.57		1.56	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Protactinium-231	0.282	U	0.667	0.668		2.75	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Radium-226	**1.26**		0.259	0.291	1.00	0.203	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Radium-228	**1.30**		0.236	0.271		0.167	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Thorium-232	**1.30**		0.236	0.271		0.167	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Thorium-234	0.692	U	0.621	0.625		2.82	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Thallium-208	**0.412**		0.104	0.112		0.0911	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Uranium-235	0.173	U	0.299	0.299		0.501	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Uranium-238	0.692	U	0.621	0.625		2.82	pCi/g	05/28/14 15:58	06/19/14 17:40	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:40*	*1*

Client Sample ID: KOCH-GRASS-1

Lab Sample ID: 160-6793-18

Date Collected: 05/22/14 11:23

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.707		0.196	0.205	1.00	0.0936	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-230	0.906		0.219	0.232	1.00	0.0629	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-232	0.876		0.215	0.227	1.00	0.0597	pCi/g	05/27/14 09:25	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*70.1*		*30 - 110*	*05/27/14 09:25*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.698		0.200	0.208	1.00	0.0903	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-235/236	0.0141	U	0.0353	0.0353	1.00	0.0790	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-238	0.610		0.185	0.192	1.00	0.0634	pCi/g	05/27/14 09:25	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*70.5*		*30 - 110*	*05/27/14 09:25*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.122	U	0.224	0.225		0.587	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Actinium 228	1.04		0.267	0.287		0.213	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-212	1.78		1.01	1.03		0.992	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-214	1.19		0.230	0.261		0.169	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-210	2.79		1.82	1.85		2.66	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-212	1.23		0.210	0.263		0.191	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-214	1.46		0.223	0.270		0.175	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Potassium-40	12.8		2.20	2.56		1.64	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Protactinium-231	0.439	U	0.414	0.416		2.77	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-226	1.19		0.230	0.261	1.00	0.169	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-228	1.04		0.267	0.287		0.213	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-232	1.04		0.267	0.287		0.213	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-234	1.92	U	1.38	1.40		2.27	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thallium-208	0.378		0.0985	0.106		0.0797	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-235	0.145	U	0.179	0.180		0.649	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-238	1.92	U	1.38	1.40		2.27	pCi/g	05/28/14 15:58	06/19/14 17:37	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:37*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: KOCH-GRASS-2

Lab Sample ID: 160-6793-19

Date Collected: 05/22/14 11:30
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.751**		0.204	0.213	1.00	0.131	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-230	**1.12**		0.240	0.257	1.00	0.0684	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-232	**0.865**		0.210	0.223	1.00	0.0660	pCi/g	05/27/14 09:25	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*74.8*		*30 - 110*	*05/27/14 09:25*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.582**		0.164	0.171	1.00	0.0597	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-235/236	**0.0429**		0.0495	0.0497	1.00	0.0429	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-238	**0.567**		0.162	0.169	1.00	0.0653	pCi/g	05/27/14 09:25	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*78.0*		*30 - 110*	*05/27/14 09:25*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.131	U	0.264	0.264		2.00	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Actinium 228	**1.26**		0.283	0.311		0.179	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-212	0.234	U	0.893	0.894		1.61	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-214	**1.29**		0.263	0.296		0.197	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-210	2.14	U	1.87	1.89		2.95	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-212	**1.03**		0.194	0.235		0.225	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-214	**1.29**		0.262	0.295		0.260	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Potassium-40	**16.0**		2.56	3.04		1.12	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Protactinium-231	0.701	U	0.661	0.665		3.87	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-226	**1.29**		0.263	0.296	1.00	0.197	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-228	**1.26**		0.283	0.311		0.179	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-232	**1.26**		0.283	0.311		0.179	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-234	0.900	U	0.839	0.844		2.67	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thallium-208	**0.398**		0.106	0.113		0.0630	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-235	0.386	U	0.407	0.409		0.612	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-238	0.900	U	0.839	0.844		2.67	pCi/g	05/28/14 15:58	06/19/14 17:37	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:37*	*1*

Client Sample ID: KOCH-GRASS-3

Lab Sample ID: 160-6793-20

Date Collected: 05/22/14 11:35

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.04**		0.229	0.245	1.00	0.0945	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-230	**1.16**		0.241	0.260	1.00	0.0754	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-232	**0.748**		0.192	0.202	1.00	0.0560	pCi/g	05/27/14 09:25	06/02/14 01:39	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.4*		*30 - 110*	*05/27/14 09:25*	*06/02/14 01:39*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.691**		0.183	0.192	1.00	0.0623	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-235/236	0.00653	U	0.0314	0.0314	1.00	0.0849	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-238	**0.664**		0.179	0.188	1.00	0.0681	pCi/g	05/27/14 09:25	05/30/14 18:29	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.6*		*30 - 110*	*05/27/14 09:25*	*05/30/14 18:29*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0992	U	0.468	0.469		1.85	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Actinium 228	**0.980**		0.260	0.279		0.276	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-212	**1.75**		0.948	0.965		0.901	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-214	**1.19**		0.212	0.245		0.143	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-210	3.34	U	2.33	2.37		3.39	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-212	**1.07**		0.184	0.230		0.175	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-214	**1.34**		0.237	0.275		0.179	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Potassium-40	**15.9**		2.10	2.66		0.513	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Protactinium-231	0.576	U	0.519	0.523		3.05	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-226	**1.19**		0.212	0.245	1.00	0.143	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-228	**0.980**		0.260	0.279		0.276	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-232	**0.980**		0.260	0.279		0.276	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-234	0.741	U	0.873	0.877		2.74	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thallium-208	**0.348**		0.102	0.108		0.0811	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-235	0.148	U	0.366	0.367		0.712	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-238	0.741	U	0.873	0.877		2.74	pCi/g	05/28/14 15:58	06/19/14 17:38	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 15:58*	*06/19/14 17:38*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: KOCH-GRASS-4

Lab Sample ID: 160-6793-21

Date Collected: 05/22/14 11:41
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.716**		0.174	0.184	1.00	0.0731	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	**0.947**		0.199	0.214	1.00	0.0655	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	**0.678**		0.168	0.177	1.00	0.0625	pCi/g	06/03/14 09:05	06/10/14 15:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*94.4*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:21*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.561**		0.164	0.170	1.00	0.0755	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0118	U	0.0295	0.0296	1.00	0.0661	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	**0.613**		0.170	0.177	1.00	0.0605	pCi/g	05/27/14 11:23	05/30/14 18:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.4*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:21*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0458	U	1.60	1.60		2.73	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Actinium 228	0.716	U	0.419	0.426		0.792	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-212	0.879	U	1.45	1.46		2.47	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-214	**1.32**		0.361	0.386		0.293	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-210	**4.12**		2.69	2.74		4.08	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-212	**1.23**		0.254	0.300		0.229	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-214	**1.50**		0.332	0.367		0.220	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Potassium-40	**17.3**		3.50	3.93		1.29	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Protactinium-231	1.49	U	1.72	1.72		3.69	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-226	**1.32**		0.361	0.386	1.00	0.293	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-228	0.716	U	0.419	0.426		0.792	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-232	0.716	U	0.419	0.426		0.792	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-234	1.71	U	1.22	1.23		4.12	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thallium-208	**0.273**		0.169	0.171		0.233	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-235	0.424	U	0.468	0.470		0.720	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-238	1.71	U	1.22	1.23		4.12	pCi/g	05/28/14 16:56	06/19/14 18:30	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:30*	*1*

Client Sample ID: KOCH-GRASS-5

Lab Sample ID: 160-6793-22

Date Collected: 05/22/14 11:47

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.733**		0.186	0.196	1.00	0.0853	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**1.19**		0.236	0.256	1.00	0.0787	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.981**		0.213	0.229	1.00	0.0680	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.3*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.434**		0.140	0.145	1.00	0.0584	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	-0.00524	U	0.00742	0.00743	1.00	0.0727	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	**0.523**		0.154	0.160	1.00	0.0583	pCi/g	05/27/14 11:23	05/30/14 18:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.8*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:21*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	**0.384**		0.183	0.190		0.227	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Actinium 228	**1.16**		0.231	0.260		0.131	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-212	1.13	U	0.861	0.869		1.30	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-214	**1.30**		0.216	0.255		0.117	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-210	1.53	U	1.66	1.67		2.37	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-212	**1.02**		0.143	0.194		0.136	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-214	**1.49**		0.205	0.257		0.112	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Potassium-40	**15.9**		2.17	2.72		0.546	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Protactinium-231	0.255	U	0.259	0.261		2.63	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-226	**1.30**		0.216	0.255	1.00	0.117	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-228	**1.16**		0.231	0.260		0.131	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-232	**1.16**		0.231	0.260		0.131	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-234	0.707	U	0.592	0.597		1.95	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thallium-208	**0.361**		0.0948	0.102		0.0673	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-235	0.259	U	0.278	0.279		0.454	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-238	0.707	U	0.592	0.597		1.95	pCi/g	05/28/14 16:56	06/19/14 18:30	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:30*	*1*

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: KOCH-GRASS-6

Lab Sample ID: 160-6793-23

Date Collected: 05/22/14 11:50
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.721		0.179	0.189	1.00	0.0877	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.932		0.202	0.217	1.00	0.0794	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.836		0.191	0.203	1.00	0.0710	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.2*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.732		0.195	0.204	1.00	0.0860	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0472		0.0545	0.0547	1.00	0.0472	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.745		0.194	0.204	1.00	0.0379	pCi/g	05/27/14 11:23	05/30/14 18:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.7*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:21*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0433	U	0.0861	0.0863		0.635	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Actinium 228	0.860		0.310	0.322		0.324	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Bismuth-212	0.809	U	0.739	0.743		1.13	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Bismuth-214	1.13		0.231	0.260		0.133	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Lead-210	2.16	U	1.95	1.97		3.14	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Lead-212	1.04		0.192	0.235		0.183	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Lead-214	1.41		0.207	0.253		0.164	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Potassium-40	19.0		2.56	3.22		0.892	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Protactinium-231	0.613	U	0.594	0.598		3.13	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Radium-226	1.13		0.231	0.260	1.00	0.133	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Radium-228	0.860		0.310	0.322		0.324	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Thorium-232	0.860		0.310	0.322		0.324	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Thorium-234	3.66		1.58	1.62		2.49	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Thallium-208	0.456		0.0951	0.106		0.0365	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Uranium-235	0.311	U	0.384	0.385		0.579	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Uranium-238	3.66		1.58	1.62		2.49	pCi/g	05/28/14 16:56	06/19/14 18:31	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:31*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BLANCHETTE-SOIL-1

Lab Sample ID: 160-6793-24

Date Collected: 05/22/14 13:31
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.729**		0.177	0.187	1.00	0.0552	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**0.636**		0.166	0.175	1.00	0.0723	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.672**		0.169	0.179	1.00	0.0579	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.0*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.522**		0.156	0.162	1.00	0.0733	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0282	U	0.0399	0.0399	1.00	0.0423	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	**0.847**		0.196	0.208	1.00	0.0339	pCi/g	05/27/14 11:23	05/30/14 18:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.3*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:21*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.409	U	0.440	0.443		0.720	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Actinium 228	**1.12**		0.259	0.284		0.162	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Bismuth-212	0.505	U	0.611	0.613		0.999	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Bismuth-214	**0.935**		0.185	0.209		0.150	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Lead-210	0.402	U	1.37	1.37		2.34	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Lead-212	**0.908**		0.125	0.172		0.114	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Lead-214	**0.836**		0.172	0.192		0.156	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Potassium-40	**13.1**		1.65	2.13		0.810	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Protactinium-231	0.0528	U	0.819	0.819		2.12	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Radium-226	**0.935**		0.185	0.209	1.00	0.150	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Radium-228	**1.12**		0.259	0.284		0.162	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Thorium-232	**1.12**		0.259	0.284		0.162	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Thorium-234	1.35	U	0.894	0.905		1.38	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Thallium-208	**0.308**		0.0619	0.0696		0.0229	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Uranium-235	0.0534	U	0.271	0.271		0.431	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Uranium-238	1.35	U	0.894	0.905		1.38	pCi/g	05/28/14 16:56	06/19/14 18:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:25*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BLANCHETTE-SOIL-2

Lab Sample ID: 160-6793-25

Date Collected: 05/22/14 13:40
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.759**		0.185	0.196	1.00	0.0785	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**0.769**		0.185	0.196	1.00	0.0574	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.692**		0.175	0.185	1.00	0.0626	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.5*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.632**		0.168	0.176	1.00	0.0626	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0248	U	0.0391	0.0391	1.00	0.0623	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	**0.819**		0.190	0.202	1.00	0.0570	pCi/g	05/27/14 11:23	05/30/14 18:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*87.8*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:21*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0996	U	0.313	0.313		1.58	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Actinium 228	**1.15**		0.252	0.278		0.173	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-212	0.482	U	0.673	0.674		1.12	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-214	**1.09**		0.187	0.219		0.134	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-210	1.06	U	1.82	1.82		2.88	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-212	**0.830**		0.188	0.216		0.191	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-214	**1.02**		0.198	0.225		0.179	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Potassium-40	**16.1**		2.02	2.61		0.707	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Protactinium-231	0.332	U	0.362	0.364		2.86	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-226	**1.09**		0.187	0.219	1.00	0.134	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-228	**1.15**		0.252	0.278		0.173	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-232	**1.15**		0.252	0.278		0.173	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-234	0.384	U	0.605	0.607		2.59	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thallium-208	**0.305**		0.0801	0.0861		0.0745	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-235	0.248	U	0.272	0.273		0.411	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-238	0.384	U	0.605	0.607		2.59	pCi/g	05/28/14 16:56	06/19/14 18:26	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:26*	*1*

Client Sample ID: BLANCHETTE-SOIL-3

Lab Sample ID: 160-6793-26

Date Collected: 05/22/14 13:45

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.688**		0.175	0.184	1.00	0.0768	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**0.734**		0.180	0.190	1.00	0.0735	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.867**		0.196	0.209	1.00	0.0851	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.0*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.464**		0.144	0.150	1.00	0.0579	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.00866	U	0.0287	0.0287	1.00	0.0720	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	**0.549**		0.157	0.164	1.00	0.0632	pCi/g	05/27/14 11:23	05/30/14 18:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.0*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:21*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0655	U	0.133	0.133		0.744	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Actinium 228	**1.04**		0.243	0.265		0.167	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-212	0.406	U	0.655	0.657		1.11	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-214	**1.01**		0.243	0.265		0.209	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-210	1.47	U	1.61	1.61		2.80	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-212	**0.878**		0.134	0.176		0.131	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-214	**1.16**		0.173	0.211		0.149	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Potassium-40	**14.1**		1.87	2.37		1.00	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Protactinium-231	0.320	U	0.284	0.287		2.45	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-226	**1.01**		0.243	0.265	1.00	0.209	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-228	**1.04**		0.243	0.265		0.167	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-232	**1.04**		0.243	0.265		0.167	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-234	1.71	U	1.41	1.43		2.36	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thallium-208	**0.410**		0.0846	0.0947		0.0671	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-235	0.125	U	0.314	0.314		0.508	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-238	1.71	U	1.41	1.43		2.36	pCi/g	05/28/14 16:56	06/19/14 18:27	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:27*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BLANCHETTE-SOIL-4

Lab Sample ID: 160-6793-27

Date Collected: 05/22/14 13:50
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.495		0.151	0.157	1.00	0.0934	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.720		0.178	0.188	1.00	0.0664	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.715		0.179	0.189	1.00	0.0856	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.1*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.780		0.181	0.192	1.00	0.0633	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0387		0.0447	0.0448	1.00	0.0387	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.584		0.156	0.164	1.00	0.0589	pCi/g	05/27/14 11:23	05/30/14 18:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*94.7*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:20*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.121	U	0.235	0.235		0.399	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Actinium 228	0.603		0.276	0.283		0.372	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-212	1.91		0.603	0.634		0.351	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-214	0.843		0.179	0.200		0.164	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-210	0.793	U	1.56	1.56		2.52	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-212	0.616		0.143	0.163		0.190	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-214	0.676		0.168	0.182		0.211	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Potassium-40	14.9		1.87	2.41		0.786	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Protactinium-231	-0.0550	U	1.11	1.11		2.00	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-226	0.843		0.179	0.200	1.00	0.164	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-228	0.603		0.276	0.283		0.372	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-232	0.603		0.276	0.283		0.372	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-234	0.974	U	1.24	1.25		2.15	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thallium-208	0.300		0.0775	0.0835		0.0663	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-235	-0.0302	U	0.306	0.306		0.530	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-238	0.974	U	1.24	1.25		2.15	pCi/g	05/28/14 16:56	06/19/14 18:27	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:27*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BLANCHETTE-SOIL-5

Lab Sample ID: 160-6793-28

Date Collected: 05/22/14 13:55
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.658		0.176	0.184	1.00	0.0811	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-230	0.857		0.199	0.212	1.00	0.0726	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-232	0.752		0.186	0.197	1.00	0.0693	pCi/g	06/03/14 09:05	06/11/14 15:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.2*		*30 - 110*	*06/03/14 09:05*	*06/11/14 15:44*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.578		0.108	0.119	1.00	0.0330	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-235/236	0.0187		0.0216	0.0217	1.00	0.0187	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-238	0.641		0.113	0.126	1.00	0.0150	pCi/g	05/27/14 11:23	06/02/14 01:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.9*		*30 - 110*	*05/27/14 11:23*	*06/02/14 01:33*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.101	U	0.269	0.269		1.52	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Actinium 228	1.16		0.240	0.268		0.302	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-212	0.843	U	0.827	0.831		1.31	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-214	0.794		0.212	0.228		0.194	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-210	1.81	U	1.85	1.87		2.61	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-212	0.893		0.138	0.180		0.131	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-214	0.889		0.180	0.203		0.133	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Potassium-40	12.7		1.97	2.36		1.28	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Protactinium-231	-0.190	U	1.16	1.16		2.08	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-226	0.794		0.212	0.228	1.00	0.194	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-228	1.16		0.240	0.268		0.302	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-232	1.16		0.240	0.268		0.302	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-234	1.22	U	1.35	1.36		2.28	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thallium-208	0.331		0.0957	0.102		0.0804	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-235	-0.0107	U	0.0277	0.0277		0.504	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-238	1.22	U	1.35	1.36		2.28	pCi/g	05/28/14 16:56	06/19/14 18:26	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:26*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BLANCHETTE-SOIL-6

Lab Sample ID: 160-6793-29

Date Collected: 05/22/14 14:00
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.667**		0.178	0.187	1.00	0.0756	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**0.764**		0.190	0.201	1.00	0.0681	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.538**		0.160	0.166	1.00	0.0710	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.4*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.540**		0.152	0.159	1.00	0.0554	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0133	U	0.0265	0.0266	1.00	0.0398	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	**0.520**		0.149	0.155	1.00	0.0485	pCi/g	05/27/14 11:23	05/30/14 18:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.1*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:20*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.546	U	0.624	0.628		1.02	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Actinium 228	**0.635**		0.247	0.256		0.372	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-212	0.0173	U	0.825	0.825		1.54	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-214	**0.804**		0.204	0.221		0.176	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-210	2.50	U	1.87	1.89		2.66	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-212	**0.753**		0.178	0.203		0.189	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-214	**0.909**		0.167	0.192		0.150	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Potassium-40	**14.7**		2.33	2.77		1.01	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Protactinium-231	0.500	U	0.388	0.392		2.61	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-226	**0.804**		0.204	0.221	1.00	0.176	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-228	**0.635**		0.247	0.256		0.372	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-232	**0.635**		0.247	0.256		0.372	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-234	0.498	U	0.794	0.795		2.44	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thallium-208	**0.255**		0.0920	0.0957		0.107	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-235	0.0623	U	0.308	0.308		0.536	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-238	0.498	U	0.794	0.795		2.44	pCi/g	05/28/14 16:56	06/19/14 18:26	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:26*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BLANCHETTE-GRASS-1

Lab Sample ID: 160-6793-30

Date Collected: 05/22/14 14:08
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.810**		0.195	0.206	1.00	0.0946	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**0.823**		0.195	0.206	1.00	0.0770	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.706**		0.178	0.188	1.00	0.0512	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.3*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.671**		0.201	0.209	1.00	0.0681	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0524	U	0.0649	0.0651	1.00	0.0848	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	**0.896**		0.231	0.243	1.00	0.0448	pCi/g	05/27/14 11:23	05/30/14 18:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*64.3*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:20*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0551	U	0.372	0.373		1.87	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Actinium 228	**1.38**		0.244	0.282		0.133	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-212	**2.05**		0.692	0.724		0.431	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-214	**1.32**		0.239	0.276		0.170	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-210	2.69	U	2.19	2.21		3.32	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-212	**1.09**		0.166	0.217		0.164	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-214	**1.17**		0.195	0.230		0.186	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Potassium-40	**17.1**		2.20	2.81		0.519	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Protactinium-231	0.583	U	0.386	0.392		2.85	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-226	**1.32**		0.239	0.276	1.00	0.170	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-228	**1.38**		0.244	0.282		0.133	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-232	**1.38**		0.244	0.282		0.133	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-234	1.73	U	1.59	1.60		2.72	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thallium-208	**0.382**		0.108	0.115		0.0894	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-235	0.368	U	0.353	0.355		0.586	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-238	1.73	U	1.59	1.60		2.72	pCi/g	05/28/14 16:56	06/19/14 18:27	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 18:27*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BLANCHETTE-GRASS-2

Lab Sample ID: 160-6793-31

Date Collected: 05/22/14 14:15
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.536**		0.156	0.162	1.00	0.0782	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**0.968**		0.207	0.222	1.00	0.0526	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.688**		0.174	0.183	1.00	0.0499	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.6*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.781**		0.211	0.221	1.00	0.0901	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0347	U	0.0490	0.0491	1.00	0.0520	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	**0.659**		0.193	0.201	1.00	0.0791	pCi/g	05/27/14 11:23	05/30/14 18:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*69.1*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:20*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.818	U	0.939	0.945		1.54	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Actinium 228	0.499	U	0.327	0.331		1.16	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-212	1.10	U	1.28	1.28		2.05	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-214	**1.28**		0.324	0.351		0.227	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-210	3.34	U	2.42	2.45		3.86	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-212	**1.09**		0.236	0.275		0.207	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-214	**1.14**		0.290	0.313		0.280	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Potassium-40	**14.1**		3.34	3.64		2.28	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Protactinium-231	0.0103	U	2.52	2.52		4.62	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-226	**1.28**		0.324	0.351	1.00	0.227	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-228	0.499	U	0.327	0.331		1.16	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-232	0.499	U	0.327	0.331		1.16	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-234	3.21	U	2.84	2.85		3.84	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thallium-208	**0.439**		0.189	0.194		0.181	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-235	0.159	U	0.400	0.401		0.695	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-238	3.21	U	2.84	2.85		3.84	pCi/g	05/28/14 16:56	06/19/14 19:08	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 19:08*	*1*

Client Sample ID: BLANCHETTE-GRASS-3

Lab Sample ID: 160-6793-32

Date Collected: 05/22/14 14:25

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.522**		0.158	0.164	1.00	0.112	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	**0.986**		0.208	0.224	1.00	0.0620	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	**0.387**		0.130	0.134	1.00	0.0564	pCi/g	06/03/14 09:05	06/10/14 15:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.5*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:20*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.655**		0.196	0.203	1.00	0.0820	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.000	U	0.00673	0.00673	1.00	0.0538	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	**0.613**		0.189	0.196	1.00	0.0748	pCi/g	05/27/14 11:23	05/30/14 18:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*71.8*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:20*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.101	U	0.228	0.229		0.724	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Actinium 228	**1.18**		0.283	0.308		0.183	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-212	0.450	U	0.894	0.895		1.55	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-214	**1.16**		0.304	0.326		0.231	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-210	2.65	U	2.18	2.21		2.88	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-212	**1.08**		0.211	0.253		0.203	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-214	**1.14**		0.197	0.230		0.137	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Potassium-40	**16.4**		2.60	3.09		1.06	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Protactinium-231	0.355	U	0.488	0.489		3.81	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-226	**1.16**		0.304	0.326	1.00	0.231	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-228	**1.18**		0.283	0.308		0.183	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-232	**1.18**		0.283	0.308		0.183	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-234	1.20	U	0.832	0.841		2.78	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thallium-208	**0.247**		0.125	0.128		0.166	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-235	0.166	U	0.349	0.349		0.628	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-238	1.20	U	0.832	0.841		2.78	pCi/g	05/28/14 16:56	06/19/14 19:08	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 19:08*	*1*

Client Sample ID: BLANCHETTE-GRASS-4

Lab Sample ID: 160-6793-33

Date Collected: 05/22/14 14:30

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.607**		0.166	0.174	1.00	0.0841	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	**0.772**		0.185	0.196	1.00	0.0671	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	**0.511**		0.150	0.156	1.00	0.0498	pCi/g	06/03/14 09:05	06/10/14 15:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.7*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:21*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.703**		0.194	0.203	1.00	0.0806	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0164	U	0.0329	0.0329	1.00	0.0493	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	**0.541**		0.169	0.175	1.00	0.0395	pCi/g	05/27/14 11:23	05/30/14 18:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*71.8*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:20*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.403	U	0.567	0.569		0.939	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Actinium 228	**1.38**		0.248	0.285		0.205	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-212	**1.09**		0.662	0.672		0.909	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-214	**1.15**		0.195	0.229		0.142	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-210	1.53	U	1.68	1.69		2.75	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-212	**1.04**		0.155	0.205		0.157	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-214	**1.47**		0.206	0.257		0.144	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Potassium-40	**15.7**		1.99	2.56		0.982	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Protactinium-231	0.610	U	1.18	1.18		2.51	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-226	**1.15**		0.195	0.229	1.00	0.142	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-228	**1.38**		0.248	0.285		0.205	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-232	**1.38**		0.248	0.285		0.205	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-234	1.31	U	0.759	0.771		2.34	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thallium-208	**0.287**		0.0793	0.0847		0.0629	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-235	0.189	U	0.332	0.332		0.556	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-238	1.31	U	0.759	0.771		2.34	pCi/g	05/28/14 16:56	06/19/14 19:04	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 19:04*	*1*

Client Sample ID: BLANCHETTE-GRASS-5

Lab Sample ID: 160-6793-34

Date Collected: 05/22/14 14:35

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.651**		0.177	0.185	1.00	0.0961	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	**0.779**		0.191	0.202	1.00	0.0780	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	**0.560**		0.162	0.168	1.00	0.0739	pCi/g	06/03/14 09:05	06/10/14 15:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.4*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:21*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.635**		0.182	0.190	1.00	0.0593	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0324	U	0.0458	0.0459	1.00	0.0486	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	**0.707**		0.193	0.202	1.00	0.0739	pCi/g	05/27/14 11:23	05/30/14 18:20	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*75.2*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:20*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.162	U	0.184	0.185		0.777	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Actinium 228	**1.41**		0.318	0.349		0.246	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-212	0.896	U	0.867	0.872		1.36	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-214	**1.14**		0.287	0.311		0.251	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-210	0.359	U	2.28	2.28		4.20	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-212	**0.905**		0.207	0.238		0.219	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-214	**1.22**		0.212	0.246		0.251	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Potassium-40	**16.2**		2.28	2.82		0.887	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Protactinium-231	0.0453	U	1.71	1.71		3.06	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-226	**1.14**		0.287	0.311	1.00	0.251	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-228	**1.41**		0.318	0.349		0.246	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-232	**1.41**		0.318	0.349		0.246	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-234	2.24	U	1.61	1.63		2.47	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thallium-208	**0.273**		0.0915	0.0958		0.0999	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-235	0.297	U	0.328	0.329		0.547	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-238	2.24	U	1.61	1.63		2.47	pCi/g	05/28/14 16:56	06/19/14 19:04	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 19:04*	*1*

Client Sample ID: BLANCHETTE-GRASS-6

Lab Sample ID: 160-6793-35

Date Collected: 05/22/14 14:45

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.738		0.192	0.202	1.00	0.0952	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	1.08		0.229	0.247	1.00	0.0736	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	0.644		0.177	0.185	1.00	0.0624	pCi/g	06/03/14 09:05	06/10/14 15:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.3*		*30 - 110*	*06/03/14 09:05*	*06/10/14 15:21*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.656		0.134	0.145	1.00	0.0444	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-235/236	0.0336		0.0336	0.0337	1.00	0.0252	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-238	0.512		0.118	0.125	1.00	0.0202	pCi/g	05/27/14 11:23	06/02/14 01:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*64.5*		*30 - 110*	*05/27/14 11:23*	*06/02/14 01:33*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0500	U	0.977	0.977		1.65	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Actinium 228	1.15		0.232	0.260		0.212	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Bismuth-212	0.623	U	0.926	0.929		1.55	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Bismuth-214	1.04		0.205	0.232		0.173	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Lead-210	3.24	U	2.98	3.01		3.72	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Lead-212	1.00		0.165	0.210		0.175	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Lead-214	1.19		0.200	0.235		0.190	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Potassium-40	14.9		2.13	2.62		1.22	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Protactinium-231	-0.841	U	1.65	1.65		2.80	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Radium-226	1.04		0.205	0.232	1.00	0.173	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Radium-228	1.15		0.232	0.260		0.212	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Thorium-232	1.15		0.232	0.260		0.212	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Thorium-234	0.565	U	0.768	0.770		2.96	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Thallium-208	0.449		0.108	0.117		0.0896	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Uranium-235	0.180	U	0.377	0.378		0.690	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Uranium-238	0.565	U	0.768	0.770		2.96	pCi/g	05/28/14 16:56	06/19/14 19:05	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 19:05*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-1

Lab Sample ID: 160-6793-36

Date Collected: 05/23/14 10:57
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.756**		0.185	0.196	1.00	0.0637	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**0.994**		0.212	0.227	1.00	0.0582	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.817**		0.191	0.203	1.00	0.0508	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.7*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.657**		0.169	0.178	1.00	0.0807	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-235/236	0.0107	U	0.0267	0.0267	1.00	0.0597	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-238	**0.652**		0.169	0.177	1.00	0.0857	pCi/g	05/29/14 12:48	06/05/14 20:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*91.8*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:40*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.557	U	0.548	0.553		0.891	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Actinium 228	**1.18**		0.316	0.339		0.156	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Bismuth-212	-0.0296	U	0.722	0.722		1.36	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Bismuth-214	**1.16**		0.277	0.302		0.240	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Lead-210	1.83	U	1.73	1.74		2.69	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Lead-212	**1.25**		0.208	0.264		0.187	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Lead-214	**1.43**		0.213	0.259		0.166	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Potassium-40	**19.1**		2.63	3.28		1.52	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Protactinium-231	0.810	U	0.620	0.627		3.17	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Radium-226	**1.16**		0.277	0.302	1.00	0.240	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Radium-228	**1.18**		0.316	0.339		0.156	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Thorium-232	**1.18**		0.316	0.339		0.156	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Thorium-234	1.27	U	1.32	1.33		2.25	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Thallium-208	**0.315**		0.103	0.109		0.127	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Uranium-235	0.222	U	0.317	0.318		0.624	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Uranium-238	1.27	U	1.32	1.33		2.25	pCi/g	05/29/14 11:21	06/20/14 13:56	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 13:56*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-2

Lab Sample ID: 160-6793-37

Date Collected: 05/23/14 10:51
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.935**		0.200	0.215	1.00	0.0873	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**0.906**		0.195	0.209	1.00	0.0475	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.926**		0.197	0.212	1.00	0.0633	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.8*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.682**		0.172	0.181	1.00	0.0828	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0236	U	0.0372	0.0372	1.00	0.0593	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.546**		0.152	0.159	1.00	0.0638	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*92.9*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0592	U	1.32	1.32		2.23	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Actinium 228	**1.29**		0.269	0.299		0.173	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Bismuth-212	0.603	U	0.924	0.926		1.55	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Bismuth-214	**0.791**		0.250	0.263		0.261	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Lead-210	**3.59**		2.60	2.63		3.30	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Lead-212	**1.30**		0.262	0.311		0.251	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Lead-214	**1.37**		0.266	0.302		0.192	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Potassium-40	**18.3**		2.68	3.27		1.08	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Protactinium-231	0.424	U	0.316	0.319		3.70	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Radium-226	**0.791**		0.250	0.263	1.00	0.261	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Radium-228	**1.29**		0.269	0.299		0.173	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Thorium-232	**1.29**		0.269	0.299		0.173	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Thorium-234	1.29	U	1.59	1.60		2.73	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Thallium-208	**0.506**		0.134	0.144		0.103	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Uranium-235	0.262	U	0.369	0.370		0.613	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Uranium-238	1.29	U	1.59	1.60		2.73	pCi/g	05/29/14 11:21	06/20/14 13:57	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 13:57*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-3

Lab Sample ID: 160-6793-38

Date Collected: 05/23/14 10:47
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.874**		0.200	0.213	1.00	0.101	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**0.965**		0.206	0.222	1.00	0.0667	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.846**		0.192	0.205	1.00	0.0495	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.5*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.502**		0.160	0.165	1.00	0.104	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0359	U	0.0519	0.0520	1.00	0.0839	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.684**		0.182	0.191	1.00	0.0804	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*78.2*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.133	U	0.539	0.540		2.85	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Actinium 228	**0.788**		0.364	0.372		0.681	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-212	0.221	U	1.41	1.41		2.61	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-214	**1.18**		0.302	0.326		0.217	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-210	2.29	U	2.47	2.48		4.33	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-212	**1.45**		0.289	0.345		0.269	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-214	**1.43**		0.321	0.354		0.246	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Potassium-40	**19.9**		3.66	4.19		1.24	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Protactinium-231	1.49	U	1.73	1.74		3.45	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-226	**1.18**		0.302	0.326	1.00	0.217	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-228	**0.788**		0.364	0.372		0.681	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-232	**0.788**		0.364	0.372		0.681	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-234	1.66	U	2.21	2.22		3.82	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thallium-208	**0.637**		0.181	0.192		0.150	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-235	0.548	U	0.564	0.567		0.898	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-238	1.66	U	2.21	2.22		3.82	pCi/g	05/29/14 11:21	06/20/14 14:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 14:35*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-4

Lab Sample ID: 160-6793-39

Date Collected: 05/23/14 10:38
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.917**		0.202	0.216	1.00	0.0775	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**1.11**		0.222	0.240	1.00	0.0623	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.794**		0.186	0.198	1.00	0.0496	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.787**		0.181	0.193	1.00	0.0750	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0126	U	0.0253	0.0253	1.00	0.0379	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.639**		0.162	0.171	1.00	0.0656	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*91.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0188	U	0.963	0.963		1.62	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Actinium 228	**1.34**		0.352	0.378		0.220	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-212	**2.62**		1.10	1.14		0.931	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-214	**1.13**		0.189	0.222		0.0795	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-210	1.18	U	1.69	1.70		2.91	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-212	**1.18**		0.149	0.214		0.131	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-214	**1.07**		0.181	0.213		0.108	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Potassium-40	**15.8**		2.15	2.69		0.538	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Protactinium-231	0.816	U	0.478	0.487		2.62	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-226	**1.13**		0.189	0.222	1.00	0.0795	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-228	**1.34**		0.352	0.378		0.220	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-232	**1.34**		0.352	0.378		0.220	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-234	0.832	U	0.608	0.614		2.02	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thallium-208	**0.391**		0.0879	0.0968		0.0494	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-235	0.00107	U	0.260	0.260		0.455	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-238	0.832	U	0.608	0.614		2.02	pCi/g	05/29/14 11:21	06/20/14 14:33	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 14:33*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-5

Lab Sample ID: 160-6793-40

Date Collected: 05/23/14 11:02
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.03**		0.206	0.223	1.00	0.0535	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**1.08**		0.212	0.231	1.00	0.0629	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.777**		0.179	0.190	1.00	0.0467	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.0*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.626**		0.166	0.174	1.00	0.0698	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0243	U	0.0383	0.0384	1.00	0.0611	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.606**		0.163	0.171	1.00	0.0657	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.9*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0808	U	0.179	0.179		1.11	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Actinium 228	**1.45**		0.309	0.343		0.263	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-212	0.464	U	0.836	0.838		1.43	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-214	**1.39**		0.235	0.276		0.0736	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-210	**4.44**		2.42	2.48		2.87	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-212	**1.30**		0.222	0.279		0.196	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-214	**1.58**		0.224	0.278		0.153	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Potassium-40	**16.5**		2.46	2.99		0.946	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Protactinium-231	0.554	U	0.669	0.672		3.00	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-226	**1.39**		0.235	0.276	1.00	0.0736	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-228	**1.45**		0.309	0.343		0.263	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-232	**1.45**		0.309	0.343		0.263	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-234	1.36	U	0.883	0.894		2.90	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thallium-208	**0.481**		0.131	0.140		0.101	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-235	0.220	U	0.437	0.438		0.713	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-238	1.36	U	0.883	0.894		2.90	pCi/g	05/29/14 11:21	06/20/14 14:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 14:35*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-6

Lab Sample ID: 160-6793-41

Date Collected: 05/23/14 08:58
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.454**		0.151	0.155	1.00	0.0908	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**0.686**		0.183	0.191	1.00	0.0807	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.485**		0.152	0.157	1.00	0.0613	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.8*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.384**		0.134	0.137	1.00	0.0729	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0508	U	0.0565	0.0567	1.00	0.0728	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.529**		0.156	0.162	1.00	0.0727	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*82.9*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.202	U	0.295	0.296		0.489	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Actinium 228	**0.254**		0.143	0.145		0.199	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Bismuth-212	0.000	U	0.517	0.517		0.650	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Bismuth-214	**0.665**		0.122	0.140		0.0958	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Lead-210	0.944	U	0.963	0.970		1.57	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Lead-212	**0.551**		0.0877	0.113		0.0921	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Lead-214	**0.523**		0.101	0.115		0.111	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Potassium-40	**16.2**		1.54	2.26		0.577	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Protactinium-231	0.190	U	0.241	0.242		1.42	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Radium-226	**0.665**		0.122	0.140	1.00	0.0958	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Radium-228	**0.254**		0.143	0.145		0.199	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Thorium-232	**0.254**		0.143	0.145		0.199	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Thorium-234	0.853	U	0.868	0.873		1.41	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Thallium-208	**0.211**		0.0503	0.0549		0.0370	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Uranium-235	0.0651	U	0.154	0.154		0.352	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Uranium-238	0.853	U	0.868	0.873		1.41	pCi/g	05/29/14 11:21	06/20/14 14:43	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 14:43*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-7

Lab Sample ID: 160-6793-42

Date Collected: 05/23/14 11:06
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.02		0.210	0.227	1.00	0.0752	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	1.08		0.214	0.232	1.00	0.0550	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	1.01		0.207	0.223	1.00	0.0577	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.4*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.840		0.194	0.206	1.00	0.0779	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0682		0.0610	0.0612	1.00	0.0409	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.778		0.187	0.198	1.00	0.0865	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.2*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.531	U	0.600	0.604		0.985	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Actinium 228	0.711		0.217	0.229		0.379	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Bismuth-212	0.846	U	0.759	0.764		1.18	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Bismuth-214	1.14		0.218	0.249		0.179	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Lead-210	1.78	U	2.09	2.10		3.21	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Lead-212	1.07		0.183	0.230		0.218	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Lead-214	1.15		0.215	0.246		0.236	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Potassium-40	17.8		2.21	2.86		0.761	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Protactinium-231	0.451	U	0.824	0.826		2.83	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Radium-226	1.14		0.218	0.249	1.00	0.179	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Radium-228	0.711		0.217	0.229		0.379	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Thorium-232	0.711		0.217	0.229		0.379	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Thorium-234	1.76	U	1.47	1.48		2.50	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Thallium-208	0.410		0.109	0.117		0.101	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Uranium-235	-0.0231	U	0.572	0.572		0.605	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Uranium-238	1.76	U	1.47	1.48		2.50	pCi/g	05/29/14 11:21	06/20/14 14:44	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 14:44*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-8

Lab Sample ID: 160-6793-43

Date Collected: 05/23/14 09:28
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.544**		0.156	0.162	1.00	0.0797	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**0.566**		0.157	0.164	1.00	0.0614	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.533**		0.152	0.158	1.00	0.0558	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.6*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.401**		0.136	0.140	1.00	0.0643	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.00616	U	0.0296	0.0296	1.00	0.0801	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.409**		0.138	0.142	1.00	0.0689	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.0*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.216	U	0.344	0.345		0.573	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Actinium 228	**0.769**		0.201	0.216		0.193	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Bismuth-212	**1.03**		0.526	0.537		0.521	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Bismuth-214	**0.625**		0.170	0.182		0.165	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Lead-210	1.36	U	1.60	1.61		2.26	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Lead-212	**0.538**		0.103	0.124		0.119	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Lead-214	**0.640**		0.130	0.146		0.138	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Potassium-40	**15.8**		1.73	2.36		0.525	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Protactinium-231	0.494	U	0.627	0.629		1.56	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Radium-226	**0.625**		0.170	0.182	1.00	0.165	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Radium-228	**0.769**		0.201	0.216		0.193	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Thorium-232	**0.769**		0.201	0.216		0.193	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Thorium-234	1.13	U	1.12	1.13		1.59	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Thallium-208	**0.203**		0.0672	0.0705		0.0638	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Uranium-235	0.114	U	0.140	0.141		0.385	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Uranium-238	1.13	U	1.12	1.13		1.59	pCi/g	05/29/14 11:21	06/20/14 15:29	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:29*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-9

Lab Sample ID: 160-6793-44

Date Collected: 05/23/14 08:44
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.501**		0.154	0.159	1.00	0.0972	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	**0.766**		0.185	0.196	1.00	0.0628	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	**0.468**		0.144	0.149	1.00	0.0571	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.4*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.577**		0.196	0.202	1.00	0.0926	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0127	U	0.0419	0.0419	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.472**		0.178	0.183	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*58.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.295	U	0.362	0.364		0.596	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Actinium 228	**0.533**		0.200	0.207		0.166	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Bismuth-212	0.0415	U	0.401	0.401		0.740	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Bismuth-214	**0.458**		0.108	0.118		0.105	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Lead-210	0.0377	U	1.29	1.29		2.35	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Lead-212	**0.493**		0.0977	0.117		0.120	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Lead-214	**0.576**		0.137	0.149		0.139	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Potassium-40	**16.9**		1.67	2.40		0.560	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Protactinium-231	0.306	U	0.265	0.267		1.91	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Radium-226	**0.458**		0.108	0.118	1.00	0.105	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Radium-228	**0.533**		0.200	0.207		0.166	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Thorium-232	**0.533**		0.200	0.207		0.166	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Thorium-234	0.0240	U	0.162	0.163		2.14	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Thallium-208	**0.178**		0.0643	0.0669		0.0644	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Uranium-235	0.0729	U	0.208	0.208		0.355	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Uranium-238	0.0240	U	0.162	0.163		2.14	pCi/g	05/29/14 11:21	06/20/14 14:46	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 14:46*	*1*

Client Sample ID: BMAC-GRASS-10

Lab Sample ID: 160-6793-45

Date Collected: 05/23/14 11:12

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.24		0.235	0.257	1.00	0.0893	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	1.18		0.229	0.250	1.00	0.0746	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.843		0.193	0.206	1.00	0.0666	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.8*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.844		0.202	0.214	1.00	0.0810	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0713		0.0665	0.0667	1.00	0.0674	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.898		0.207	0.221	1.00	0.0617	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*82.2*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0818	U	0.470	0.470		1.96	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Actinium 228	0.904		0.337	0.349		0.434	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-212	0.946	U	0.934	0.939		1.48	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-214	1.35		0.257	0.293		0.193	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-210	3.44		2.12	2.16		3.01	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-212	1.25		0.190	0.250		0.196	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-214	1.44		0.229	0.274		0.211	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Potassium-40	17.6		2.59	3.15		1.72	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Protactinium-231	0.871	U	0.576	0.584		2.92	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-226	1.35		0.257	0.293	1.00	0.193	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-228	0.904		0.337	0.349		0.434	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-232	0.904		0.337	0.349		0.434	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-234	1.76	U	1.36	1.37		2.24	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thallium-208	0.308		0.100	0.105		0.121	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-235	0.145	U	0.281	0.282		0.404	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-238	1.76	U	1.36	1.37		2.24	pCi/g	05/29/14 11:21	06/20/14 14:33	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 14:33*	*1*

Client Sample ID: BMAC-GRASS-11

Lab Sample ID: 160-6793-46

Date Collected: 05/23/14 10:30

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.940**		0.203	0.218	1.00	0.0869	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.918**		0.200	0.214	1.00	0.0727	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.848**		0.192	0.205	1.00	0.0756	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.4*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.673**		0.175	0.184	1.00	0.0644	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0229	U	0.0405	0.0406	1.00	0.0732	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.682**		0.177	0.186	1.00	0.0642	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.6*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0442	U	0.0741	0.0743		1.03	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Actinium 228	**0.984**		0.397	0.410		0.617	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Bismuth-212	1.07	U	1.38	1.38		2.26	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Bismuth-214	**0.950**		0.250	0.269		0.191	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Lead-210	0.843	U	2.31	2.31		3.83	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Lead-212	**0.988**		0.242	0.274		0.252	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Lead-214	**1.21**		0.276	0.304		0.271	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Potassium-40	**16.5**		3.21	3.63		1.56	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Protactinium-231	0.737	U	0.754	0.759		4.54	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Radium-226	**0.950**		0.250	0.269	1.00	0.191	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Radium-228	**0.984**		0.397	0.410		0.617	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Thorium-232	**0.984**		0.397	0.410		0.617	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Thorium-234	0.908	U	0.988	0.993		3.33	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Thallium-208	**0.464**		0.132	0.140		0.101	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Uranium-235	0.133	U	0.346	0.347		0.514	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Uranium-238	0.908	U	0.988	0.993		3.33	pCi/g	05/29/14 11:21	06/20/14 15:11	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:11*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-12

Lab Sample ID: 160-6793-47

Date Collected: 05/23/14 10:00
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.786**		0.198	0.209	1.00	0.113	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.999**		0.218	0.233	1.00	0.0613	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.689**		0.181	0.190	1.00	0.0610	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.9*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.577**		0.174	0.181	1.00	0.0829	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0129	U	0.0324	0.0324	1.00	0.0725	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.540**		0.168	0.174	1.00	0.0780	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*75.4*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.106	U	0.235	0.235		0.422	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Actinium 228	**1.02**		0.194	0.221		0.110	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Bismuth-212	**1.06**		0.674	0.683		0.961	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Bismuth-214	**0.883**		0.187	0.209		0.149	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Lead-210	1.30	U	1.41	1.42		2.39	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Lead-212	**0.914**		0.124	0.171		0.115	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Lead-214	**0.937**		0.147	0.176		0.111	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Potassium-40	**17.0**		2.17	2.78		0.818	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Protactinium-231	0.394	U	0.299	0.302		2.12	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Radium-226	**0.883**		0.187	0.209	1.00	0.149	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Radium-228	**1.02**		0.194	0.221		0.110	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Thorium-232	**1.02**		0.194	0.221		0.110	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Thorium-234	0.974	U	0.497	0.507		1.50	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Thallium-208	**0.341**		0.0787	0.0863		0.0518	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Uranium-235	0.170	U	0.221	0.222		0.392	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Uranium-238	0.974	U	0.497	0.507		1.50	pCi/g	05/29/14 11:21	06/20/14 15:10	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:10*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-13

Lab Sample ID: 160-6793-48

Date Collected: 05/23/14 10:23
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.783		0.192	0.203	1.00	0.0931	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.883		0.201	0.214	1.00	0.0591	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.702		0.178	0.188	1.00	0.0339	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.612		0.168	0.176	1.00	0.0651	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	-0.00267	U	0.00534	0.00535	1.00	0.0648	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.672		0.176	0.184	1.00	0.0520	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.0*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.379		0.339	0.343		0.330	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Actinium 228	0.640		0.239	0.247		0.360	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Bismuth-212	1.38		0.854	0.866		0.889	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Bismuth-214	0.929		0.204	0.225		0.114	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Lead-210	2.34	U	1.97	1.99		3.17	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Lead-212	1.04		0.162	0.211		0.159	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Lead-214	1.30		0.220	0.258		0.191	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Potassium-40	17.8		2.41	3.02		0.843	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Protactinium-231	0.267	U	0.269	0.270		2.78	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Radium-226	0.929		0.204	0.225	1.00	0.114	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Radium-228	0.640		0.239	0.247		0.360	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Thorium-232	0.640		0.239	0.247		0.360	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Thorium-234	1.79	U	1.33	1.34		2.25	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Thallium-208	0.367		0.101	0.108		0.0731	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Uranium-235	0.146	U	0.249	0.249		0.524	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Uranium-238	1.79	U	1.33	1.34		2.25	pCi/g	05/29/14 11:21	06/20/14 15:09	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:09*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-14

Lab Sample ID: 160-6793-49

Date Collected: 05/23/14 07:52
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.599**		0.169	0.176	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.676**		0.174	0.183	1.00	0.0577	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.637**		0.169	0.177	1.00	0.0630	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.9*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.407**		0.141	0.145	1.00	0.0834	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0383	U	0.0512	0.0513	1.00	0.0758	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.466**		0.148	0.153	1.00	0.0533	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.1*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.433	U	0.405	0.409		0.661	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Actinium 228	**0.749**		0.177	0.193		0.118	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-212	0.499	U	0.558	0.560		0.907	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-214	**0.467**		0.113	0.123		0.100	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-210	0.938	U	0.903	0.909		1.46	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-212	**0.495**		0.118	0.134		0.120	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-214	**0.767**		0.134	0.156		0.124	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Potassium-40	**16.3**		1.56	2.28		0.591	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Protactinium-231	0.355	U	0.488	0.490		1.44	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-226	**0.467**		0.113	0.123	1.00	0.100	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-228	**0.749**		0.177	0.193		0.118	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-232	**0.749**		0.177	0.193		0.118	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-234	0.739	U	0.470	0.477		1.52	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thallium-208	**0.221**		0.0590	0.0633		0.0475	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-235	0.141	U	0.220	0.221		0.367	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-238	0.739	U	0.470	0.477		1.52	pCi/g	05/29/14 11:21	06/20/14 15:28	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:28*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-15

Lab Sample ID: 160-6793-50

Date Collected: 05/23/14 10:20
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.09**		0.213	0.231	1.00	0.0755	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.806**		0.182	0.194	1.00	0.0466	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.812**		0.182	0.194	1.00	0.0463	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.652**		0.177	0.185	1.00	0.0832	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0355	U	0.0513	0.0514	1.00	0.0828	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.580**		0.165	0.172	1.00	0.0607	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.7*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.165	U	0.309	0.310		1.90	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Actinium 228	**0.907**		0.273	0.288		0.429	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-212	0.540	U	0.666	0.668		1.09	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-214	**1.20**		0.274	0.300		0.243	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-210	0.604	U	1.95	1.95		3.58	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-212	**1.06**		0.173	0.221		0.190	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-214	**1.16**		0.199	0.233		0.235	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Potassium-40	**17.2**		2.21	2.83		0.786	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Protactinium-231	0.993	U	0.666	0.675		3.20	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-226	**1.20**		0.274	0.300	1.00	0.243	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-228	**0.907**		0.273	0.288		0.429	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-232	**0.907**		0.273	0.288		0.429	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-234	1.70	U	1.06	1.08		2.80	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thallium-208	**0.394**		0.103	0.111		0.0938	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-235	0.00159	U	0.00589	0.00590		0.575	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-238	1.70	U	1.06	1.08		2.80	pCi/g	05/29/14 11:21	06/20/14 16:05	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 16:05*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-16

Lab Sample ID: 160-6793-51

Date Collected: 05/23/14 08:05
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.509**		0.148	0.154	1.00	0.0913	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.441**		0.135	0.140	1.00	0.0579	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.380**		0.125	0.129	1.00	0.0525	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.422**		0.147	0.152	1.00	0.0718	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0285	U	0.0448	0.0449	1.00	0.0715	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.323**		0.129	0.131	1.00	0.0654	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*78.0*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.114	U	0.152	0.153		0.251	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Actinium 228	**0.318**		0.164	0.167		0.223	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-212	0.393	U	0.509	0.510		0.839	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-214	**0.606**		0.133	0.148		0.117	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-210	**1.68**		1.24	1.26		1.67	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-212	**0.451**		0.0835	0.102		0.0947	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-214	**0.502**		0.117	0.128		0.109	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Potassium-40	**15.0**		1.54	2.17		0.648	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Protactinium-231	0.389	U	0.515	0.517		1.63	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-226	**0.606**		0.133	0.148	1.00	0.117	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-228	**0.318**		0.164	0.167		0.223	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-232	**0.318**		0.164	0.167		0.223	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-234	1.08	U	1.15	1.16		1.50	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thallium-208	**0.152**		0.0564	0.0586		0.0608	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-235	0.219	U	0.198	0.199		0.304	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-238	1.08	U	1.15	1.16		1.50	pCi/g	05/29/14 11:21	06/20/14 16:05	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 16:05*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-17

Lab Sample ID: 160-6793-52

Date Collected: 05/23/14 10:14
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.711**		0.191	0.200	1.00	0.100	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.831**		0.203	0.214	1.00	0.0636	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.435**		0.147	0.151	1.00	0.0635	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.506**		0.162	0.168	1.00	0.0729	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0259	U	0.0459	0.0460	1.00	0.0829	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.457**		0.156	0.161	1.00	0.0910	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*75.5*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0707	U	0.0941	0.0945		1.00	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Actinium 228	**0.708**		0.184	0.197		0.184	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Bismuth-212	0.599	U	0.538	0.542		0.843	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Bismuth-214	**0.580**		0.151	0.163		0.145	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Lead-210	-0.156	U	1.57	1.57		2.27	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Lead-212	**0.656**		0.116	0.144		0.107	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Lead-214	**0.572**		0.129	0.142		0.156	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Potassium-40	**14.2**		1.56	2.13		0.575	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Protactinium-231	0.414	U	0.301	0.304		1.99	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Radium-226	**0.580**		0.151	0.163	1.00	0.145	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Radium-228	**0.708**		0.184	0.197		0.184	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Thorium-232	**0.708**		0.184	0.197		0.184	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Thorium-234	0.531	U	0.533	0.536		1.99	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Thallium-208	**0.181**		0.0643	0.0670		0.0671	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Uranium-235	0.151	U	0.229	0.230		0.377	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Uranium-238	0.531	U	0.533	0.536		1.99	pCi/g	05/29/14 11:21	06/20/14 15:30	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:30*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-18

Lab Sample ID: 160-6793-53

Date Collected: 05/23/14 10:35
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.636**		0.160	0.169	1.00	0.0303	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.752**		0.175	0.186	1.00	0.0575	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.640**		0.161	0.170	1.00	0.0522	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*97.2*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.593**		0.161	0.168	1.00	0.0656	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	**0.0668**		0.0598	0.0600	1.00	0.0401	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	**0.453**		0.141	0.146	1.00	0.0654	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.6*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:41*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.00315	U	0.258	0.258		0.461	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Actinium 228	**0.867**		0.246	0.261		0.348	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-212	0.510	U	0.712	0.714		1.18	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-214	**0.954**		0.211	0.233		0.161	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-210	1.61	U	1.84	1.85		2.68	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-212	**0.960**		0.139	0.186		0.129	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-214	**0.987**		0.165	0.195		0.149	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Potassium-40	**16.6**		2.12	2.72		0.857	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Protactinium-231	0.547	U	0.687	0.689		2.03	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-226	**0.954**		0.211	0.233	1.00	0.161	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-228	**0.867**		0.246	0.261		0.348	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-232	**0.867**		0.246	0.261		0.348	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-234	0.203	U	0.574	0.575		2.26	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thallium-208	**0.277**		0.0832	0.0880		0.0814	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-235	0.160	U	0.277	0.277		0.475	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-238	0.203	U	0.574	0.575		2.26	pCi/g	05/29/14 11:21	06/20/14 15:08	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:08*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-19

Lab Sample ID: 160-6793-54

Date Collected: 05/23/14 09:47
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.751**		0.183	0.194	1.00	0.0777	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.959**		0.205	0.221	1.00	0.0568	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.889**		0.197	0.211	1.00	0.0566	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.0*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.552**		0.173	0.179	1.00	0.121	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-235/236	-0.0155	U	0.0495	0.0495	1.00	0.142	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-238	**0.674**		0.188	0.196	1.00	0.109	pCi/g	05/29/14 12:48	06/05/14 20:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*76.7*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:40*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0224	U	0.208	0.208		0.868	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Actinium 228	**1.08**		0.301	0.321		0.155	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-212	0.445	U	0.882	0.884		1.52	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-214	**1.18**		0.230	0.260		0.163	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-210	2.18	U	2.21	2.22		2.98	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-212	**0.905**		0.254	0.279		0.251	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-214	**1.25**		0.235	0.269		0.194	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Potassium-40	**16.9**		2.44	2.99		0.970	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Protactinium-231	0.704	U	0.423	0.430		3.01	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-226	**1.18**		0.230	0.260	1.00	0.163	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-228	**1.08**		0.301	0.321		0.155	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-232	**1.08**		0.301	0.321		0.155	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-234	0.846	U	1.75	1.75		3.01	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thallium-208	**0.472**		0.0969	0.109		0.0367	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-235	0.206	U	0.400	0.400		0.632	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-238	0.846	U	1.75	1.75		3.01	pCi/g	05/29/14 11:21	06/20/14 15:08	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:08*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-20

Lab Sample ID: 160-6793-55

Date Collected: 05/23/14 09:40
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.901**		0.200	0.213	1.00	0.0977	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	**0.945**		0.202	0.217	1.00	0.0687	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	**0.901**		0.195	0.209	1.00	0.0481	pCi/g	05/29/14 12:48	06/05/14 20:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.630**		0.177	0.185	1.00	0.116	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-235/236	0.0356	U	0.0589	0.0590	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-238	**0.845**		0.201	0.213	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.8*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:40*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.120	U	0.186	0.186		1.08	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Actinium 228	**0.828**		0.203	0.220		0.283	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Bismuth-212	**1.14**		0.688	0.698		0.977	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Bismuth-214	**1.08**		0.225	0.251		0.176	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Lead-210	**2.63**		1.82	1.85		2.22	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Lead-212	**1.14**		0.143	0.205		0.122	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Lead-214	**1.24**		0.197	0.235		0.155	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Potassium-40	**16.6**		1.92	2.57		0.874	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Protactinium-231	0.828	U	0.975	0.979		1.59	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Radium-226	**1.08**		0.225	0.251	1.00	0.176	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Radium-228	**0.828**		0.203	0.220		0.283	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Thorium-232	**0.828**		0.203	0.220		0.283	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Thorium-234	1.03	U	0.695	0.703		2.43	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Thallium-208	**0.453**		0.109	0.118		0.0736	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Uranium-235	0.118	U	0.156	0.156		0.599	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Uranium-238	1.03	U	0.695	0.703		2.43	pCi/g	05/29/14 11:21	06/20/14 16:04	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 16:04*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-21

Lab Sample ID: 160-6793-56

Date Collected: 05/23/14 10:10
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.531**		0.170	0.176	1.00	0.119	pCi/g	05/29/14 12:52	06/10/14 15:22	1
Thorium-230	**0.963**		0.220	0.235	1.00	0.0761	pCi/g	05/29/14 12:52	06/10/14 15:22	1
Thorium-232	**0.432**		0.147	0.151	1.00	0.0565	pCi/g	05/29/14 12:52	06/10/14 15:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.2*		*30 - 110*	*05/29/14 12:52*	*06/10/14 15:22*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.440**		0.145	0.150	1.00	0.0544	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0297	U	0.0421	0.0421	1.00	0.0446	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.286**		0.117	0.119	1.00	0.0358	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.6*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0318	U	0.0503	0.0505		0.464	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Actinium 228	**0.618**		0.209	0.219		0.152	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-212	0.148	U	0.531	0.531		0.945	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-214	**0.551**		0.117	0.131		0.0636	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-210	1.06	U	1.05	1.06		1.70	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-212	**0.454**		0.122	0.135		0.124	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-214	**0.570**		0.107	0.123		0.0584	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Potassium-40	**16.3**		1.84	2.48		0.536	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Protactinium-231	0.320	U	0.416	0.417		1.81	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-226	**0.551**		0.117	0.131	1.00	0.0636	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-228	**0.618**		0.209	0.219		0.152	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-232	**0.618**		0.209	0.219		0.152	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-234	0.640	U	0.914	0.916		1.60	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thallium-208	**0.205**		0.0581	0.0619		0.0430	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-235	0.0411	U	0.0848	0.0849		0.408	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-238	0.640	U	0.914	0.916		1.60	pCi/g	05/29/14 13:01	06/20/14 15:43	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 15:43*	*1*

Client Sample ID: BMAC-GRASS-22

Lab Sample ID: 160-6793-57

Date Collected: 05/23/14 10:45
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.798		0.186	0.198	1.00	0.0656	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	1.03		0.212	0.229	1.00	0.0731	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.862		0.193	0.206	1.00	0.0556	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.4*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.743		0.184	0.194	1.00	0.0588	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0845		0.0690	0.0694	1.00	0.0423	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.615		0.168	0.176	1.00	0.0643	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.0*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.113	U	0.144	0.145		0.664	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Actinium 228	1.52		0.353	0.385		0.253	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-212	1.05	U	0.891	0.897		1.36	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-214	1.04		0.228	0.252		0.188	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-210	3.05		1.86	1.89		2.65	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-212	1.13		0.177	0.229		0.182	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-214	1.12		0.200	0.231		0.161	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Potassium-40	15.0		2.28	2.75		1.08	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Protactinium-231	0.704	U	1.10	1.11		2.49	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-226	1.04		0.228	0.252	1.00	0.188	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-228	1.52		0.353	0.385		0.253	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-232	1.52		0.353	0.385		0.253	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-234	0.810	U	0.714	0.719		2.63	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thallium-208	0.477		0.109	0.120		0.0813	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-235	0.259	U	0.371	0.372		0.612	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-238	0.810	U	0.714	0.719		2.63	pCi/g	05/29/14 13:01	06/20/14 15:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 15:39*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-23

Lab Sample ID: 160-6793-58

Date Collected: 05/23/14 09:52
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.714**		0.181	0.191	1.00	0.0881	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**0.884**		0.199	0.213	1.00	0.0634	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**1.01**		0.212	0.228	1.00	0.0576	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.7*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.469**		0.140	0.146	1.00	0.0587	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0313	U	0.0452	0.0453	1.00	0.0730	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.657**		0.165	0.174	1.00	0.0469	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*90.9*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-1.07	U	0.361	0.387		0.444	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Actinium 228	**0.844**		0.253	0.267		0.417	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-212	1.01	U	0.845	0.852		1.28	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-214	**0.962**		0.224	0.245		0.234	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-210	0.436	U	1.96	1.96		3.51	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-212	**1.03**		0.199	0.239		0.203	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-214	**1.44**		0.199	0.248		0.198	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Potassium-40	**19.1**		2.58	3.24		0.965	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Protactinium-231	0.765	U	0.694	0.699		3.21	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-226	**0.962**		0.224	0.245	1.00	0.234	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-228	**0.844**		0.253	0.267		0.417	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-232	**0.844**		0.253	0.267		0.417	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-234	0.285	U	1.73	1.73		3.03	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thallium-208	**0.431**		0.118	0.127		0.0838	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-235	0.297	U	0.375	0.376		0.559	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-238	0.285	U	1.73	1.73		3.03	pCi/g	05/29/14 13:01	06/20/14 15:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 15:39*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-24

Lab Sample ID: 160-6793-59

Date Collected: 05/23/14 08:57
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.721**		0.183	0.192	1.00	0.111	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**1.08**		0.217	0.235	1.00	0.0561	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**0.776**		0.184	0.195	1.00	0.0655	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.6*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.793**		0.182	0.194	1.00	0.0538	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0258	U	0.0364	0.0365	1.00	0.0386	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.506**		0.145	0.151	1.00	0.0310	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*93.7*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.180	U	0.292	0.293		0.609	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Actinium 228	**1.18**		0.355	0.375		0.259	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-212	1.03	U	1.42	1.42		2.36	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-214	**1.23**		0.309	0.335		0.242	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-210	3.27	U	2.81	2.84		3.86	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-212	**1.19**		0.221	0.269		0.214	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-214	**1.21**		0.250	0.280		0.218	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Potassium-40	**19.4**		3.33	3.88		1.06	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Protactinium-231	0.473	U	1.62	1.62		2.91	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-226	**1.23**		0.309	0.335	1.00	0.242	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-228	**1.18**		0.355	0.375		0.259	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-232	**1.18**		0.355	0.375		0.259	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-234	0.664	U	1.08	1.08		3.53	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thallium-208	**0.409**		0.137	0.144		0.134	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-235	0.198	U	0.342	0.343		0.644	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-238	0.664	U	1.08	1.08		3.53	pCi/g	05/29/14 13:01	06/20/14 15:43	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 15:43*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-25

Lab Sample ID: 160-6793-60

Date Collected: 05/23/14 08:45
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.848**		0.198	0.210	1.00	0.0861	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**1.17**		0.232	0.252	1.00	0.0890	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**0.852**		0.197	0.209	1.00	0.0725	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.2*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.481**		0.140	0.146	1.00	0.0524	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	**0.0628**		0.0562	0.0564	1.00	0.0377	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.635**		0.160	0.169	1.00	0.0302	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*96.3*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.577	U	0.717	0.721		1.18	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Actinium 228	**1.19**		0.278	0.303		0.201	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Bismuth-212	0.965	U	0.762	0.768		1.16	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Bismuth-214	**0.890**		0.217	0.236		0.200	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Lead-210	0.902	U	1.72	1.72		3.08	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Lead-212	**1.15**		0.203	0.251		0.199	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Lead-214	**1.14**		0.214	0.245		0.193	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Potassium-40	**16.7**		2.01	2.64		0.808	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Protactinium-231	0.211	U	0.378	0.378		2.36	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Radium-226	**0.890**		0.217	0.236	1.00	0.200	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Radium-228	**1.19**		0.278	0.303		0.201	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Thorium-232	**1.19**		0.278	0.303		0.201	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Thorium-234	2.25	U	1.80	1.82		2.40	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Thallium-208	**0.431**		0.0883	0.0990		0.0668	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Uranium-235	0.245	U	0.275	0.276		0.515	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Uranium-238	2.25	U	1.80	1.82		2.40	pCi/g	05/29/14 13:01	06/20/14 16:06	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:06*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-26

Lab Sample ID: 160-6793-61

Date Collected: 05/23/14 09:58
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.810**		0.188	0.200	1.00	0.0761	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**0.985**		0.206	0.222	1.00	0.0654	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**0.893**		0.195	0.209	1.00	0.0485	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.8*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.554**		0.153	0.160	1.00	0.0700	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0288	U	0.0454	0.0455	1.00	0.0782	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.677**		0.168	0.178	1.00	0.0699	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*91.8*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.00193	U	0.315	0.315		0.561	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Actinium 228	**1.29**		0.271	0.301		0.203	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Bismuth-212	**1.41**		0.842	0.854		1.15	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Bismuth-214	**1.09**		0.234	0.260		0.150	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Lead-210	**3.08**		1.82	1.86		2.80	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Lead-212	**1.10**		0.165	0.218		0.160	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Lead-214	**1.20**		0.181	0.219		0.179	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Potassium-40	**12.9**		2.08	2.47		1.07	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Protactinium-231	-0.0832	U	0.127	0.127		3.08	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Radium-226	**1.09**		0.234	0.260	1.00	0.150	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Radium-228	**1.29**		0.271	0.301		0.203	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Thorium-232	**1.29**		0.271	0.301		0.203	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Thorium-234	2.15	U	1.56	1.57		2.60	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Thallium-208	**0.376**		0.0824	0.0912		0.0343	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Uranium-235	0.250	U	0.358	0.359		0.590	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Uranium-238	2.15	U	1.56	1.57		2.60	pCi/g	05/29/14 13:01	06/20/14 16:17	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:17*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-27

Lab Sample ID: 160-6793-62

Date Collected: 05/23/14 10:03
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.644		0.169	0.178	1.00	0.100	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.856		0.191	0.204	1.00	0.0711	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.600		0.159	0.166	1.00	0.0541	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.4*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.471		0.141	0.146	1.00	0.0478	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0629		0.0587	0.0589	1.00	0.0595	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.520		0.148	0.155	1.00	0.0545	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.6*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.301	U	0.220	0.223		0.325	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Actinium 228	1.29		0.223	0.259		0.125	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Bismuth-212	0.626	U	0.695	0.698		1.12	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Bismuth-214	1.39		0.228	0.270		0.155	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Lead-210	2.47		1.75	1.77		2.46	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Lead-212	1.06		0.150	0.203		0.142	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Lead-214	1.35		0.182	0.230		0.156	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Potassium-40	14.3		2.00	2.48		0.873	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Protactinium-231	0.391	U	0.424	0.426		2.54	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Radium-226	1.39		0.228	0.270	1.00	0.155	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Radium-228	1.29		0.223	0.259		0.125	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Thorium-232	1.29		0.223	0.259		0.125	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Thorium-234	2.18		1.28	1.30		2.05	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Thallium-208	0.400		0.100	0.108		0.0804	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Uranium-235	0.218	U	0.274	0.275		0.488	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Uranium-238	2.18		1.28	1.30		2.05	pCi/g	05/29/14 13:01	06/20/14 16:10	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:10*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-28

Lab Sample ID: 160-6793-63

Date Collected: 05/23/14 08:05
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.869**		0.198	0.211	1.00	0.0817	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**1.02**		0.213	0.229	1.00	0.0576	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**0.708**		0.178	0.188	1.00	0.0673	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.598**		0.158	0.166	1.00	0.0539	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	**0.0645**		0.0577	0.0580	1.00	0.0387	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.557**		0.152	0.159	1.00	0.0471	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.1*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.864	U	0.872	0.879		1.42	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Actinium 228	**0.841**		0.293	0.305		0.548	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Bismuth-212	0.886	U	1.06	1.06		1.72	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Bismuth-214	**1.20**		0.266	0.294		0.219	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Lead-210	1.20	U	2.01	2.02		3.57	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Lead-212	**0.877**		0.209	0.238		0.217	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Lead-214	**1.21**		0.228	0.260		0.132	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Potassium-40	**16.4**		2.57	3.07		1.10	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Protactinium-231	0.325	U	0.887	0.888		3.00	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Radium-226	**1.20**		0.266	0.294	1.00	0.219	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Radium-228	**0.841**		0.293	0.305		0.548	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Thorium-232	**0.841**		0.293	0.305		0.548	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Thorium-234	0.828	U	0.981	0.984		3.17	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Thallium-208	**0.420**		0.122	0.130		0.0914	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Uranium-235	0.162	U	0.349	0.349		0.593	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Uranium-238	0.828	U	0.981	0.984		3.17	pCi/g	05/29/14 13:01	06/20/14 16:11	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:11*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-29

Lab Sample ID: 160-6793-64

Date Collected: 05/23/14 07:45
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.683		0.169	0.179	1.00	0.0728	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.902		0.192	0.207	1.00	0.0308	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.754		0.175	0.186	1.00	0.0306	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.2*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.818		0.189	0.202	1.00	0.0498	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0247	U	0.0388	0.0389	1.00	0.0620	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.873		0.195	0.209	1.00	0.0327	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.1*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.518	U	0.581	0.585		0.954	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Actinium 228	1.19		0.250	0.278		0.283	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Bismuth-212	1.62		0.658	0.679		0.743	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Bismuth-214	0.990		0.194	0.219		0.153	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Lead-210	2.23		1.71	1.73		2.09	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Lead-212	0.962		0.140	0.187		0.141	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Lead-214	1.04		0.162	0.195		0.142	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Potassium-40	16.7		1.94	2.58		0.882	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Protactinium-231	0.120	U	0.147	0.147		2.37	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Radium-226	0.990		0.194	0.219	1.00	0.153	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Radium-228	1.19		0.250	0.278		0.283	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Thorium-232	1.19		0.250	0.278		0.283	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Thorium-234	1.57	U	1.35	1.36		2.18	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Thallium-208	0.337		0.0850	0.0919		0.0668	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Uranium-235	0.00400	U	0.0120	0.0120		0.569	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Uranium-238	1.57	U	1.35	1.36		2.18	pCi/g	05/29/14 13:01	06/20/14 16:37	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:37*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-GRASS-30

Lab Sample ID: 160-6793-65

Date Collected: 05/23/14 07:52
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.772**		0.186	0.197	1.00	0.0964	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**1.12**		0.219	0.239	1.00	0.0487	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**0.678**		0.170	0.180	1.00	0.0527	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.2*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.725**		0.180	0.190	1.00	0.0710	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0137	U	0.0273	0.0273	1.00	0.0410	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.826**		0.191	0.203	1.00	0.0623	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.1*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.462	U	0.353	0.358		1.84	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Actinium 228	**1.30**		0.335	0.360		0.254	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-212	0.752	U	0.803	0.807		1.28	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-214	**1.11**		0.270	0.293		0.242	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-210	3.42	U	2.63	2.66		3.55	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-212	**0.971**		0.173	0.214		0.197	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-214	**1.17**		0.221	0.252		0.200	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Potassium-40	**13.8**		2.03	2.47		0.828	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Protactinium-231	0.721	U	0.528	0.534		3.02	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-226	**1.11**		0.270	0.293	1.00	0.242	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-228	**1.30**		0.335	0.360		0.254	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-232	**1.30**		0.335	0.360		0.254	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-234	0.947	U	0.799	0.805		2.54	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thallium-208	**0.420**		0.105	0.114		0.0914	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-235	0.149	U	0.283	0.283		0.589	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-238	0.947	U	0.799	0.805		2.54	pCi/g	05/29/14 13:01	06/20/14 16:38	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:38*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-1

Date Collected: 05/23/14 09:07
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-66

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.532**		0.153	0.159	1.00	0.0810	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**0.602**		0.161	0.169	1.00	0.0646	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**0.407**		0.132	0.136	1.00	0.0511	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.373**		0.135	0.138	1.00	0.0675	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	**0.0591**		0.0591	0.0593	1.00	0.0443	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.386**		0.136	0.140	1.00	0.0615	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*87.5*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0711	U	0.249	0.250		0.383	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Actinium 228	**0.865**		0.177	0.197		0.0992	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-212	0.237	U	0.655	0.656		1.14	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-214	**0.652**		0.157	0.171		0.146	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-210	1.11	U	1.26	1.27		2.01	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-212	**0.735**		0.118	0.152		0.103	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-214	**0.714**		0.147	0.165		0.135	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Potassium-40	**14.6**		1.79	2.33		0.886	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Protactinium-231	0.00417	U	0.00967	0.00968		2.06	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-226	**0.652**		0.157	0.171	1.00	0.146	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-228	**0.865**		0.177	0.197		0.0992	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-232	**0.865**		0.177	0.197		0.0992	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-234	1.02	U	1.09	1.10		1.87	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thallium-208	**0.158**		0.0650	0.0670		0.0851	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-235	0.195	U	0.298	0.299		0.442	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-238	1.02	U	1.09	1.10		1.87	pCi/g	05/29/14 13:01	06/20/14 16:38	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:38*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-2

Date Collected: 05/23/14 09:11
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-67

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.582**		0.161	0.168	1.00	0.0981	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	**0.597**		0.159	0.167	1.00	0.0637	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	**0.475**		0.141	0.146	1.00	0.0506	pCi/g	05/29/14 12:52	06/05/14 20:49	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.2*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:49*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.474**		0.146	0.151	1.00	0.0669	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0136	U	0.0273	0.0273	1.00	0.0409	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.438**		0.138	0.143	1.00	0.0328	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.7*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.258	U	0.398	0.399		0.661	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Actinium 228	**0.472**		0.186	0.192		0.301	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Bismuth-212	0.175	U	0.631	0.631		1.12	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Bismuth-214	**0.588**		0.178	0.188		0.183	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Lead-210	**3.18**		1.83	1.86		2.32	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Lead-212	**0.561**		0.144	0.161		0.158	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Lead-214	**0.733**		0.171	0.187		0.160	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Potassium-40	**13.2**		1.67	2.15		0.709	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Protactinium-231	0.575	U	0.602	0.605		2.55	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Radium-226	**0.588**		0.178	0.188	1.00	0.183	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Radium-228	**0.472**		0.186	0.192		0.301	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Thorium-232	**0.472**		0.186	0.192		0.301	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Thorium-234	0.728	U	1.27	1.27		2.20	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Thallium-208	**0.273**		0.0863	0.0908		0.0791	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Uranium-235	0.0550	U	0.256	0.256		0.442	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Uranium-238	0.728	U	1.27	1.27		2.20	pCi/g	05/29/14 13:01	06/20/14 16:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:39*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-3

Lab Sample ID: 160-6793-68

Date Collected: 05/23/14 09:13
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.539		0.157	0.163	1.00	0.0967	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	0.547		0.153	0.160	1.00	0.0322	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.527		0.151	0.158	1.00	0.0634	pCi/g	05/29/14 12:52	06/05/14 20:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.5*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.531		0.154	0.160	1.00	0.0506	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0415		0.0479	0.0480	1.00	0.0415	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.348		0.126	0.129	1.00	0.0631	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.1*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0148	U	0.575	0.575		0.973	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Actinium 228	0.820		0.182	0.201		0.0800	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Bismuth-212	0.468	U	0.491	0.494		0.785	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Bismuth-214	0.585		0.122	0.137		0.114	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Lead-210	0.703	U	1.19	1.19		2.13	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Lead-212	0.554		0.103	0.126		0.124	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Lead-214	0.629		0.131	0.146		0.120	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Potassium-40	13.3		1.52	2.04		0.581	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Protactinium-231	-0.306	U	1.12	1.12		1.93	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Radium-226	0.585		0.122	0.137	1.00	0.114	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Radium-228	0.820		0.182	0.201		0.0800	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Thorium-232	0.820		0.182	0.201		0.0800	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Thorium-234	0.673	U	0.522	0.527		2.04	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Thallium-208	0.239		0.0592	0.0642		0.0495	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Uranium-235	0.134	U	0.175	0.176		0.383	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Uranium-238	0.673	U	0.522	0.527		2.04	pCi/g	05/29/14 13:01	06/20/14 17:13	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 17:13*	*1*

Client Sample ID: BMAC-SOIL-4

Lab Sample ID: 160-6793-69

Date Collected: 05/23/14 09:35

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.11**		0.233	0.251	1.00	0.102	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	**1.37**		0.255	0.280	1.00	0.0541	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	**0.749**		0.189	0.199	1.00	0.0539	pCi/g	05/29/14 12:52	06/05/14 20:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.8*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**1.12**		0.229	0.247	1.00	0.0350	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0118	U	0.0295	0.0296	1.00	0.0661	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**1.04**		0.220	0.236	1.00	0.0349	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.5*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0232	U	0.0994	0.0995		1.40	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Actinium 228	**1.55**		0.239	0.287		0.193	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Bismuth-212	**2.06**		0.657	0.691		0.459	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Bismuth-214	**1.20**		0.189	0.227		0.118	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Lead-210	1.58	U	1.63	1.64		2.18	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Lead-212	**1.28**		0.132	0.212		0.117	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Lead-214	**1.23**		0.160	0.205		0.128	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Potassium-40	**15.7**		1.88	2.48		0.668	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Protactinium-231	0.972	U	0.673	0.681		1.32	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Radium-226	**1.20**		0.189	0.227	1.00	0.118	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Radium-228	**1.55**		0.239	0.287		0.193	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Thorium-232	**1.55**		0.239	0.287		0.193	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Thorium-234	0.953	U	0.554	0.563		1.70	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Thallium-208	**0.397**		0.0826	0.0923		0.0606	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Uranium-235	0.103	U	0.173	0.173		0.408	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Uranium-238	0.953	U	0.554	0.563		1.70	pCi/g	05/29/14 13:01	06/20/14 16:50	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:50*	*1*

Client Sample ID: BMAC-SOIL-5

Lab Sample ID: 160-6793-70

Date Collected: 05/23/14 09:33

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.922		0.202	0.217	1.00	0.105	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	1.17		0.223	0.243	1.00	0.0645	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.724		0.175	0.185	1.00	0.0479	pCi/g	05/29/14 12:52	06/05/14 20:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.9*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.700		0.183	0.192	1.00	0.0670	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0586		0.0586	0.0588	1.00	0.0440	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.952		0.212	0.226	1.00	0.0353	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*82.8*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.00466	U	0.0886	0.0886		1.15	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Actinium 228	1.31		0.304	0.332		0.232	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Bismuth-212	2.18		0.760	0.794		0.559	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Bismuth-214	1.36		0.203	0.248		0.112	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Lead-210	2.77		1.64	1.67		2.55	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Lead-212	1.30		0.150	0.225		0.130	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Lead-214	1.39		0.202	0.248		0.191	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Potassium-40	16.4		2.01	2.62		0.633	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Protactinium-231	0.601	U	0.953	0.955		1.60	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Radium-226	1.36		0.203	0.248	1.00	0.112	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Radium-228	1.31		0.304	0.332		0.232	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Thorium-232	1.31		0.304	0.332		0.232	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Thorium-234	1.03	U	0.799	0.806		2.51	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Thallium-208	0.475		0.106	0.116		0.0730	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Uranium-235	0.248	U	0.330	0.331		0.549	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Uranium-238	1.03	U	0.799	0.806		2.51	pCi/g	05/29/14 13:01	06/20/14 16:49	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:49*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-6

Date Collected: 05/23/14 09:39
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-71

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.16**		0.242	0.261	1.00	0.118	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	**1.10**		0.232	0.250	1.00	0.0552	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	**1.05**		0.225	0.242	1.00	0.0627	pCi/g	05/29/14 12:52	06/05/14 20:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.0*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.904**		0.201	0.215	1.00	0.0335	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0278	U	0.0393	0.0394	1.00	0.0417	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.686**		0.176	0.185	1.00	0.0579	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*87.3*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0105	U	0.0168	0.0169		0.598	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Actinium 228	**1.01**		0.264	0.284		0.284	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-212	0.482	U	0.671	0.673		1.12	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-214	**1.28**		0.209	0.247		0.142	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-210	0.901	U	1.60	1.60		2.79	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-212	**1.15**		0.153	0.214		0.153	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-214	**1.40**		0.180	0.231		0.152	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Potassium-40	**15.6**		1.97	2.54		0.790	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Protactinium-231	0.678	U	0.683	0.687		2.35	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-226	**1.28**		0.209	0.247	1.00	0.142	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-228	**1.01**		0.264	0.284		0.284	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-232	**1.01**		0.264	0.284		0.284	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-234	1.40	U	0.628	0.645		1.94	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thallium-208	**0.393**		0.101	0.109		0.0902	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-235	0.0904	U	0.336	0.336		0.541	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-238	1.40	U	0.628	0.645		1.94	pCi/g	05/29/14 13:01	06/20/14 16:45	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:45*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-7

Date Collected: 05/23/14 08:41
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-72

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.579**		0.158	0.166	1.00	0.0902	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	**0.583**		0.155	0.163	1.00	0.0468	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	**0.427**		0.133	0.137	1.00	0.0465	pCi/g	05/29/14 12:52	06/05/14 20:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.7*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.480**		0.144	0.149	1.00	0.0601	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	-0.00247	U	0.00493	0.00494	1.00	0.0599	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.327**		0.117	0.121	1.00	0.0317	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.4*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0220	U	0.0256	0.0257		0.687	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Actinium 228	**0.786**		0.200	0.216		0.132	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-212	0.0521	U	0.656	0.656		1.22	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-214	**0.819**		0.187	0.206		0.145	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-210	1.91	U	1.89	1.91		2.47	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-212	**0.647**		0.173	0.192		0.173	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-214	**0.960**		0.173	0.200		0.100	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Potassium-40	**14.0**		2.05	2.50		0.822	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Protactinium-231	0.463	U	0.728	0.730		2.01	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-226	**0.819**		0.187	0.206	1.00	0.145	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-228	**0.786**		0.200	0.216		0.132	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-232	**0.786**		0.200	0.216		0.132	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-234	0.645	U	0.619	0.623		2.16	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thallium-208	**0.289**		0.0876	0.0926		0.0658	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-235	0.0640	U	0.162	0.162		0.490	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-238	0.645	U	0.619	0.623		2.16	pCi/g	05/29/14 13:01	06/20/14 16:45	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:45*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-8

Lab Sample ID: 160-6793-73

Date Collected: 05/23/14 08:38
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.473**		0.143	0.148	1.00	0.0323	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	**0.587**		0.160	0.167	1.00	0.0559	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	**0.426**		0.135	0.140	1.00	0.0321	pCi/g	05/29/14 12:52	06/05/14 20:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.6*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.332**		0.118	0.121	1.00	0.0476	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.000	U	0.00487	0.00487	1.00	0.0390	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	**0.498**		0.145	0.150	1.00	0.0475	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*92.3*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.436	U	0.405	0.409		0.659	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Actinium 228	**0.501**		0.149	0.158		0.193	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-212	0.235	U	0.524	0.525		0.905	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-214	**0.701**		0.152	0.168		0.128	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-210	1.15	U	1.19	1.20		1.94	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-212	**0.609**		0.0980	0.126		0.100	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-214	**0.642**		0.115	0.133		0.110	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Potassium-40	**14.7**		1.59	2.19		0.678	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Protactinium-231	0.437	U	0.785	0.786		1.64	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-226	**0.701**		0.152	0.168	1.00	0.128	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-228	**0.501**		0.149	0.158		0.193	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-232	**0.501**		0.149	0.158		0.193	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-234	0.593	U	0.478	0.482		1.68	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thallium-208	**0.231**		0.0538	0.0589		0.0303	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-235	0.0766	U	0.249	0.249		0.424	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-238	0.593	U	0.478	0.482		1.68	pCi/g	05/29/14 13:01	06/20/14 17:11	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 17:11*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-9

Date Collected: 05/23/14 07:47
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-74

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.514**		0.160	0.166	1.00	0.0985	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.726**		0.185	0.195	1.00	0.0533	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.653**		0.175	0.184	1.00	0.0533	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.0*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.370**		0.146	0.149	1.00	0.0796	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0174	U	0.0348	0.0349	1.00	0.0523	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.467**		0.163	0.168	1.00	0.0795	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*69.0*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.183	U	0.217	0.219		0.370	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Actinium 228	**0.734**		0.206	0.219		0.114	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-212	0.836	U	0.722	0.727		1.12	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-214	**0.771**		0.169	0.187		0.147	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-210	0.278	U	1.57	1.57		2.94	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-212	**0.649**		0.131	0.156		0.155	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-214	**0.649**		0.145	0.160		0.189	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Potassium-40	**13.4**		1.81	2.27		0.677	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Protactinium-231	0.355	U	0.797	0.798		1.40	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-226	**0.771**		0.169	0.187	1.00	0.147	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-228	**0.734**		0.206	0.219		0.114	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-232	**0.734**		0.206	0.219		0.114	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-234	0.948	U	1.27	1.27		1.97	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thallium-208	**0.265**		0.0712	0.0763		0.0688	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-235	0.0828	U	0.264	0.264		0.465	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-238	0.948	U	1.27	1.27		1.97	pCi/g	05/29/14 13:01	06/20/14 17:11	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 17:11*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-10

Lab Sample ID: 160-6793-75

Date Collected: 05/23/14 08:26
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.05**		0.224	0.241	1.00	0.0951	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**1.24**		0.241	0.262	1.00	0.0609	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.881**		0.203	0.216	1.00	0.0529	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.2*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.798**		0.200	0.211	1.00	0.0837	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	-0.00287	U	0.00574	0.00575	1.00	0.0697	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.882**		0.208	0.221	1.00	0.0559	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*79.7*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.506	U	0.738	0.741		1.22	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Actinium 228	**1.79**		0.312	0.362		0.296	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Bismuth-212	**1.67**		0.885	0.902		1.24	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Bismuth-214	**1.45**		0.235	0.279		0.176	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Lead-210	1.46	U	1.90	1.91		3.30	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Lead-212	**1.47**		0.179	0.261		0.174	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Lead-214	**1.52**		0.201	0.256		0.207	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Potassium-40	**18.6**		2.18	2.90		1.03	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Protactinium-231	1.24	U	1.24	1.24		2.30	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Radium-226	**1.45**		0.235	0.279	1.00	0.176	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Radium-228	**1.79**		0.312	0.362		0.296	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Thorium-232	**1.79**		0.312	0.362		0.296	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Thorium-234	1.20	U	0.735	0.745		2.23	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Thallium-208	**0.563**		0.114	0.128		0.0914	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Uranium-235	0.297	U	0.385	0.386		0.635	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Uranium-238	1.20	U	0.735	0.745		2.23	pCi/g	05/29/14 13:01	06/20/14 17:12	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 17:12*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-11

Date Collected: 05/23/14 07:43
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-76

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.633**		0.173	0.181	1.00	0.0785	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.566**		0.162	0.168	1.00	0.0346	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.666**		0.175	0.184	1.00	0.0345	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.8*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.364**		0.138	0.142	1.00	0.0729	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0289	U	0.0455	0.0456	1.00	0.0726	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.318**		0.131	0.134	1.00	0.0870	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*73.7*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0798	U	0.248	0.249		0.358	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Actinium 228	**0.652**		0.184	0.196		0.181	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Bismuth-212	0.429	U	0.519	0.521		0.849	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Bismuth-214	**0.602**		0.160	0.172		0.149	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Lead-210	0.612	U	1.17	1.17		2.09	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Lead-212	**0.510**		0.0920	0.113		0.103	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Lead-214	**0.686**		0.112	0.133		0.121	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Potassium-40	**13.4**		1.53	2.05		0.710	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Protactinium-231	0.775	U	0.650	0.655		1.39	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Radium-226	**0.602**		0.160	0.172	1.00	0.149	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Radium-228	**0.652**		0.184	0.196		0.181	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Thorium-232	**0.652**		0.184	0.196		0.181	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Thorium-234	1.09	U	1.04	1.04		1.46	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Thallium-208	**0.229**		0.0573	0.0621		0.0504	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Uranium-235	0.174	U	0.204	0.204		0.327	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Uranium-238	1.09	U	1.04	1.04		1.46	pCi/g	05/29/14 13:15	06/20/14 10:52	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:15*	*06/20/14 10:52*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-12

Date Collected: 05/23/14 08:21
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-77

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.21**		0.240	0.260	1.00	0.0799	pCi/g	05/29/14 13:01	06/10/14 15:24	1
Thorium-230	**1.36**		0.253	0.277	1.00	0.0535	pCi/g	05/29/14 13:01	06/10/14 15:24	1
Thorium-232	**1.17**		0.234	0.254	1.00	0.0532	pCi/g	05/29/14 13:01	06/10/14 15:24	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.7*		*30 - 110*	*05/29/14 13:01*	*06/10/14 15:24*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.988**		0.215	0.231	1.00	0.0708	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0234	U	0.0415	0.0416	1.00	0.0750	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**1.11**		0.227	0.245	1.00	0.0601	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*80.5*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	**0.499**		0.289	0.296		0.437	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Actinium 228	**1.35**		0.311	0.340		0.223	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-212	0.554	U	0.662	0.665		1.08	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-214	**1.58**		0.213	0.269		0.142	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-210	2.08	U	1.71	1.72		2.44	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-212	**1.18**		0.156	0.219		0.173	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-214	**1.46**		0.207	0.256		0.183	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Potassium-40	**16.6**		1.81	2.48		0.665	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Protactinium-231	0.623	U	0.869	0.871		2.38	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-226	**1.58**		0.213	0.269	1.00	0.142	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-228	**1.35**		0.311	0.340		0.223	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-232	**1.35**		0.311	0.340		0.223	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-234	0.956	U	0.858	0.864		2.82	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thallium-208	**0.550**		0.111	0.125		0.0926	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-235	0.126	U	0.309	0.310		0.553	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-238	0.956	U	0.858	0.864		2.82	pCi/g	05/29/14 13:16	06/20/14 10:53	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:16*	*06/20/14 10:53*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-13

Date Collected: 05/23/14 08:29
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-78

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.47**		0.257	0.286	1.00	0.103	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**1.77**		0.279	0.316	1.00	0.0568	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**1.65**		0.269	0.303	1.00	0.0704	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.3*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**1.46**		0.251	0.280	1.00	0.0490	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0511	U	0.0538	0.0540	1.00	0.0610	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**1.74**		0.274	0.311	1.00	0.0656	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.5*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.114	U	0.220	0.220		1.70	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Actinium 228	**1.23**		0.265	0.293		0.111	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-212	**1.50**		0.736	0.753		0.789	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-214	**1.22**		0.218	0.252		0.173	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-210	0.500	U	1.68	1.69		2.53	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-212	**1.35**		0.161	0.238		0.154	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-214	**1.52**		0.193	0.249		0.182	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Potassium-40	**20.0**		2.21	3.02		0.773	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Protactinium-231	1.09	U	0.728	0.737		2.69	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-226	**1.22**		0.218	0.252	1.00	0.173	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-228	**1.23**		0.265	0.293		0.111	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-232	**1.23**		0.265	0.293		0.111	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-234	1.15	U	0.721	0.731		2.50	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thallium-208	**0.494**		0.0990	0.111		0.0712	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-235	0.261	U	0.335	0.336		0.549	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-238	1.15	U	0.721	0.731		2.50	pCi/g	05/29/14 13:16	06/20/14 10:53	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:16*	*06/20/14 10:53*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-14

Lab Sample ID: 160-6793-79

Date Collected: 05/23/14 08:17
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.25**		0.237	0.259	1.00	0.0944	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**1.35**		0.244	0.269	1.00	0.0572	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**1.06**		0.216	0.233	1.00	0.0498	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.7*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**1.34**		0.249	0.273	1.00	0.0737	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0372	U	0.0497	0.0498	1.00	0.0736	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**1.00**		0.215	0.231	1.00	0.0735	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.4*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	**0.703**		0.204	0.224		0.105	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Actinium 228	**1.41**		0.289	0.323		0.305	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Bismuth-212	0.687	U	0.854	0.857		1.40	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Bismuth-214	**1.71**		0.236	0.295		0.114	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Lead-210	1.92	U	2.47	2.48		3.22	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Lead-212	**1.37**		0.184	0.256		0.191	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Lead-214	**1.59**		0.215	0.271		0.177	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Potassium-40	**19.1**		2.39	3.09		0.828	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Protactinium-231	0.888	U	0.774	0.780		2.97	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Radium-226	**1.71**		0.236	0.295	1.00	0.114	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Radium-228	**1.41**		0.289	0.323		0.305	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Thorium-232	**1.41**		0.289	0.323		0.305	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Thorium-234	1.34	U	0.879	0.890		2.96	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Thallium-208	**0.555**		0.105	0.120		0.0519	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Uranium-235	0.159	U	0.408	0.409		0.689	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Uranium-238	1.34	U	0.879	0.890		2.96	pCi/g	05/29/14 13:16	06/20/14 10:54	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:16*	*06/20/14 10:54*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-15

Lab Sample ID: 160-6793-80

Date Collected: 05/23/14 10:08
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.925		0.215	0.228	1.00	0.101	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	1.02		0.224	0.240	1.00	0.0924	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.728		0.188	0.197	1.00	0.0616	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.2*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.409		0.139	0.143	1.00	0.0775	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0426		0.0491	0.0493	1.00	0.0426	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.774		0.188	0.199	1.00	0.0341	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*82.0*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.634	U	0.598	0.604		0.972	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Actinium 228	1.35		0.266	0.299		0.147	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-212	0.591	U	0.761	0.764		1.25	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-214	1.28		0.226	0.262		0.127	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-210	3.04		1.69	1.73		2.25	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-212	1.11		0.155	0.211		0.138	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-214	1.28		0.222	0.259		0.151	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Potassium-40	14.1		2.16	2.60		0.613	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Protactinium-231	0.497	U	0.889	0.890		2.27	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-226	1.28		0.226	0.262	1.00	0.127	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-228	1.35		0.266	0.299		0.147	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-232	1.35		0.266	0.299		0.147	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-234	1.21	U	1.36	1.37		2.32	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thallium-208	0.416		0.0971	0.106		0.0563	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-235	0.195	U	0.284	0.284		0.417	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-238	1.21	U	1.36	1.37		2.32	pCi/g	05/29/14 13:06	06/20/14 11:49	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:49*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-16

Date Collected: 05/23/14 11:05
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-81

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.785**		0.190	0.201	1.00	0.0692	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.985**		0.213	0.229	1.00	0.0772	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.808**		0.192	0.203	1.00	0.0586	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.4*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.555**		0.157	0.164	1.00	0.0703	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0380	U	0.0471	0.0472	1.00	0.0616	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.647**		0.168	0.177	1.00	0.0563	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.4*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0467	U	0.208	0.208		1.14	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Actinium 228	**0.673**		0.250	0.259		0.164	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Bismuth-212	0.154	U	0.710	0.710		1.31	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Bismuth-214	**1.02**		0.257	0.278		0.177	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-210	**3.25**		1.71	1.75		2.05	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-212	**0.778**		0.150	0.181		0.139	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-214	**0.996**		0.192	0.218		0.144	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Potassium-40	**13.1**		2.20	2.57		0.945	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Protactinium-231	0.0853	U	0.945	0.945		1.78	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Radium-226	**1.02**		0.257	0.278	1.00	0.177	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Radium-228	**0.673**		0.250	0.259		0.164	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thorium-232	**0.673**		0.250	0.259		0.164	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thorium-234	2.07	U	0.843	0.870		2.17	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thallium-208	**0.274**		0.106	0.109		0.0936	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Uranium-235	0.189	U	0.334	0.335		0.582	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Uranium-238	2.07	U	0.843	0.870		2.17	pCi/g	05/29/14 13:06	06/20/14 11:51	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:51*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-17

Date Collected: 05/23/14 11:00
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-82

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.787**		0.194	0.205	1.00	0.0914	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**1.02**		0.218	0.235	1.00	0.0658	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.732**		0.184	0.194	1.00	0.0598	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.5*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.739**		0.185	0.195	1.00	0.0652	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0232	U	0.0411	0.0411	1.00	0.0741	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.629**		0.170	0.178	1.00	0.0343	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.6*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0880	U	0.109	0.109		0.567	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Actinium 228	**0.948**		0.221	0.241		0.124	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Bismuth-212	0.799	U	0.750	0.754		1.17	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Bismuth-214	**0.761**		0.229	0.243		0.229	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Lead-210	2.17	U	1.80	1.82		2.80	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Lead-212	**0.922**		0.222	0.252		0.221	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Lead-214	**1.04**		0.179	0.209		0.142	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Potassium-40	**14.1**		1.94	2.42		0.741	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Protactinium-231	0.186	U	0.184	0.185		3.15	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Radium-226	**0.761**		0.229	0.243	1.00	0.229	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Radium-228	**0.948**		0.221	0.241		0.124	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Thorium-232	**0.948**		0.221	0.241		0.124	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Thorium-234	1.56	U	1.51	1.51		2.14	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Thallium-208	**0.369**		0.107	0.114		0.102	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Uranium-235	-0.104	U	3.91	3.91		0.597	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Uranium-238	1.56	U	1.51	1.51		2.14	pCi/g	05/29/14 13:06	06/20/14 11:46	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:46*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-18

Date Collected: 05/23/14 11:08
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-83

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.612**		0.160	0.168	1.00	0.100	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.855**		0.183	0.197	1.00	0.0507	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.517**		0.143	0.149	1.00	0.0592	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*98.7*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.602**		0.167	0.174	1.00	0.0595	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0374	U	0.0499	0.0500	1.00	0.0740	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.521**		0.155	0.161	1.00	0.0593	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.7*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.176	U	0.232	0.233		0.322	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Actinium 228	**1.29**		0.242	0.275		0.194	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Bismuth-212	**1.23**		0.574	0.588		0.500	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Bismuth-214	**0.983**		0.199	0.224		0.166	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Lead-210	1.61	U	1.76	1.77		2.54	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Lead-212	**0.973**		0.138	0.187		0.129	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Lead-214	**1.05**		0.156	0.190		0.160	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Potassium-40	**13.8**		1.84	2.32		0.986	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Protactinium-231	0.910	U	0.973	0.978		2.18	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Radium-226	**0.983**		0.199	0.224	1.00	0.166	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Radium-228	**1.29**		0.242	0.275		0.194	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Thorium-232	**1.29**		0.242	0.275		0.194	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Thorium-234	0.454	U	0.588	0.590		2.65	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Thallium-208	**0.215**		0.0723	0.0756		0.0922	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Uranium-235	0.305	U	0.263	0.265		0.454	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Uranium-238	0.454	U	0.588	0.590		2.65	pCi/g	05/29/14 13:06	06/20/14 11:47	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:47*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-19

Date Collected: 05/23/14 09:34
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-84

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.658**		0.177	0.185	1.00	0.0878	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.690**		0.181	0.190	1.00	0.0908	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.761**		0.188	0.199	1.00	0.0740	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.3*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.519**		0.161	0.167	1.00	0.0823	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0301	U	0.0426	0.0427	1.00	0.0452	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.531**		0.160	0.166	1.00	0.0362	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*80.4*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.137	U	0.212	0.212		0.431	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Actinium 228	**1.11**		0.298	0.319		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Bismuth-212	0.304	U	0.666	0.667		1.16	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Bismuth-214	**0.766**		0.186	0.202		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-210	**3.74**		2.07	2.11		2.72	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-212	**0.725**		0.145	0.173		0.179	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-214	**0.853**		0.155	0.178		0.166	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Potassium-40	**11.8**		1.88	2.23		1.12	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Protactinium-231	0.676	U	0.552	0.557		2.28	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-226	**0.766**		0.186	0.202	1.00	0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-228	**1.11**		0.298	0.319		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thorium-232	**1.11**		0.298	0.319		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thorium-234	1.08	U	1.40	1.41		2.42	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thallium-208	**0.298**		0.0774	0.0833		0.0689	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-235	0.176	U	0.286	0.287		0.566	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-238	1.08	U	1.40	1.41		2.42	pCi/g	05/29/14 13:06	06/20/14 11:48	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:48*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-20

Lab Sample ID: 160-6793-85

Date Collected: 05/23/14 09:32
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.730**		0.187	0.197	1.00	0.0828	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.633**		0.173	0.181	1.00	0.0712	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.764**		0.189	0.199	1.00	0.0528	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.6*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.528**		0.152	0.159	1.00	0.0696	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0134	U	0.0268	0.0268	1.00	0.0402	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.569**		0.156	0.163	1.00	0.0322	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.3*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0631	U	0.264	0.264		1.48	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Actinium 228	**0.877**		0.273	0.287		0.194	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Bismuth-212	0.337	U	0.638	0.639		1.10	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Bismuth-214	**0.847**		0.183	0.203		0.142	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-210	0.852	U	1.78	1.78		2.69	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-212	**0.857**		0.136	0.175		0.132	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-214	**0.786**		0.168	0.187		0.147	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Potassium-40	**12.3**		1.87	2.26		0.891	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Protactinium-231	0.226	U	0.354	0.355		2.01	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-226	**0.847**		0.183	0.203	1.00	0.142	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-228	**0.877**		0.273	0.287		0.194	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thorium-232	**0.877**		0.273	0.287		0.194	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thorium-234	1.15	U	0.720	0.730		2.19	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thallium-208	**0.314**		0.0817	0.0880		0.0663	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-235	0.154	U	0.222	0.223		0.399	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-238	1.15	U	0.720	0.730		2.19	pCi/g	05/29/14 13:06	06/20/14 11:48	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:48*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-21

Date Collected: 05/23/14 09:03
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-86

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.636**		0.163	0.172	1.00	0.0944	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.641**		0.160	0.169	1.00	0.0638	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.487**		0.139	0.145	1.00	0.0509	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.4*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.611**		0.175	0.182	1.00	0.0703	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0125	U	0.0313	0.0313	1.00	0.0700	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.464**		0.152	0.157	1.00	0.0641	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.9*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.689	U	0.687	0.693		1.12	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Actinium 228	**0.779**		0.294	0.304		0.327	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-212	0.241	U	0.871	0.872		1.55	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-214	**0.883**		0.187	0.208		0.131	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-210	-0.257	U	2.55	2.55		3.28	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-212	**0.792**		0.162	0.191		0.163	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-214	**0.948**		0.182	0.207		0.140	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Potassium-40	**14.0**		2.38	2.78		1.36	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Protactinium-231	0.442	U	1.06	1.06		2.01	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-226	**0.883**		0.187	0.208	1.00	0.131	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-228	**0.779**		0.294	0.304		0.327	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-232	**0.779**		0.294	0.304		0.327	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-234	0.719	U	0.867	0.870		2.66	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thallium-208	**0.319**		0.0886	0.0945		0.0567	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-235	0.198	U	0.255	0.256		0.536	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-238	0.719	U	0.867	0.870		2.66	pCi/g	05/29/14 13:06	06/20/14 11:49	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:49*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-22

Lab Sample ID: 160-6793-87

Date Collected: 05/23/14 09:12
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.718**		0.174	0.185	1.00	0.0762	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.844**		0.187	0.200	1.00	0.0537	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**0.650**		0.165	0.174	1.00	0.0628	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.7*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.717**		0.190	0.199	1.00	0.0646	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.00968	U	0.0320	0.0320	1.00	0.0804	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.726**		0.191	0.200	1.00	0.0706	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*78.9*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0389	U	1.26	1.26		2.15	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Actinium 228	**0.718**		0.315	0.323		0.343	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Bismuth-212	0.902	U	1.32	1.32		2.21	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Bismuth-214	**0.966**		0.259	0.278		0.191	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Lead-210	2.79	U	2.41	2.43		3.49	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Lead-212	**0.899**		0.197	0.228		0.199	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Lead-214	**0.758**		0.271	0.283		0.274	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Potassium-40	**11.2**		2.71	2.95		1.77	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Protactinium-231	0.692	U	0.644	0.648		3.67	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Radium-226	**0.966**		0.259	0.278	1.00	0.191	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Radium-228	**0.718**		0.315	0.323		0.343	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Thorium-232	**0.718**		0.315	0.323		0.343	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Thorium-234	0.864	U	0.892	0.896		2.91	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Thallium-208	**0.271**		0.107	0.110		0.101	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Uranium-235	0.288	U	0.340	0.341		0.667	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Uranium-238	0.864	U	0.892	0.896		2.91	pCi/g	05/29/14 13:06	06/20/14 12:53	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:53*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-23

Lab Sample ID: 160-6793-88

Date Collected: 05/23/14 09:07
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.874**		0.209	0.221	1.00	0.0866	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	**0.881**		0.207	0.220	1.00	0.0366	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	**1.16**		0.237	0.256	1.00	0.0364	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*74.9*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.677**		0.177	0.186	1.00	0.0600	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0144	U	0.0287	0.0288	1.00	0.0431	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.562**		0.161	0.168	1.00	0.0525	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.2*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0163	U	0.692	0.692		1.17	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Actinium 228	**0.429**		0.232	0.236		0.308	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-212	0.585	U	0.622	0.625		0.993	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-214	**0.869**		0.169	0.191		0.112	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-210	0.637	U	1.30	1.30		2.01	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-212	**0.703**		0.111	0.144		0.109	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-214	**0.994**		0.144	0.177		0.106	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Potassium-40	**12.0**		1.85	2.22		0.799	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Protactinium-231	0.634	U	0.825	0.828		1.79	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-226	**0.869**		0.169	0.191	1.00	0.112	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-228	**0.429**		0.232	0.236		0.308	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-232	**0.429**		0.232	0.236		0.308	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-234	0.603	U	0.584	0.587		1.85	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thallium-208	**0.280**		0.0676	0.0735		0.0386	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-235	0.127	U	0.204	0.205		0.351	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-238	0.603	U	0.584	0.587		1.85	pCi/g	05/29/14 13:06	06/20/14 12:52	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:52*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-24

Date Collected: 05/23/14 09:25
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-89

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.189**		0.101	0.103	1.00	0.0904	pCi/g	05/29/14 13:01	06/12/14 16:28	1
Thorium-230	**0.170**		0.106	0.107	1.00	0.125	pCi/g	05/29/14 13:01	06/12/14 16:28	1
Thorium-232	0.111	U	0.0900	0.0905	1.00	0.122	pCi/g	05/29/14 13:01	06/12/14 16:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*77.9*		*30 - 110*	*05/29/14 13:01*	*06/12/14 16:28*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.133**		0.0872	0.0879	1.00	0.0885	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.000	U	0.00581	0.00581	1.00	0.0465	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.140**		0.0866	0.0874	1.00	0.0759	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*76.0*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.000	U	0.417	0.417		1.29	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Actinium 228	0.0546	U	0.169	0.169		1.21	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-212	-0.00632	U	1.72	1.72		3.43	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-214	0.208	U	0.327	0.328		0.574	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-210	**7.79**		4.75	4.84		5.12	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-212	-0.0214	U	0.271	0.271		0.380	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-214	0.127	U	0.296	0.296		0.518	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Potassium-40	-0.793	U	31.7	31.7		3.01	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Protactinium-231	1.27	U	1.72	1.72		3.44	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-226	0.208	U	0.327	0.328	1.00	0.574	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-228	0.0546	U	0.169	0.169		1.21	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-232	0.0546	U	0.169	0.169		1.21	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-234	2.43	U	3.07	3.08		5.17	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thallium-208	0.0596	U	0.138	0.138		0.123	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-235	-0.205	U	8.21	8.21		1.54	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-238	2.43	U	3.07	3.08		5.17	pCi/g	05/29/14 13:06	06/20/14 12:52	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:52*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-25

Lab Sample ID: 160-6793-90

Date Collected: 05/23/14 09:18
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0655	U	0.0599	0.0601	1.00	0.0795	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-230	**0.179**		0.0883	0.0896	1.00	0.0634	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-232	**0.0799**		0.0586	0.0590	1.00	0.0502	pCi/g	05/29/14 13:01	06/09/14 17:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.5*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:51*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.103**		0.0722	0.0728	1.00	0.0733	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.000	U	0.00528	0.00528	1.00	0.0423	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.0862**		0.0642	0.0646	1.00	0.0587	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.0*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.00706	U	0.0142	0.0142		1.29	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Actinium 228	0.0865	U	0.272	0.272		0.945	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-212	0.00838	U	1.24	1.24		2.52	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-214	0.00541	U	0.0554	0.0554		0.639	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-210	3.68	U	6.39	6.40		9.77	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-212	0.0595	U	0.214	0.214		0.411	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-214	-0.0318	U	0.213	0.213		0.581	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Potassium-40	1.44	U	2.28	2.29		4.12	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Protactinium-231	0.299	U	1.41	1.41		5.32	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-226	0.00541	U	0.0554	0.0554	1.00	0.639	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-228	0.0865	U	0.272	0.272		0.945	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-232	0.0865	U	0.272	0.272		0.945	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-234	**5.14**		3.06	3.11		4.80	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thallium-208	-0.114	U	4.55	4.55		0.367	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-235	0.0467	U	0.0677	0.0679		1.19	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-238	**5.14**		3.06	3.11		4.80	pCi/g	05/29/14 13:06	06/20/14 12:49	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:49*	*1*

Client Sample ID: BMAC-SOIL-26

Lab Sample ID: 160-6793-91

Date Collected: 05/23/14 08:40

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.675**		0.176	0.185	1.00	0.0645	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-230	**0.563**		0.161	0.167	1.00	0.0590	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-232	**0.467**		0.146	0.151	1.00	0.0514	pCi/g	05/29/14 13:01	06/09/14 17:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.7*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:51*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.522**		0.152	0.159	1.00	0.0333	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0276	U	0.0391	0.0392	1.00	0.0415	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.482**		0.147	0.153	1.00	0.0631	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.3*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.623	U	0.577	0.582		0.938	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Actinium 228	**0.798**		0.183	0.200		0.327	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Bismuth-212	0.287	U	0.571	0.571		0.985	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Bismuth-214	**0.686**		0.159	0.174		0.150	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Lead-210	**2.56**		1.70	1.73		2.30	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Lead-212	**0.701**		0.120	0.150		0.128	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Lead-214	**0.690**		0.138	0.155		0.145	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Potassium-40	**11.1**		1.63	1.98		1.03	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Protactinium-231	0.279	U	0.682	0.683		2.03	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Radium-226	**0.686**		0.159	0.174	1.00	0.150	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Radium-228	**0.798**		0.183	0.200		0.327	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Thorium-232	**0.798**		0.183	0.200		0.327	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Thorium-234	0.728	U	0.595	0.599		1.91	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Thallium-208	**0.212**		0.0734	0.0766		0.0815	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Uranium-235	0.0596	U	0.248	0.248		0.429	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Uranium-238	0.728	U	0.595	0.599		1.91	pCi/g	05/29/14 13:06	06/20/14 12:50	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:50*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-27

Lab Sample ID: 160-6793-92

Date Collected: 05/23/14 08:35
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.518**		0.157	0.163	1.00	0.0985	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-230	**0.703**		0.179	0.189	1.00	0.0761	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-232	**0.717**		0.180	0.189	1.00	0.0633	pCi/g	05/29/14 13:01	06/09/14 17:51	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.2*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:51*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.423**		0.138	0.142	1.00	0.0509	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0530	U	0.0559	0.0561	1.00	0.0633	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	**0.589**		0.163	0.170	1.00	0.0508	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.1*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:53*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.381	U	0.505	0.507		0.834	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Actinium 228	**0.957**		0.208	0.230		0.0980	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Bismuth-212	0.174	U	0.551	0.551		0.979	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Bismuth-214	**0.909**		0.185	0.208		0.153	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Lead-210	0.977	U	1.76	1.77		2.57	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Lead-212	**0.785**		0.149	0.180		0.145	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Lead-214	**0.871**		0.156	0.181		0.183	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Potassium-40	**14.6**		1.76	2.31		0.711	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Protactinium-231	0.420	U	0.428	0.431		2.16	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Radium-226	**0.909**		0.185	0.208	1.00	0.153	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Radium-228	**0.957**		0.208	0.230		0.0980	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Thorium-232	**0.957**		0.208	0.230		0.0980	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Thorium-234	1.14	U	1.34	1.35		2.28	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Thallium-208	**0.240**		0.0747	0.0788		0.0743	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Uranium-235	0.0527	U	0.246	0.246		0.386	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Uranium-238	1.14	U	1.34	1.35		2.28	pCi/g	05/29/14 13:06	06/20/14 12:51	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:51*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-28

Date Collected: 05/23/14 08:32
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-93

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.622**		0.148	0.157	1.00	0.0668	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-230	**0.714**		0.156	0.167	1.00	0.0283	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-232	**0.588**		0.142	0.150	1.00	0.0474	pCi/g	05/29/14 13:04	06/12/14 16:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.5*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:33*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.392**		0.154	0.157	1.00	0.144	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0379	U	0.0547	0.0548	1.00	0.0883	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.618**		0.182	0.190	1.00	0.119	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.2*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0157	U	0.0714	0.0714		0.322	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Actinium 228	**0.846**		0.223	0.239		0.113	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Bismuth-212	0.406	U	0.652	0.654		1.10	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Bismuth-214	**0.742**		0.157	0.175		0.122	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Lead-210	0.00836	U	1.15	1.15		2.18	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Lead-212	**0.694**		0.138	0.164		0.142	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Lead-214	**0.916**		0.169	0.194		0.117	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Potassium-40	**15.1**		1.94	2.48		0.788	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Protactinium-231	0.188	U	0.259	0.260		2.04	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Radium-226	**0.742**		0.157	0.175	1.00	0.122	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Radium-228	**0.846**		0.223	0.239		0.113	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Thorium-232	**0.846**		0.223	0.239		0.113	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Thorium-234	0.432	U	0.367	0.370		2.20	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Thallium-208	**0.303**		0.0765	0.0827		0.0601	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Uranium-235	0.125	U	0.228	0.229		0.430	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Uranium-238	0.432	U	0.367	0.370		2.20	pCi/g	05/29/14 13:06	06/20/14 12:48	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:48*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-SOIL-29

Date Collected: 05/23/14 08:25
Date Received: 05/23/14 13:40

Lab Sample ID: 160-6793-94

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.684**		0.149	0.160	1.00	0.0749	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**0.706**		0.149	0.160	1.00	0.0436	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.603**		0.137	0.146	1.00	0.0375	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.7*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.423**		0.140	0.144	1.00	0.0946	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	-0.00752	U	0.00868	0.00870	1.00	0.0760	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.513**		0.150	0.156	1.00	0.0729	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*86.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.490	U	0.620	0.624		1.02	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Actinium 228	**0.635**		0.215	0.224		0.134	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-212	0.229	U	0.679	0.680		1.21	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-214	**0.783**		0.179	0.196		0.141	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-210	1.36	U	1.56	1.56		2.27	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-212	**0.733**		0.155	0.182		0.157	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-214	**0.834**		0.181	0.201		0.151	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Potassium-40	**12.6**		2.04	2.41		1.34	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Protactinium-231	0.573	U	0.757	0.759		2.22	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-226	**0.783**		0.179	0.196	1.00	0.141	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-228	**0.635**		0.215	0.224		0.134	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-232	**0.635**		0.215	0.224		0.134	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-234	0.196	U	0.603	0.603		2.47	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thallium-208	**0.243**		0.0768	0.0808		0.0605	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-235	0.285	U	0.311	0.313		0.474	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-238	0.196	U	0.603	0.603		2.47	pCi/g	05/29/14 13:06	06/20/14 12:49	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 12:49*	*1*

Client Sample ID: BMAC-SOIL-30

Lab Sample ID: 160-6793-95

Date Collected: 05/23/14 08:15

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.644**		0.146	0.156	1.00	0.0746	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**0.851**		0.166	0.181	1.00	0.0626	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.530**		0.130	0.138	1.00	0.0437	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.9*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.492**		0.147	0.153	1.00	0.0783	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.000	U	0.00494	0.00494	1.00	0.0395	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.529**		0.151	0.158	1.00	0.0684	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*87.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0804	U	0.213	0.213		1.02	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Actinium 228	0.556	U	0.313	0.318		0.618	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-212	0.477	U	1.16	1.17		2.06	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-214	**0.803**		0.298	0.310		0.299	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-210	2.57	U	2.79	2.81		3.70	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-212	**0.681**		0.231	0.247		0.254	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-214	**0.937**		0.204	0.226		0.119	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Potassium-40	**10.9**		2.50	2.74		1.08	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Protactinium-231	0.162	U	1.19	1.19		2.44	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-226	**0.803**		0.298	0.310	1.00	0.299	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-228	0.556	U	0.313	0.318		0.618	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-232	0.556	U	0.313	0.318		0.618	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-234	0.871	U	0.909	0.913		3.31	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thallium-208	**0.330**		0.107	0.113		0.0944	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-235	0.204	U	0.358	0.359		0.606	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-238	0.871	U	0.909	0.913		3.31	pCi/g	05/29/14 13:06	06/20/14 13:59	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 13:59*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-2

Lab Sample ID: 160-6793-96

Date Collected: 05/23/14 12:24
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.815**		0.156	0.170	1.00	0.0490	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**1.04**		0.176	0.196	1.00	0.0551	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.705**		0.144	0.156	1.00	0.0409	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.1*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.717**		0.188	0.198	1.00	0.0785	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0123	U	0.0307	0.0307	1.00	0.0688	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.669**		0.182	0.190	1.00	0.0739	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*78.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0555	U	0.636	0.636		1.47	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Actinium 228	**1.15**		0.301	0.323		0.197	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Bismuth-212	0.781	U	0.695	0.700		1.08	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Bismuth-214	**1.22**		0.227	0.260		0.152	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Lead-210	**3.32**		2.08	2.11		2.66	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Lead-212	**0.986**		0.135	0.186		0.128	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Lead-214	**1.44**		0.214	0.261		0.151	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Potassium-40	**14.9**		2.11	2.60		0.820	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Protactinium-231	0.561	U	0.797	0.799		1.33	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Radium-226	**1.22**		0.227	0.260	1.00	0.152	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Radium-228	**1.15**		0.301	0.323		0.197	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Thorium-232	**1.15**		0.301	0.323		0.197	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Thorium-234	1.66	U	1.11	1.12		1.82	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Thallium-208	**0.443**		0.0994	0.110		0.0649	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Uranium-235	0.258	U	0.242	0.244		0.404	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Uranium-238	1.66	U	1.11	1.12		1.82	pCi/g	05/29/14 13:06	06/20/14 13:58	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 13:58*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-3

Lab Sample ID: 160-6793-97

Date Collected: 05/23/14 12:40
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.942**		0.181	0.197	1.00	0.0744	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**1.14**		0.197	0.219	1.00	0.0523	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.837**		0.168	0.182	1.00	0.0471	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.5*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.485**		0.153	0.159	1.00	0.0764	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0239	U	0.0423	0.0423	1.00	0.0764	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.625**		0.174	0.181	1.00	0.0763	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.9*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0425	U	0.375	0.375		0.569	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Actinium 228	**1.23**		0.315	0.339		0.224	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-212	1.11	U	0.912	0.920		1.39	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-214	**1.21**		0.213	0.247		0.0688	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-210	**6.53**		2.13	2.26		2.37	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-212	**1.10**		0.163	0.216		0.147	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-214	**0.984**		0.209	0.232		0.151	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Potassium-40	**14.4**		2.36	2.78		1.67	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Protactinium-231	0.658	U	0.581	0.585		3.15	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-226	**1.21**		0.213	0.247	1.00	0.0688	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-228	**1.23**		0.315	0.339		0.224	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-232	**1.23**		0.315	0.339		0.224	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-234	1.64	U	1.42	1.43		2.44	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thallium-208	**0.374**		0.0955	0.103		0.0581	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-235	0.231	U	0.363	0.363		0.612	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-238	1.64	U	1.42	1.43		2.44	pCi/g	05/29/14 13:06	06/20/14 13:59	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 13:59*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-4

Lab Sample ID: 160-6793-98

Date Collected: 05/23/14 12:42
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.02		0.177	0.197	1.00	0.0847	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.00		0.171	0.191	1.00	0.0408	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.841		0.157	0.172	1.00	0.0484	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*98.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.537		0.160	0.166	1.00	0.0818	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0573		0.0573	0.0575	1.00	0.0430	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.748		0.188	0.199	1.00	0.0908	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*83.1*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.218	U	0.303	0.304		0.503	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Actinium 228	1.13		0.213	0.243		0.345	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-212	0.613	U	0.677	0.680		1.09	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-214	1.10		0.200	0.230		0.162	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-210	3.67		1.54	1.60		1.87	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-212	1.25		0.155	0.224		0.127	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-214	1.27		0.196	0.236		0.137	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Potassium-40	18.5		2.13	2.84		0.961	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Protactinium-231	0.713	U	0.452	0.458		2.82	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-226	1.10		0.200	0.230	1.00	0.162	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-228	1.13		0.213	0.243		0.345	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-232	1.13		0.213	0.243		0.345	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-234	1.62	U	1.21	1.22		1.67	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thallium-208	0.397		0.0978	0.106		0.0653	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-235	0.0474	U	0.356	0.356		0.562	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-238	1.62	U	1.21	1.22		1.67	pCi/g	05/29/14 13:06	06/20/14 13:54	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 13:54*	*1*

Client Sample ID: BMAC-OUTFALL-5

Lab Sample ID: 160-6793-99

Date Collected: 05/23/14 13:02
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.752**		0.161	0.173	1.00	0.0713	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**0.985**		0.184	0.202	1.00	0.0738	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.710**		0.155	0.166	1.00	0.0593	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.6*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.524**		0.150	0.156	1.00	0.0603	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0190	U	0.0383	0.0383	1.00	0.0751	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.595**		0.160	0.168	1.00	0.0646	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*90.8*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.314	U	0.285	0.288		1.79	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Actinium 228	**1.11**		0.247	0.272		0.258	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-212	0.538	U	0.659	0.661		1.07	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-214	**1.14**		0.209	0.240		0.166	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-210	1.55	U	1.82	1.83		2.93	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-212	**1.04**		0.178	0.223		0.167	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-214	**1.17**		0.190	0.225		0.149	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Potassium-40	**13.7**		1.97	2.41		1.01	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Protactinium-231	0.382	U	0.390	0.392		2.89	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-226	**1.14**		0.209	0.240	1.00	0.166	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-228	**1.11**		0.247	0.272		0.258	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-232	**1.11**		0.247	0.272		0.258	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-234	1.34	U	1.66	1.67		2.86	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thallium-208	**0.360**		0.0897	0.0971		0.0840	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-235	-0.0409	U	0.140	0.140		0.620	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-238	1.34	U	1.66	1.67		2.86	pCi/g	05/29/14 13:06	06/20/14 13:54	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 13:54*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-6

Lab Sample ID: 160-6793-100

Date Collected: 05/23/14 12:59
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.709**		0.154	0.165	1.00	0.0640	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**0.797**		0.162	0.175	1.00	0.0543	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.548**		0.134	0.141	1.00	0.0392	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.8*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.639**		0.173	0.181	1.00	0.0656	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.00896	U	0.0297	0.0297	1.00	0.0745	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.507**		0.155	0.160	1.00	0.0744	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*79.0*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.606	U	0.589	0.594		0.959	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Actinium 228	**1.26**		0.305	0.331		0.128	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Bismuth-212	**1.57**		0.783	0.800		0.764	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Bismuth-214	**0.728**		0.151	0.169		0.0577	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Lead-210	**2.91**		1.66	1.69		1.95	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Lead-212	**0.963**		0.136	0.185		0.113	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Lead-214	**1.12**		0.188	0.221		0.179	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Potassium-40	**15.5**		2.11	2.64		0.741	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Protactinium-231	0.728	U	0.584	0.590		2.50	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Radium-226	**0.728**		0.151	0.169	1.00	0.0577	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Radium-228	**1.26**		0.305	0.331		0.128	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Thorium-232	**1.26**		0.305	0.331		0.128	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Thorium-234	**2.10**		1.54	1.56		2.07	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Thallium-208	**0.287**		0.0867	0.0916		0.0957	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Uranium-235	0.236	U	0.313	0.314		0.557	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Uranium-238	**2.10**		1.54	1.56		2.07	pCi/g	05/29/14 13:09	06/20/14 10:54	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 10:54*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-7

Lab Sample ID: 160-6793-101

Date Collected: 05/23/14 12:55
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.671**		0.153	0.163	1.00	0.0879	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**0.845**		0.167	0.182	1.00	0.0579	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.424**		0.117	0.123	1.00	0.0392	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.9*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.557**		0.161	0.168	1.00	0.0775	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0257	U	0.0404	0.0405	1.00	0.0645	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.553**		0.159	0.166	1.00	0.0591	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0325	U	0.0620	0.0622		0.556	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Actinium 228	**0.638**		0.278	0.285		0.351	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Bismuth-212	0.549	U	0.723	0.725		1.19	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Bismuth-214	**0.777**		0.157	0.176		0.106	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Lead-210	**3.83**		2.12	2.17		2.42	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Lead-212	**0.567**		0.133	0.152		0.138	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Lead-214	**0.971**		0.189	0.214		0.136	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Potassium-40	**11.4**		1.79	2.13		0.767	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Protactinium-231	0.396	U	0.705	0.706		1.99	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Radium-226	**0.777**		0.157	0.176	1.00	0.106	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Radium-228	**0.638**		0.278	0.285		0.351	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Thorium-232	**0.638**		0.278	0.285		0.351	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Thorium-234	0.763	U	0.580	0.586		2.08	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Thallium-208	**0.301**		0.0791	0.0850		0.0495	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Uranium-235	0.0794	U	0.130	0.130		0.547	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Uranium-238	0.763	U	0.580	0.586		2.08	pCi/g	05/29/14 13:09	06/20/14 01:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 01:35*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-8

Lab Sample ID: 160-6793-102

Date Collected: 05/23/14 12:51
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.645**		0.151	0.161	1.00	0.0704	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**1.03**		0.189	0.208	1.00	0.0482	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.582**		0.143	0.151	1.00	0.0572	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.8*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.679**		0.177	0.186	1.00	0.0650	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0373	U	0.0498	0.0499	1.00	0.0739	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.689**		0.178	0.188	1.00	0.0649	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*79.4*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.106	U	0.125	0.126		0.748	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Actinium 228	0.0511	U	0.0897	0.0899		0.460	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-212	0.596	U	0.861	0.864		1.44	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-214	**0.787**		0.236	0.250		0.216	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-210	**6.60**		3.01	3.11		3.50	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-212	**0.354**		0.149	0.156		0.186	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-214	**0.838**		0.208	0.225		0.153	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Potassium-40	**9.33**		2.18	2.38		1.52	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Protactinium-231	0.117	U	1.30	1.30		2.41	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-226	**0.787**		0.236	0.250	1.00	0.216	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-228	0.0511	U	0.0897	0.0899		0.460	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-232	0.0511	U	0.0897	0.0899		0.460	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-234	0.954	U	1.18	1.19		2.08	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thallium-208	**0.178**		0.0760	0.0782		0.0767	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-235	0.208	U	0.324	0.324		0.542	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-238	0.954	U	1.18	1.19		2.08	pCi/g	05/29/14 13:09	06/20/14 02:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:16*	*1*

Client Sample ID: BMAC-OUTFALL-9

Lab Sample ID: 160-6793-103

Date Collected: 05/23/14 12:47

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.880		0.171	0.186	1.00	0.0640	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-230	1.18		0.197	0.220	1.00	0.0543	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-232	0.670		0.148	0.158	1.00	0.0392	pCi/g	05/29/14 13:04	06/13/14 16:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.4*		*30 - 110*	*05/29/14 13:04*	*06/13/14 16:53*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.830		0.196	0.208	1.00	0.0735	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0821		0.0694	0.0698	1.00	0.0643	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.569		0.162	0.169	1.00	0.0692	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.4*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0278	U	0.212	0.212		0.427	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Actinium 228	0.809		0.279	0.291		0.317	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-212	1.00	U	0.747	0.754		1.13	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-214	1.08		0.208	0.237		0.155	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-210	3.50		1.73	1.78		2.27	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-212	0.972		0.132	0.182		0.127	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-214	1.07		0.171	0.204		0.170	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Potassium-40	17.4		2.12	2.77		0.474	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Protactinium-231	0.752	U	0.625	0.630		2.33	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-226	1.08		0.208	0.237	1.00	0.155	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-228	0.809		0.279	0.291		0.317	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-232	0.809		0.279	0.291		0.317	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-234	1.43	U	1.27	1.28		1.84	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thallium-208	0.413		0.118	0.126		0.0939	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-235	0.140	U	0.184	0.185		0.276	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-238	1.43	U	1.27	1.28		1.84	pCi/g	05/29/14 13:09	06/20/14 02:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:16*	*1*

Client Sample ID: BMAC-OUTFALL-10

Lab Sample ID: 160-6793-104

Date Collected: 05/23/14 12:03

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.918**		0.183	0.198	1.00	0.0931	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-230	**1.01**		0.188	0.206	1.00	0.0614	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-232	**0.789**		0.165	0.178	1.00	0.0415	pCi/g	05/29/14 13:04	06/13/14 16:53	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*05/29/14 13:04*	*06/13/14 16:53*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.581**		0.158	0.166	1.00	0.0607	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0373	U	0.0462	0.0464	1.00	0.0604	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.786**		0.183	0.195	1.00	0.0485	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*90.8*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.441	U	0.513	0.516		0.842	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Actinium 228	**0.405**		0.235	0.238		0.323	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-212	0.596	U	0.769	0.772		1.27	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-214	**0.916**		0.205	0.226		0.154	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-210	1.40	U	1.42	1.43		2.31	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-212	**0.923**		0.138	0.182		0.136	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-214	**1.10**		0.190	0.222		0.155	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Potassium-40	**14.8**		2.00	2.50		0.694	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Protactinium-231	0.660	U	0.903	0.906		2.55	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-226	**0.916**		0.205	0.226	1.00	0.154	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-228	**0.405**		0.235	0.238		0.323	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-232	**0.405**		0.235	0.238		0.323	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-234	1.55	U	1.53	1.54		2.11	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thallium-208	**0.337**		0.0788	0.0862		0.0449	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-235	-0.0474	U	1.89	1.89		0.525	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-238	1.55	U	1.53	1.54		2.11	pCi/g	05/29/14 13:09	06/20/14 02:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:16*	*1*

Client Sample ID: BMAC-OUTFALL-11

Lab Sample ID: 160-6793-105

Date Collected: 05/23/14 12:12

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.999		0.175	0.194	1.00	0.0636	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.08		0.181	0.202	1.00	0.0499	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.762		0.151	0.164	1.00	0.0386	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.6*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.619		0.178	0.186	1.00	0.0885	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.103		0.0824	0.0829	1.00	0.0805	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.520		0.161	0.167	1.00	0.0566	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*76.5*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.452	U	0.604	0.607		0.998	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Actinium 228	1.41		0.239	0.279		0.0943	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-212	0.626	U	0.667	0.670		1.07	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-214	1.09		0.199	0.229		0.160	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-210	2.24		1.30	1.33		1.60	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-212	1.32		0.146	0.224		0.117	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-214	1.23		0.183	0.223		0.132	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Potassium-40	16.8		1.97	2.61		1.02	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Protactinium-231	0.298	U	0.361	0.363		2.51	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-226	1.09		0.199	0.229	1.00	0.160	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-228	1.41		0.239	0.279		0.0943	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-232	1.41		0.239	0.279		0.0943	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-234	1.54	U	0.734	0.752		2.25	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thallium-208	0.438		0.0885	0.0995		0.0590	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Uranium-235	0.208	U	0.307	0.308		0.449	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Uranium-238	1.54	U	0.734	0.752		2.25	pCi/g	05/29/14 13:09	06/20/14 02:12	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:12*	*1*

Client Sample ID: BMAC-OUTFALL-14

Lab Sample ID: 160-6793-106

Date Collected: 05/23/14 11:49
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.02**		0.180	0.199	1.00	0.0487	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**1.48**		0.216	0.249	1.00	0.0441	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.852**		0.164	0.179	1.00	0.0379	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.594**		0.164	0.172	1.00	0.0786	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0198	U	0.0399	0.0400	1.00	0.0783	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.614**		0.165	0.173	1.00	0.0573	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.281	U	0.644	0.645		1.08	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Actinium 228	**0.551**		0.267	0.273		0.359	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-212	**1.56**		0.811	0.827		1.10	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-214	**1.03**		0.219	0.243		0.192	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-210	2.86	U	2.13	2.16		2.92	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-212	**0.888**		0.163	0.199		0.199	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-214	**1.15**		0.186	0.221		0.196	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Potassium-40	**17.9**		2.11	2.79		0.687	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Protactinium-231	0.567	U	0.773	0.775		2.74	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-226	**1.03**		0.219	0.243	1.00	0.192	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-228	**0.551**		0.267	0.273		0.359	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-232	**0.551**		0.267	0.273		0.359	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-234	0.802	U	1.50	1.51		2.62	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thallium-208	**0.364**		0.0873	0.0951		0.0745	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-235	0.139	U	0.188	0.188		0.599	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-238	0.802	U	1.50	1.51		2.62	pCi/g	05/29/14 13:09	06/20/14 02:13	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:13*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-15

Lab Sample ID: 160-6793-107

Date Collected: 05/23/14 11:44
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.845		0.169	0.183	1.00	0.0799	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.02		0.183	0.203	1.00	0.0607	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.542		0.133	0.141	1.00	0.0498	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.9*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.626		0.159	0.168	1.00	0.0570	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0600		0.0560	0.0562	1.00	0.0568	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.657		0.163	0.172	1.00	0.0520	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*94.6*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.202	U	0.226	0.228		1.54	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Actinium 228	0.945		0.265	0.282		0.137	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Bismuth-212	0.862	U	0.884	0.888		1.41	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Bismuth-214	0.978		0.209	0.233		0.152	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Lead-210	2.88		1.96	1.99		2.57	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Lead-212	0.994		0.141	0.191		0.126	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Lead-214	1.15		0.197	0.231		0.153	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Potassium-40	16.5		2.26	2.82		0.570	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Protactinium-231	0.0614	U	0.184	0.184		2.46	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Radium-226	0.978		0.209	0.233	1.00	0.152	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Radium-228	0.945		0.265	0.282		0.137	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Thorium-232	0.945		0.265	0.282		0.137	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Thorium-234	1.60	U	1.45	1.46		2.06	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Thallium-208	0.321		0.0883	0.0943		0.0643	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Uranium-235	0.263	U	0.255	0.257		0.420	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Uranium-238	1.60	U	1.45	1.46		2.06	pCi/g	05/29/14 13:09	06/20/14 10:55	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 10:55*	*1*

Client Sample ID: BMAC-OUTFALL-16

Lab Sample ID: 160-6793-108

Date Collected: 05/23/14 11:40

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.868**		0.169	0.184	1.00	0.0746	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**1.13**		0.190	0.212	1.00	0.0386	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.713**		0.151	0.163	1.00	0.0529	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.4*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.523**		0.156	0.162	1.00	0.0655	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0519	U	0.0578	0.0580	1.00	0.0744	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.651**		0.175	0.184	1.00	0.0817	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*82.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.148	U	0.280	0.281		1.38	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Actinium 228	**1.20**		0.256	0.284		0.111	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Bismuth-212	0.000	U	0.715	0.715		1.22	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Bismuth-214	**1.17**		0.219	0.251		0.182	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Lead-210	2.24	U	2.15	2.16		2.83	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Lead-212	**0.898**		0.157	0.195		0.188	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Lead-214	**1.04**		0.233	0.257		0.209	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Potassium-40	**15.9**		1.95	2.54		0.802	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Protactinium-231	0.766	U	0.574	0.580		2.44	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Radium-226	**1.17**		0.219	0.251	1.00	0.182	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Radium-228	**1.20**		0.256	0.284		0.111	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Thorium-232	**1.20**		0.256	0.284		0.111	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Thorium-234	0.406	U	0.692	0.694		2.25	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Thallium-208	**0.430**		0.0904	0.101		0.0685	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Uranium-235	0.202	U	0.292	0.293		0.552	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Uranium-238	0.406	U	0.692	0.694		2.25	pCi/g	05/29/14 13:09	06/20/14 02:14	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:14*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-17

Lab Sample ID: 160-6793-109

Date Collected: 05/23/14 11:29
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.965		0.186	0.202	1.00	0.0885	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.855		0.172	0.186	1.00	0.0571	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.721		0.157	0.168	1.00	0.0411	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.525		0.154	0.160	1.00	0.0678	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0829		0.0677	0.0681	1.00	0.0415	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.690		0.176	0.185	1.00	0.0677	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.5*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0727	U	0.131	0.132		0.437	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Actinium 228	0.648		0.175	0.187		0.203	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-212	0.234	U	0.587	0.588		1.02	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-214	0.740		0.145	0.164		0.111	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-210	-0.885	U	20.7	20.7		2.01	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-212	0.482		0.0909	0.110		0.0955	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-214	0.780		0.139	0.161		0.102	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Potassium-40	8.55		1.35	1.61		0.670	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Protactinium-231	-0.113	U	1.02	1.02		1.80	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-226	0.740		0.145	0.164	1.00	0.111	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-228	0.648		0.175	0.187		0.203	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-232	0.648		0.175	0.187		0.203	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-234	0.569	U	0.493	0.497		1.46	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thallium-208	0.242		0.0641	0.0689		0.0511	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Uranium-235	0.109	U	0.219	0.219		0.369	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Uranium-238	0.569	U	0.493	0.497		1.46	pCi/g	05/29/14 13:09	06/20/14 02:12	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:12*	*1*

Client Sample ID: BMAC-OUTFALL-18

Lab Sample ID: 160-6793-110

Date Collected: 05/23/14 11:33

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.817		0.162	0.176	1.00	0.0614	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.742		0.153	0.165	1.00	0.0485	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.591		0.136	0.145	1.00	0.0378	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.6*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.693		0.178	0.187	1.00	0.0519	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.128		0.0851	0.0858	1.00	0.0426	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.694		0.178	0.187	1.00	0.0341	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.6*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0967	U	0.183	0.183		0.538	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Actinium 228	0.593		0.218	0.227		0.294	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-212	0.00643	U	0.709	0.709		1.33	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-214	0.918		0.194	0.216		0.144	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-210	3.40		1.75	1.80		2.28	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-212	0.672		0.173	0.193		0.170	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-214	1.04		0.171	0.203		0.157	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Potassium-40	-0.252	U	10.1	10.1		4.64	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Protactinium-231	-0.521	U	1.43	1.43		2.46	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-226	0.918		0.194	0.216	1.00	0.144	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-228	0.593		0.218	0.227		0.294	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-232	0.593		0.218	0.227		0.294	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-234	0.828	U	0.755	0.760		2.40	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thallium-208	0.306		0.0733	0.0799		0.0321	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-235	0.157	U	0.316	0.316		0.532	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-238	0.828	U	0.755	0.760		2.40	pCi/g	05/29/14 13:09	06/20/14 02:13	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 02:13*	*1*

Client Sample Results

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Client Sample ID: BMAC-OUTFALL-19

Lab Sample ID: 160-6793-111

Date Collected: 05/23/14 13:09
Matrix: Solid
Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.994**		0.182	0.201	1.00	0.0466	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	**0.958**		0.180	0.197	1.00	0.0556	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	**0.735**		0.156	0.168	1.00	0.0401	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.5*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	**0.487**		0.149	0.154	1.00	0.0638	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0253	U	0.0398	0.0399	1.00	0.0635	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	**0.544**		0.157	0.163	1.00	0.0581	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*84.8*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0614	U	0.139	0.139		0.841	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Actinium 228	0.608	U	0.318	0.324		0.622	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Bismuth-212	0.262	U	1.08	1.08		1.99	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Bismuth-214	**1.04**		0.282	0.302		0.229	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Lead-210	**4.99**		2.66	2.72		3.50	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Lead-212	**0.938**		0.199	0.233		0.204	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Lead-214	**1.29**		0.216	0.254		0.0898	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Potassium-40	**13.3**		2.75	3.07		1.05	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Protactinium-231	0.443	U	1.03	1.03		3.31	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Radium-226	**1.04**		0.282	0.302	1.00	0.229	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Radium-228	0.608	U	0.318	0.324		0.622	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Thorium-232	0.608	U	0.318	0.324		0.622	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Thorium-234	**2.76**		1.73	1.76		2.53	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Thallium-208	**0.388**		0.117	0.124		0.0970	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Uranium-235	0.219	U	0.437	0.437		0.747	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Uranium-238	**2.76**		1.73	1.76		2.53	pCi/g	05/29/14 13:09	06/20/14 10:56	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 10:56*	*1*

Client Sample ID: BMAC-OUTFALL-20

Lab Sample ID: 160-6793-112

Date Collected: 05/23/14 13:11

Matrix: Solid

Date Received: 05/23/14 13:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.869		0.164	0.179	1.00	0.0640	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.853		0.161	0.177	1.00	0.0564	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.697		0.145	0.156	1.00	0.0419	pCi/g	05/29/14 13:04	06/12/14 16:34	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*97.9*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:34*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.535		0.165	0.171	1.00	0.0652	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.109		0.0826	0.0831	1.00	0.0468	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.644		0.181	0.189	1.00	0.0712	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*76.6*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:31*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.111	U	0.251	0.251		1.73	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Actinium 228	1.10		0.238	0.263		0.135	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Bismuth-212	0.675	U	0.754	0.757		1.21	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Bismuth-214	1.12		0.203	0.234		0.152	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Lead-210	4.46		2.83	2.88		3.64	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Lead-212	1.01		0.199	0.238		0.202	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Lead-214	1.30		0.237	0.273		0.206	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Potassium-40	14.4		2.05	2.53		0.805	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Protactinium-231	0.341	U	0.442	0.444		2.76	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Radium-226	1.12		0.203	0.234	1.00	0.152	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Radium-228	1.10		0.238	0.263		0.135	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Thorium-232	1.10		0.238	0.263		0.135	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Thorium-234	0.788	U	0.823	0.827		2.91	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Thallium-208	0.231		0.0975	0.100		0.139	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Uranium-235	0.0278	U	0.310	0.310		0.556	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Uranium-238	0.788	U	0.823	0.827		2.91	pCi/g	05/29/14 13:09	06/20/14 10:51	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 10:51*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-123904/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124692 — **Prep Batch: 123904**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.01533	U	0.0310	0.0310	1.00	0.0607	pCi/g	05/27/14 09:22	05/30/14 18:36	1
Thorium-230	0.06204		0.0524	0.0527	1.00	0.0486	pCi/g	05/27/14 09:22	05/30/14 18:36	1
Thorium-232	0.0000	U	0.00398	0.00398	1.00	0.0319	pCi/g	05/27/14 09:22	05/30/14 18:36	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:36*	*1*

Lab Sample ID: LCS 160-123904/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124693 — **Prep Batch: 123904**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.23		2.62	1.00	0.107	pCi/g	103	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*82.8*		*30 - 110*

Lab Sample ID: 160-6793-1 DU — **Client Sample ID: BMAC-DISCRETE-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124938 — **Prep Batch: 123904**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	1.05			0.8168		0.153	1.00	0.0640	pCi/g			0.72	1
Thorium-230	0.960			1.028		0.173	1.00	0.0299	pCi/g			0.20	1
Thorium-232	0.894			0.8323		0.152	1.00	0.0300	pCi/g			0.20	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*78.7*		*30 - 110*

Lab Sample ID: MB 160-124407/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125576 — **Prep Batch: 124407**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.04775	U	0.0486	0.0488	1.00	0.0612	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.1077		0.0681	0.0687	1.00	0.0323	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.03214		0.0371	0.0372	1.00	0.0321	pCi/g	05/29/14 12:48	06/05/14 20:46	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.2*		*30 - 110*	*05/29/14 12:48*	*06/05/14 20:46*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-124407/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125578 — **Prep Batch: 124407**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	24.79		2.53	1.00	0.0955	pCi/g	101	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*91.1*		*30 - 110*

Lab Sample ID: 160-6793-36 DU — **Client Sample ID: BMAC-GRASS-1**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125623 — **Prep Batch: 124407**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.756			0.8387		0.204	1.00	0.0931	pCi/g			0.21	1
Thorium-230	0.994			0.7510		0.190	1.00	0.0684	pCi/g			0.58	1
Thorium-232	0.817			0.8251		0.200	1.00	0.0598	pCi/g			0.02	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*93.0*		*30 - 110*

Lab Sample ID: MB 160-124409/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125579 — **Prep Batch: 124409**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.02263	U	0.0354	0.0354	1.00	0.0606	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	0.09459		0.0636	0.0641	1.00	0.0568	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.008076	U	0.0202	0.0202	1.00	0.0453	pCi/g	05/29/14 12:52	06/05/14 20:50	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.6*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:50*	*1*

Lab Sample ID: LCS 160-124409/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125580 — **Prep Batch: 124409**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	26.11		2.65	1.00	0.117	pCi/g	107	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*88.8*		*30 - 110*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-6793-56 DU — **Client Sample ID: BMAC-GRASS-21**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126088 — **Prep Batch: 124409**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.531			0.4912		0.164	1.00	0.100	pCi/g			0.12	1
Thorium-230	0.963			0.5893		0.177	1.00	0.0777	pCi/g			0.91	1
Thorium-232	0.432			0.4417		0.152	1.00	0.0795	pCi/g			0.03	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*80.6*		*30 - 110*

Lab Sample ID: MB 160-124410/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125952 — **Prep Batch: 124410**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.07630	U	0.0723	0.0726	1.00	0.104	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.1805		0.0918	0.0930	1.00	0.0676	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	-0.01475	U	0.0208	0.0209	1.00	0.0872	pCi/g	05/29/14 13:01	06/09/14 17:50	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.9*		*30 - 110*	*05/29/14 13:01*	*06/09/14 17:50*	*1*

Lab Sample ID: LCS 160-124410/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125955 — **Prep Batch: 124410**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.59		2.62	1.00	0.0656	pCi/g	104	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*89.0*		*30 - 110*

Lab Sample ID: 160-6793-74 DU — **Client Sample ID: BMAC-SOIL-9**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125957 — **Prep Batch: 124410**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.514			0.5781		0.163	1.00	0.0691	pCi/g			0.19	1
Thorium-230	0.726			0.6286		0.169	1.00	0.0463	pCi/g			0.27	1
Thorium-232	0.653			0.5391		0.155	1.00	0.0461	pCi/g			0.34	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*94.8*		*30 - 110*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-124412/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126687 — **Prep Batch: 124412**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.05733	U	0.0514	0.0516	1.00	0.0713	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-230	0.04332	U	0.0389	0.0391	1.00	0.0441	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-232	0.005853	U	0.0161	0.0161	1.00	0.0378	pCi/g	05/29/14 13:04	06/12/14 16:33	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.6*		*30 - 110*	*05/29/14 13:04*	*06/12/14 16:33*	*1*

Lab Sample ID: LCS 160-124412/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126688 — **Prep Batch: 124412**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	24.70		2.41	1.00	0.0457	pCi/g	101	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*94.8*		*30 - 110*

Lab Sample ID: 160-6793-93 DU — **Client Sample ID: BMAC-SOIL-28**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126690 — **Prep Batch: 124412**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.622			0.6043		0.163	1.00	0.0972	pCi/g			0.06	1
Thorium-230	0.714			0.6658		0.167	1.00	0.0515	pCi/g			0.14	1
Thorium-232	0.588			0.5241		0.147	1.00	0.0650	pCi/g			0.21	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*76.5*		*30 - 110*

Lab Sample ID: MB 160-125139/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126450 — **Prep Batch: 125139**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.004592	U	0.0221	0.0221	1.00	0.0597	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-230	0.04786	U	0.0574	0.0575	1.00	0.0904	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-232	-0.002367	U	0.0232	0.0232	1.00	0.0728	pCi/g	06/03/14 09:05	06/11/14 15:44	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.6*		*30 - 110*	*06/03/14 09:05*	*06/11/14 15:44*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-125139/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126090 — **Prep Batch: 125139**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	23.28		2.42	1.00	0.202	pCi/g	95	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*87.0*		*30 - 110*

Lab Sample ID: 160-6793-21 DU — **Client Sample ID: KOCH-GRASS-4**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126108 — **Prep Batch: 125139**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.716			0.7071		0.192	1.00	0.131	pCi/g			0.02	1
Thorium-230	0.947			1.012		0.228	1.00	0.107	pCi/g			0.15	1
Thorium-232	0.678			0.6496		0.175	1.00	0.0698	pCi/g			0.08	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*91.7*		*30 - 110*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-123926/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124690 — **Prep Batch: 123926**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.009145	U	0.0229	0.0229	1.00	0.0512	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-235/236	0.0000	U	0.00525	0.00525	1.00	0.0420	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-238	0.05617		0.0502	0.0505	1.00	0.0337	pCi/g	05/27/14 09:22	05/30/14 18:30	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*89.2*		*30 - 110*	*05/27/14 09:22*	*05/30/14 18:30*	*1*

Lab Sample ID: LCS 160-123926/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124691 — **Prep Batch: 123926**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			6.37	6.983		0.831	1.00	0.0643	pCi/g	110	84 - 120		
Uranium-238			6.51	6.764		0.810	1.00	0.0370	pCi/g	104	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*77.8*		*30 - 110*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-6793-1 DU — **Client Sample ID: BMAC-DISCRETE-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124679 — **Prep Batch: 123926**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-233/234	0.722			0.7164		0.198	1.00	0.0697	pCi/g			0.02	1
Uranium-235/236	0.0315	U		0.02765	U	0.0436	1.00	0.0695	pCi/g			0.04	1
Uranium-238	0.704			0.7463		0.201	1.00	0.0367	pCi/g			0.11	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*77.1*		*30 - 110*

Lab Sample ID: MB 160-123942/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124688 — **Prep Batch: 123942**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.02587	U	0.0374	0.0375	1.00	0.0604	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0000	U	0.00495	0.00495	1.00	0.0396	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.03839	U	0.0427	0.0429	1.00	0.0550	pCi/g	05/27/14 11:23	05/30/14 18:21	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*88.0*		*30 - 110*	*05/27/14 11:23*	*05/30/14 18:21*	*1*

Lab Sample ID: LCS 160-123942/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124689 — **Prep Batch: 123942**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			6.37	6.803		0.793	1.00	0.0576	pCi/g	107	84 - 120		
Uranium-238			6.51	6.979		0.808	1.00	0.0504	pCi/g	107	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*85.0*		*30 - 110*

Lab Sample ID: 160-6793-21 DU — **Client Sample ID: KOCH-GRASS-4**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124719 — **Prep Batch: 123942**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-233/234	0.561			0.7159		0.206	1.00	0.0762	pCi/g			0.41	1
Uranium-235/236	0.0118	U		-0.006252	U	0.00886	1.00	0.0866	pCi/g			0.47	1
Uranium-238	0.613			0.4947		0.168	1.00	0.0401	pCi/g			0.34	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-6793-21 DU — **Client Sample ID: KOCH-GRASS-4**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 124719 — **Prep Batch: 123942**

Tracer	DU %Yield	DU Qualifier	Limits
Uranium-232	72.6		30 - 110

Lab Sample ID: MB 160-124608/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125572 — **Prep Batch: 124608**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.02471	U	0.0389	0.0390	1.00	0.0671	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	-0.002563	U	0.00513	0.00513	1.00	0.0622	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.02192	U	0.0310	0.0311	1.00	0.0329	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	86.9		30 - 110	05/29/14 12:48	06/05/14 20:41	1

Lab Sample ID: LCS 160-124608/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125573 — **Prep Batch: 124608**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			6.37	6.849		0.795	1.00	0.0572	pCi/g	108	84 - 120		
Uranium-238			6.51	6.824		0.793	1.00	0.0570	pCi/g	105	82 - 122		

Tracer	LCS %Yield	LCS Qualifier	Limits
Uranium-232	84.3		30 - 110

Lab Sample ID: 160-6793-36 DU — **Client Sample ID: BMAC-GRASS-1**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125619 — **Prep Batch: 124608**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-233/234	0.657			0.6035		0.186	1.00	0.135	pCi/g			0.15	1
Uranium-235/236	0.0107	U		0.06486	U	0.0663	1.00	0.0832	pCi/g			0.58	1
Uranium-238	0.652			0.8045		0.211	1.00	0.112	pCi/g			0.39	1

Tracer	DU %Yield	DU Qualifier	Limits
Uranium-232	82.3		30 - 110

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-124609/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125574 — **Prep Batch: 124609**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.03905	U	0.0460	0.0462	1.00	0.0646	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	-0.005301	U	0.00750	0.00751	1.00	0.0734	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	-0.006377	U	0.00736	0.00738	1.00	0.0645	pCi/g	05/29/14 12:52	06/05/14 20:44	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*85.4*		*30 - 110*	*05/29/14 12:52*	*06/05/14 20:44*	*1*

Lab Sample ID: LCS 160-124609/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125575 — **Prep Batch: 124609**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Uranium-233/234	6.37	6.605		0.766	1.00	0.0601	pCi/g	104	84 - 120
Uranium-238	6.51	6.787		0.782	1.00	0.0316	pCi/g	104	82 - 122

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*91.9*		*30 - 110*

Lab Sample ID: 160-6793-56 DU — **Client Sample ID: BMAC-GRASS-21**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125603 — **Prep Batch: 124609**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Uranium-233/234	0.440		0.4530		0.158	1.00	0.0727	pCi/g	0.04	1
Uranium-235/236	0.0297	U	0.01292	U	0.0324	1.00	0.0724	pCi/g	0.23	1
Uranium-238	0.286		0.4289		0.153	1.00	0.0663	pCi/g	0.52	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*74.5*		*30 - 110*

Lab Sample ID: MB 160-124610/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125977 — **Prep Batch: 124610**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.02862	U	0.0382	0.0383	1.00	0.0566	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0000	U	0.00509	0.00509	1.00	0.0407	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.01564	U	0.0316	0.0316	1.00	0.0619	pCi/g	05/29/14 13:01	06/09/14 17:53	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-124610/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125977 — **Prep Batch: 124610**

Tracer	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	82.9		30 - 110	05/29/14 13:01	06/09/14 17:53	1

Lab Sample ID: LCS 160-124610/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125978 — **Prep Batch: 124610**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			6.37	6.020		0.739	1.00	0.0625	pCi/g	95	84 - 120		
Uranium-238			6.51	7.002		0.826	1.00	0.0683	pCi/g	108	82 - 122		

Tracer	LCS %Yield	LCS Qualifier	Limits
Uranium-232	76.8		30 - 110

Lab Sample ID: 160-6793-74 DU — **Client Sample ID: BMAC-SOIL-9**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 125980 — **Prep Batch: 124610**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-233/234	0.370			0.3984		0.140	1.00	0.0755	pCi/g			0.1	1
Uranium-235/236	0.0174	U		0.02246	U	0.0398	1.00	0.0718	pCi/g			0.07	1
Uranium-238	0.467			0.3595		0.131	1.00	0.0630	pCi/g			0.36	1

Tracer	DU %Yield	DU Qualifier	Limits
Uranium-232	82.7		30 - 110

Lab Sample ID: MB 160-124634/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126682 — **Prep Batch: 124634**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-233/234	0.01282	U	0.0578	0.0578	1.00	0.122	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.02252	U	0.0544	0.0544	1.00	0.111	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.0000	U	0.0454	0.0454	1.00	0.111	pCi/g	05/29/14 13:04	06/12/14 16:31	1

Tracer	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	79.7		30 - 110	05/29/14 13:04	06/12/14 16:31	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-124634/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126683 — **Prep Batch: 124634**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Uranium-233/234			6.37	5.723		0.711	1.00	0.0912	pCi/g	90	84 - 120		
Uranium-238			6.51	5.849		0.722	1.00	0.0969	pCi/g	90	82 - 122		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*81.5*		*30 - 110*

Lab Sample ID: 160-6793-93 DU — **Client Sample ID: BMAC-SOIL-28**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 126712 — **Prep Batch: 124634**

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Uranium-233/234	0.392			0.4040		0.145	1.00	0.0910	pCi/g			0.04	1
Uranium-235/236	0.0379	U		-0.002684	U	0.00537	1.00	0.0652	pCi/g			0.67	1
Uranium-238	0.618			0.4390		0.148	1.00	0.0701	pCi/g			0.53	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*83.7*		*30 - 110*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-124211/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127604 — **Prep Batch: 124211**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.03407	U	0.187	0.187		0.362	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Actinium 228	0.009706	U	0.0191	0.0191		0.289	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-212	0.1071	U	0.274	0.274		0.512	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-214	0.03604	U	0.101	0.101		0.183	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-210	0.8395	U	1.15	1.15		1.90	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-212	-0.006678	U	0.0731	0.0731		0.118	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-214	0.06813	U	0.0742	0.0746		0.147	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Potassium-40	0.1688	U	0.428	0.429		0.918	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Protactinium-231	0.08175	U	0.554	0.554		1.61	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-226	0.03604	U	0.101	0.101	1.00	0.183	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-228	0.009706	U	0.0191	0.0191		0.289	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-232	0.009706	U	0.0191	0.0191		0.289	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-234	-0.2462	U	1.39	1.39		1.55	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thallium-208	0.009690	U	0.0352	0.0352		0.0722	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-235	0.1504	U	0.144	0.145		0.207	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-238	-0.2462	U	1.39	1.39		1.55	pCi/g	05/28/14 15:58	06/19/14 02:23	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124211/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127604 — **Prep Batch: 124211**

Other Detected Radionuclides	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/g	05/28/14 15:58	06/19/14 02:23	1

Lab Sample ID: LCS 160-124211/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127685 — **Prep Batch: 124211**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	99.57		10.5		1.14	pCi/g	102	87 - 116
Cesium-137	31.0	31.60		3.37		0.280	pCi/g	102	87 - 120
Cobalt-60	22.2	21.97		2.27		0.112	pCi/g	99	87 - 115

Lab Sample ID: 160-6793-1 DU — **Client Sample ID: BMAC-DISCRETE-00**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127684 — **Prep Batch: 124211**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	-0.855	U	0.02371	U	0.0473		0.686	pCi/g	1.00	1
Actinium 228	1.62		1.348		0.346		0.133	pCi/g	0.38	1
Bismuth-212	0.643	U	0.4925	U	0.696		1.16	pCi/g	0.09	1
Bismuth-214	1.08		1.326		0.269		0.160	pCi/g	0.44	1
Lead-210	0.387	U	1.912	U	1.98		3.21	pCi/g	0.37	1
Lead-212	1.08		1.255		0.241		0.175	pCi/g	0.36	1
Lead-214	1.34		1.288		0.237		0.187	pCi/g	0.10	1
Potassium-40	19.8		17.36		2.90		0.834	pCi/g	0.39	1
Protactinium-231	0.589	U	0.4610	U	0.746		2.70	pCi/g	0.09	1
Radium-226	1.08		1.326		0.269	1.00	0.160	pCi/g	0.44	1
Radium-228	1.62		1.348		0.346		0.133	pCi/g	0.38	1
Thorium-232	1.62		1.348		0.346		0.133	pCi/g	0.38	1
Thorium-234	1.07	U	1.222	U	1.73		3.00	pCi/g	0.04	1
Thallium-208	0.348		0.4963		0.112		0.0488	pCi/g	0.67	1
Uranium-235	0.0282	U	0.2328	U	0.319		0.547	pCi/g	0.52	1
Uranium-238	1.07	U	1.222	U	1.73		3.00	pCi/g	0.04	1

Lab Sample ID: MB 160-124219/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127689 — **Prep Batch: 124219**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.09167	U	0.274	0.274		0.492	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Actinium 228	0.0000	U	0.0688	0.0688		0.253	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Bismuth-212	0.0000	U	0.218	0.218		1.65	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Bismuth-214	0.09328	U	0.127	0.127		0.276	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Lead-210	-0.5092	U	2.30	2.30		2.76	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Lead-212	-0.05669	U	4.32	4.32		0.186	pCi/g	05/28/14 16:56	06/19/14 17:42	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124219/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127689 — **Prep Batch: 124219**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-214	0.02792	U	0.105	0.105		0.202	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Potassium-40	0.0000	U	0.397	0.397		1.04	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Protactinium-231	0.1373	U	0.307	0.308		3.04	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Radium-226	0.09328	U	0.127	0.127	1.00	0.276	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Radium-228	0.0000	U	0.0688	0.0688		0.253	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Thorium-232	0.0000	U	0.0688	0.0688		0.253	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Thorium-234	0.1444	U	0.931	0.931		1.94	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Thallium-208	0.03117	U	0.0856	0.0857		0.150	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Uranium-235	0.07560	U	0.251	0.251		0.445	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Uranium-238	0.1444	U	0.931	0.931		1.94	pCi/g	05/28/14 16:56	06/19/14 17:42	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/28/14 16:56*	*06/19/14 17:42*	*1*

Lab Sample ID: LCS 160-124219/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127687 — **Prep Batch: 124219**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	97.03		10.2		1.03	pCi/g	100	87 - 116
Cesium-137	31.0	30.24		3.22		0.262	pCi/g	97	87 - 120
Cobalt-60	22.2	20.87		2.15		0.158	pCi/g	94	87 - 115

Lab Sample ID: 160-6793-21 DU — **Client Sample ID: KOCH-GRASS-4**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127687 — **Prep Batch: 124219**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	0.0458	U	0.04671	U	0.112		1.81	pCi/g	0	1
Actinium 228	0.716	U	1.194		0.332		0.146	pCi/g	0.63	1
Bismuth-212	0.879	U	0.5567	U	0.833		1.39	pCi/g	0.14	1
Bismuth-214	1.32		1.315		0.255		0.0897	pCi/g	0.01	1
Lead-210	4.12		2.777		1.85		2.61	pCi/g	0.29	1
Lead-212	1.23		1.260		0.229		0.136	pCi/g	0.05	1
Lead-214	1.50		1.261		0.220		0.150	pCi/g	0.41	1
Potassium-40	17.3		15.99		2.82		0.607	pCi/g	0.20	1
Protactinium-231	1.49	U	0.4631	U	0.766		2.06	pCi/g	0.41	1
Radium-226	1.32		1.315		0.255	1.00	0.0897	pCi/g	0.01	1
Radium-228	0.716	U	1.194		0.332		0.146	pCi/g	0.63	1
Thorium-232	0.716	U	1.194		0.332		0.146	pCi/g	0.63	1
Thorium-234	1.71	U	1.072	U	0.721		2.26	pCi/g	0.33	1
Thallium-208	0.273		0.3355		0.108		0.0812	pCi/g	0.22	1
Uranium-235	0.424	U	0.2441	U	0.319		0.482	pCi/g	0.23	1
Uranium-238	1.71	U	1.072	U	0.721		2.26	pCi/g	0.33	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124397/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127763 — **Prep Batch: 124397**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.1652	U	0.291	0.292		0.490	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Actinium 228	0.0000	U	0.114	0.114		0.347	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-212	0.1225	U	0.363	0.363		0.674	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-214	-0.03283	U	0.232	0.232		0.212	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-210	0.1484	U	0.821	0.821		1.78	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-212	0.04426	U	0.0657	0.0659		0.121	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-214	0.009964	U	0.0507	0.0507		0.119	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Potassium-40	0.03188	U	0.595	0.595		1.30	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Protactinium-231	0.02120	U	0.0642	0.0643		1.64	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-226	-0.03283	U	0.232	0.232	1.00	0.212	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-228	0.0000	U	0.114	0.114		0.347	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-232	0.0000	U	0.114	0.114		0.347	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-234	-0.3098	U	1.27	1.27		1.37	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thallium-208	-0.02284	U	0.113	0.113		0.0830	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-235	0.07424	U	0.168	0.168		0.230	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-238	-0.3098	U	1.27	1.27		1.37	pCi/g	05/29/14 11:21	06/20/14 15:28	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 11:21*	*06/20/14 15:28*	*1*

Lab Sample ID: LCS 160-124397/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127765 — **Prep Batch: 124397**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	99.44		10.4		1.21	pCi/g	102	87 - 116
Cesium-137	31.0	30.65		3.26		0.273	pCi/g	99	87 - 120
Cobalt-60	22.2	21.79		2.24		0.199	pCi/g	98	87 - 115

Lab Sample ID: 160-6793-36 DU — **Client Sample ID: BMAC-GRASS-1**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127767 — **Prep Batch: 124397**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	-0.557	U	-0.03065	U	1.15		1.95	pCi/g	0.31	1
Actinium 228	1.18		1.239		0.352		0.297	pCi/g	0.08	1
Bismuth-212	-0.0296	U	0.9418	U	1.03		1.65	pCi/g	0.55	1
Bismuth-214	1.16		1.036		0.288		0.226	pCi/g	0.22	1
Lead-210	1.83	U	2.494	U	2.52		3.39	pCi/g	0.16	1
Lead-212	1.25		1.023		0.237		0.230	pCi/g	0.46	1
Lead-214	1.43		1.402		0.309		0.231	pCi/g	0.05	1
Potassium-40	19.1		18.96		3.39		1.12	pCi/g	0.02	1
Protactinium-231	0.810	U	0.2167	U	0.335		3.61	pCi/g	0.62	1
Radium-226	1.16		1.036		0.288	1.00	0.226	pCi/g	0.22	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-6793-36 DU — **Client Sample ID: BMAC-GRASS-1**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127767 — **Prep Batch: 124397**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-228	1.18		1.239		0.352		0.297	pCi/g	0.08	1
Thorium-232	1.18		1.239		0.352		0.297	pCi/g	0.08	1
Thorium-234	1.27	U	0.6006	U	1.50		2.66	pCi/g	0.24	1
Thallium-208	0.315		0.4717		0.116		0.0423	pCi/g	0.70	1
Uranium-235	0.222	U	0.1376	U	0.364		0.710	pCi/g	0.12	1
Uranium-238	1.27	U	0.6006	U	1.50		2.66	pCi/g	0.24	1

Lab Sample ID: MB 160-124411/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127759 — **Prep Batch: 124411**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.01693	U	0.0309	0.0309		0.742	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Actinium 228	0.03063	U	0.0881	0.0881		0.573	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Bismuth-212	-0.1930	U	1.06	1.06		1.98	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Bismuth-214	-0.0007463	U	0.155	0.155		0.309	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Lead-210	-0.5850	U	2.73	2.73		2.89	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Lead-212	0.1307	U	0.0962	0.0976		0.143	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Lead-214	0.02054	U	0.0982	0.0983		0.183	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Potassium-40	0.0000	U	0.281	0.281		1.04	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Protactinium-231	0.2553	U	0.715	0.716		2.41	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Radium-226	-0.0007463	U	0.155	0.155	1.00	0.309	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Radium-228	0.03063	U	0.0881	0.0881		0.573	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Thorium-232	0.03063	U	0.0881	0.0881		0.573	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Thorium-234	-0.6089	U	3.96	3.96		2.08	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Thallium-208	-0.01260	U	0.0787	0.0787		0.150	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Uranium-235	0.1211	U	0.229	0.230		0.403	pCi/g	05/29/14 13:01	06/20/14 16:18	1
Uranium-238	-0.6089	U	3.96	3.96		2.08	pCi/g	05/29/14 13:01	06/20/14 16:18	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:01*	*06/20/14 16:18*	*1*

Lab Sample ID: LCS 160-124411/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127760 — **Prep Batch: 124411**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	96.78		10.1		1.04	pCi/g	99	87 - 116
Cesium-137	31.0	29.43		3.14		0.276	pCi/g	95	87 - 120
Cobalt-60	22.2	20.73		2.14		0.0407	pCi/g	93	87 - 115

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-6793-56 DU — **Client Sample ID: BMAC-GRASS-21**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127760 — **Prep Batch: 124411**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	0.0318	U	0.07983	U	0.241		0.789	pCi/g	0.16	1
Actinium 228	0.618		0.5420		0.213		0.259	pCi/g	0.18	1
Bismuth-212	0.148	U	1.175		0.410		0.240	pCi/g	1.09	1
Bismuth-214	0.551		0.5335		0.128		0.0902	pCi/g	0.07	1
Lead-210	1.06	U	0.4512	U	0.873		1.54	pCi/g	0.32	1
Lead-212	0.454		0.4540		0.0957		0.0777	pCi/g	0	1
Lead-214	0.570		0.6155		0.119		0.0904	pCi/g	0.19	1
Potassium-40	16.3		13.97		2.15		0.789	pCi/g	0.49	1
Protactinium-231	0.320	U	0.2867	U	0.253		1.56	pCi/g	0.05	1
Radium-226	0.551		0.5335		0.128	1.00	0.0902	pCi/g	0.07	1
Radium-228	0.618		0.5420		0.213		0.259	pCi/g	0.18	1
Thorium-232	0.618		0.5420		0.213		0.259	pCi/g	0.18	1
Thorium-234	0.640	U	0.8498	U	0.429		1.10	pCi/g	0.16	1
Thallium-208	0.205		0.2099		0.0586		0.0381	pCi/g	0.04	1
Uranium-235	0.0411	U	0.09891	U	0.136		0.298	pCi/g	0.26	1
Uranium-238	0.640	U	0.8498	U	0.429		1.10	pCi/g	0.16	1

Lab Sample ID: MB 160-124413/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127759 — **Prep Batch: 124413**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.01589	U	0.149	0.149		0.633	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Actinium 228	0.03304	U	0.189	0.189		0.384	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Bismuth-212	0.0000	U	0.308	0.308		0.804	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Bismuth-214	0.06079	U	0.114	0.114		0.231	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-210	0.8122	U	1.09	1.09		2.25	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-212	0.02107	U	0.0937	0.0937		0.184	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-214	0.03859	U	0.0763	0.0764		0.129	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Potassium-40	0.0000	U	0.281	0.281		1.04	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Protactinium-231	0.04885	U	0.0871	0.0872		2.74	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Radium-226	0.06079	U	0.114	0.114	1.00	0.231	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Radium-228	0.03304	U	0.189	0.189		0.384	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thorium-232	0.03304	U	0.189	0.189		0.384	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thorium-234	-0.3979	U	2.27	2.27		2.09	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thallium-208	0.02024	U	0.0776	0.0777		0.143	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Uranium-235	0.2037	U	0.219	0.220		0.347	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Uranium-238	-0.3979	U	2.27	2.27		2.09	pCi/g	05/29/14 13:06	06/20/14 11:51	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:06*	*06/20/14 11:51*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-124413/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127764 — **Prep Batch: 124413**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	98.29		10.3		0.773	pCi/g	101	87 - 116
Cesium-137	31.0	30.07		3.19		0.245	pCi/g	97	87 - 120
Cobalt-60	22.2	21.17		2.17		0.0834	pCi/g	95	87 - 115

Lab Sample ID: 160-6793-80 DU — **Client Sample ID: BMAC-SOIL-15**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127764 — **Prep Batch: 124413**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	-0.634	U	-0.2059	U	0.386		0.647	pCi/g	0.43	1
Actinium 228	1.35		1.223		0.280		0.184	pCi/g	0.22	1
Bismuth-212	0.591	U	0.8966	U	0.665		0.962	pCi/g	0.21	1
Bismuth-214	1.28		0.8138		0.211		0.177	pCi/g	0.99	1
Lead-210	3.04		1.852	U	1.48		2.31	pCi/g	0.37	1
Lead-212	1.11		1.005		0.199		0.146	pCi/g	0.25	1
Lead-214	1.28		0.9518		0.239		0.195	pCi/g	0.66	1
Potassium-40	14.1		14.58		2.45		1.01	pCi/g	0.10	1
Protactinium-231	0.497	U	-0.4455	U	1.50		2.60	pCi/g	0.39	1
Radium-226	1.28		0.8138		0.211	1.00	0.177	pCi/g	0.99	1
Radium-228	1.35		1.223		0.280		0.184	pCi/g	0.22	1
Thorium-232	1.35		1.223		0.280		0.184	pCi/g	0.22	1
Thorium-234	1.21	U	1.303	U	0.660		2.37	pCi/g	0.05	1
Thallium-208	0.416		0.3236		0.0909		0.0614	pCi/g	0.47	1
Uranium-235	0.195	U	0.05372	U	0.314		0.543	pCi/g	0.24	1
Uranium-238	1.21	U	1.303	U	0.660		2.37	pCi/g	0.05	1

Lab Sample ID: MB 160-124414/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127764 — **Prep Batch: 124414**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.09024	U	0.220	0.220		0.377	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Actinium 228	0.03525	U	0.0994	0.0994		0.182	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Bismuth-212	0.0000	U	0.0810	0.0810		0.869	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Bismuth-214	0.06998	U	0.0833	0.0837		0.149	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Lead-210	0.006491	U	0.628	0.628		1.16	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Lead-212	0.04331	U	0.0519	0.0522		0.0884	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Lead-214	0.09200		0.0577	0.0585		0.0865	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Potassium-40	-0.07715	U	0.603	0.603		0.986	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Protactinium-231	-0.02323	U	0.0547	0.0548		1.25	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Radium-226	0.06998	U	0.0833	0.0837	1.00	0.149	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Radium-228	0.03525	U	0.0994	0.0994		0.182	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Thorium-232	0.03525	U	0.0994	0.0994		0.182	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Thorium-234	0.03628	U	0.467	0.467		0.855	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Thallium-208	0.02674	U	0.0450	0.0451		0.0505	pCi/g	05/29/14 13:09	06/20/14 01:34	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124414/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127764 — **Prep Batch: 124414**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-235	0.01201	U	0.0325	0.0326		0.238	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Uranium-238	0.03628	U	0.467	0.467		0.855	pCi/g	05/29/14 13:09	06/20/14 01:34	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/29/14 13:09*	*06/20/14 01:34*	*1*

Lab Sample ID: LCS 160-124414/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127762 — **Prep Batch: 124414**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	99.64		10.5		1.19	pCi/g	102	87 - 116
Cesium-137	31.0	31.40		3.35		0.254	pCi/g	101	87 - 120
Cobalt-60	22.2	22.31		2.29		0.125	pCi/g	100	87 - 115

Lab Sample ID: 160-6793-100 DU — **Client Sample ID: BMAC-OUTFALL-6**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 127764 — **Prep Batch: 124414**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	-0.606	U	0.2099	U	0.173		0.264	pCi/g	1.06	1
Actinium 228	1.26		0.6869		0.219		0.236	pCi/g	1.04	1
Bismuth-212	1.57		0.5768	U	0.585		0.930	pCi/g	0.72	1
Bismuth-214	0.728		0.9516		0.209		0.143	pCi/g	0.59	1
Lead-210	2.91		1.300	U	1.43		2.33	pCi/g	0.51	1
Lead-212	0.963		0.8909		0.166		0.114	pCi/g	0.20	1
Lead-214	1.12		0.9072		0.156		0.100	pCi/g	0.57	1
Potassium-40	15.5		18.27		2.62		0.724	pCi/g	0.53	1
Protactinium-231	0.728	U	0.4299	U	0.587		1.99	pCi/g	0.25	1
Radium-226	0.728		0.9516		0.209	1.00	0.143	pCi/g	0.59	1
Radium-228	1.26		0.6869		0.219		0.236	pCi/g	1.04	1
Thorium-232	1.26		0.6869		0.219		0.236	pCi/g	1.04	1
Thorium-234	2.10		1.264	U	0.601		1.34	pCi/g	0.39	1
Thallium-208	0.287		0.2956		0.0710		0.0355	pCi/g	0.05	1
Uranium-235	0.236	U	0.08139	U	0.286		0.356	pCi/g	0.26	1
Uranium-238	2.10		1.264	U	0.601		1.34	pCi/g	0.39	1

QC Association Summary

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Rad

Leach Batch: 123686

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	Dry and Grind	
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	Dry and Grind	
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	Dry and Grind	
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	Dry and Grind	
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	Dry and Grind	
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	Dry and Grind	
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	Dry and Grind	
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	Dry and Grind	
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	Dry and Grind	
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	Dry and Grind	
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	Dry and Grind	
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	Dry and Grind	
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	Dry and Grind	
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	Dry and Grind	
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	Dry and Grind	
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	Dry and Grind	
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	Dry and Grind	
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	Dry and Grind	
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	Dry and Grind	
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	Dry and Grind	
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	Dry and Grind	
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	Dry and Grind	
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	Dry and Grind	
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	Dry and Grind	
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	Dry and Grind	
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	Dry and Grind	
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	Dry and Grind	
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	Dry and Grind	
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	Dry and Grind	
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	Dry and Grind	
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	Dry and Grind	
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	Dry and Grind	

Prep Batch: 123904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	ExtChrom	123686
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	ExtChrom	123686
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	ExtChrom	123686
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	ExtChrom	123686
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	ExtChrom	123686
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	ExtChrom	123686
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	ExtChrom	123686
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	ExtChrom	123686
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	ExtChrom	123686

Rad (Continued)

Prep Batch: 123904 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	ExtChrom	123686
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	ExtChrom	123686
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	ExtChrom	123686
LCS 160-123904/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123904/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 123926

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	ExtChrom	123686
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	ExtChrom	123686
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	ExtChrom	123686
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	ExtChrom	123686
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	ExtChrom	123686
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	ExtChrom	123686
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	ExtChrom	123686
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	ExtChrom	123686
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	ExtChrom	123686
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	ExtChrom	123686
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	ExtChrom	123686
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	ExtChrom	123686
LCS 160-123926/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123926/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Leach Batch: 123927

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	Dry and Grind	
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	Dry and Grind	
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	Dry and Grind	
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	Dry and Grind	
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	Dry and Grind	
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	Dry and Grind	
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	Dry and Grind	

Rad (Continued)

Leach Batch: 123927 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	Dry and Grind	
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	Dry and Grind	
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	Dry and Grind	
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	Dry and Grind	
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	Dry and Grind	
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	Dry and Grind	
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	Dry and Grind	
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	Dry and Grind	
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	Dry and Grind	
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	Dry and Grind	
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	Dry and Grind	
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	Dry and Grind	
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	Dry and Grind	
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	Dry and Grind	
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	Dry and Grind	
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	Dry and Grind	
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	Dry and Grind	
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	Dry and Grind	
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	Dry and Grind	
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	Dry and Grind	
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	Dry and Grind	
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	Dry and Grind	
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	Dry and Grind	
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	Dry and Grind	
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	Dry and Grind	
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	Dry and Grind	
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	Dry and Grind	
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	Dry and Grind	
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	Dry and Grind	
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	Dry and Grind	
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	Dry and Grind	
160-6793-74 DU	BMAC-SOIL-9	Total/NA	Solid	Dry and Grind	
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	Dry and Grind	
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	Dry and Grind	
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	Dry and Grind	
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	Dry and Grind	
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	Dry and Grind	
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	Dry and Grind	
160-6793-80 DU	BMAC-SOIL-15	Total/NA	Solid	Dry and Grind	
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	Dry and Grind	
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	Dry and Grind	
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	Dry and Grind	
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	Dry and Grind	
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	Dry and Grind	
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	Dry and Grind	
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	Dry and Grind	
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	Dry and Grind	
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	Dry and Grind	
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	Dry and Grind	
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	Dry and Grind	
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	Dry and Grind	

Rad (Continued)

Leach Batch: 123927 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	Dry and Grind	
160-6793-93 DU	BMAC-SOIL-28	Total/NA	Solid	Dry and Grind	
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	Dry and Grind	
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	Dry and Grind	
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	Dry and Grind	
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	Dry and Grind	
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	Dry and Grind	
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	Dry and Grind	
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	Dry and Grind	
160-6793-100 DU	BMAC-OUTFALL-6	Total/NA	Solid	Dry and Grind	
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	Dry and Grind	
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	Dry and Grind	
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	Dry and Grind	
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	Dry and Grind	
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	Dry and Grind	
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	Dry and Grind	
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	Dry and Grind	
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	Dry and Grind	
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	Dry and Grind	
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	Dry and Grind	
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	Dry and Grind	
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	Dry and Grind	

Prep Batch: 123942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	ExtChrom	123686
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	ExtChrom	123686
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	ExtChrom	123686
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	ExtChrom	123686
LCS 160-123942/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123942/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124211

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	Fill_Geo-21	123686
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	Fill_Geo-21	123686
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	Fill_Geo-21	123686

Rad (Continued)

Prep Batch: 124211 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	Fill_Geo-21	123686
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	Fill_Geo-21	123686
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	Fill_Geo-21	123686
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	Fill_Geo-21	123686
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	Fill_Geo-21	123686
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	Fill_Geo-21	123686
LCS 160-124211/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-124211/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 124219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	Fill_Geo-21	123686
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	Fill_Geo-21	123686
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	Fill_Geo-21	123686
LCS 160-124219/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-124219/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 124397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	Fill_Geo-21	123927
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	Fill_Geo-21	123927
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	Fill_Geo-21	123927
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	Fill_Geo-21	123927
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	Fill_Geo-21	123927
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	Fill_Geo-21	123927
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	Fill_Geo-21	123927
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	Fill_Geo-21	123927

Rad (Continued)

Prep Batch: 124397 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	Fill_Geo-21	123927
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	Fill_Geo-21	123927
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	Fill_Geo-21	123927
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	Fill_Geo-21	123927
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	Fill_Geo-21	123927
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	Fill_Geo-21	123927
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	Fill_Geo-21	123927
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	Fill_Geo-21	123927
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	Fill_Geo-21	123927
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	Fill_Geo-21	123927
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124397/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-124397/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 124407

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	ExtChrom	123927
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	ExtChrom	123927
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	ExtChrom	123927
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	ExtChrom	123927
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	ExtChrom	123927
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	ExtChrom	123927
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	ExtChrom	123927
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	ExtChrom	123927
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	ExtChrom	123927
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	ExtChrom	123927
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	ExtChrom	123927
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	ExtChrom	123927
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	ExtChrom	123927
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	ExtChrom	123927
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	ExtChrom	123927
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	ExtChrom	123927
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	ExtChrom	123927
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	ExtChrom	123927
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124407/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124407/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	ExtChrom	123927
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	ExtChrom	123927
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	ExtChrom	123927
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	ExtChrom	123927
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	ExtChrom	123927
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	ExtChrom	123927

Rad (Continued)

Prep Batch: 124409 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	ExtChrom	123927
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	ExtChrom	123927
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	ExtChrom	123927
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	ExtChrom	123927
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	ExtChrom	123927
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	ExtChrom	123927
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	ExtChrom	123927
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	ExtChrom	123927
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	ExtChrom	123927
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	ExtChrom	123927
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	ExtChrom	123927
LCS 160-124409/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124409/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124410

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-74 DU	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	ExtChrom	123927
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	ExtChrom	123927
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	ExtChrom	123927
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	ExtChrom	123927
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	ExtChrom	123927
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	ExtChrom	123927
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	ExtChrom	123927
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	ExtChrom	123927
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	ExtChrom	123927
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	ExtChrom	123927
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	ExtChrom	123927
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	ExtChrom	123927
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	ExtChrom	123927
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	ExtChrom	123927
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	ExtChrom	123927
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	ExtChrom	123927
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	ExtChrom	123927
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	ExtChrom	123927
LCS 160-124410/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124410/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	Fill_Geo-21	123927
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	Fill_Geo-21	123927
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	Fill_Geo-21	123927
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	Fill_Geo-21	123927
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	Fill_Geo-21	123927
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	Fill_Geo-21	123927
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	Fill_Geo-21	123927
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	Fill_Geo-21	123927
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	Fill_Geo-21	123927
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	Fill_Geo-21	123927

Rad (Continued)

Prep Batch: 124411 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	Fill_Geo-21	123927
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	Fill_Geo-21	123927
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	Fill_Geo-21	123927
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	Fill_Geo-21	123927
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	Fill_Geo-21	123927
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	Fill_Geo-21	123927
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	Fill_Geo-21	123927
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	Fill_Geo-21	123927
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	Fill_Geo-21	123927
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124411/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-124411/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 124412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-93 DU	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	ExtChrom	123927
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	ExtChrom	123927
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	ExtChrom	123927
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	ExtChrom	123927
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	ExtChrom	123927
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	ExtChrom	123927
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	ExtChrom	123927
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	ExtChrom	123927
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	ExtChrom	123927
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	ExtChrom	123927
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	ExtChrom	123927
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	ExtChrom	123927
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	ExtChrom	123927
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	ExtChrom	123927
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	ExtChrom	123927
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	ExtChrom	123927
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	ExtChrom	123927
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	ExtChrom	123927
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124412/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124412/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-80 DU	BMAC-SOIL-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	Fill_Geo-21	123927
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	Fill_Geo-21	123927
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	Fill_Geo-21	123927
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	Fill_Geo-21	123927
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	Fill_Geo-21	123927
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	Fill_Geo-21	123927
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	Fill_Geo-21	123927

Rad (Continued)

Prep Batch: 124413 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	Fill_Geo-21	123927
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	Fill_Geo-21	123927
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	Fill_Geo-21	123927
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	Fill_Geo-21	123927
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	Fill_Geo-21	123927
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	Fill_Geo-21	123927
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	Fill_Geo-21	123927
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	Fill_Geo-21	123927
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	Fill_Geo-21	123927
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	Fill_Geo-21	123927
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	Fill_Geo-21	123927
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124413/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-124413/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 124414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	Fill_Geo-21	123927
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	Fill_Geo-21	123927
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	Fill_Geo-21	123927
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	Fill_Geo-21	123927
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-100 DU	BMAC-OUTFALL-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	Fill_Geo-21	123927
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	Fill_Geo-21	123927
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	Fill_Geo-21	123927
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	Fill_Geo-21	123927
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	Fill_Geo-21	123927
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	Fill_Geo-21	123927
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	Fill_Geo-21	123927
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	Fill_Geo-21	123927
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	Fill_Geo-21	123927
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	Fill_Geo-21	123927
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124414/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-124414/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 124608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	ExtChrom	123927
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	ExtChrom	123927
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	ExtChrom	123927
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	ExtChrom	123927
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	ExtChrom	123927
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	ExtChrom	123927
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	ExtChrom	123927
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	ExtChrom	123927
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	ExtChrom	123927

Rad (Continued)

Prep Batch: 124608 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	ExtChrom	123927
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	ExtChrom	123927
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	ExtChrom	123927
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	ExtChrom	123927
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	ExtChrom	123927
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	ExtChrom	123927
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	ExtChrom	123927
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	ExtChrom	123927
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	ExtChrom	123927
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124608/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124608/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124609

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	ExtChrom	123927
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	ExtChrom	123927
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	ExtChrom	123927
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	ExtChrom	123927
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	ExtChrom	123927
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	ExtChrom	123927
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	ExtChrom	123927
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	ExtChrom	123927
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	ExtChrom	123927
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	ExtChrom	123927
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	ExtChrom	123927
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	ExtChrom	123927
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	ExtChrom	123927
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	ExtChrom	123927
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	ExtChrom	123927
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	ExtChrom	123927
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	ExtChrom	123927
LCS 160-124609/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124609/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-74 DU	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	ExtChrom	123927
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	ExtChrom	123927
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	ExtChrom	123927
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	ExtChrom	123927
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	ExtChrom	123927
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	ExtChrom	123927
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	ExtChrom	123927
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	ExtChrom	123927
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	ExtChrom	123927
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	ExtChrom	123927

Rad (Continued)

Prep Batch: 124610 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	ExtChrom	123927
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	ExtChrom	123927
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	ExtChrom	123927
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	ExtChrom	123927
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	ExtChrom	123927
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	ExtChrom	123927
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	ExtChrom	123927
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	ExtChrom	123927
LCS 160-124610/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124610/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 124634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-93 DU	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	ExtChrom	123927
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	ExtChrom	123927
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	ExtChrom	123927
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	ExtChrom	123927
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	ExtChrom	123927
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	ExtChrom	123927
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	ExtChrom	123927
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	ExtChrom	123927
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	ExtChrom	123927
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	ExtChrom	123927
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	ExtChrom	123927
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	ExtChrom	123927
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	ExtChrom	123927
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	ExtChrom	123927
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	ExtChrom	123927
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	ExtChrom	123927
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	ExtChrom	123927
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	ExtChrom	123927
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124634/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124634/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 125139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	ExtChrom	123686
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	ExtChrom	123686

Rad (Continued)

Prep Batch: 125139 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	ExtChrom	123686
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	ExtChrom	123686
LCS 160-125139/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-125139/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	Client Sample ID	Th-229 (30-110)						
160-6793-1	BMAC-DISCRETE-00	77.9						
160-6793-1 DU	BMAC-DISCRETE-00	78.7						
160-6793-2	BMAC-DISCRETE-1	87.2						
160-6793-3	BMAC-DISCRETE-2	89.1						
160-6793-4	BMAC-DISCRETE-3	83.9						
160-6793-5	BMAC-DISCRETE-4	82.7						
160-6793-6	BMAC-DISCRETE-5	87.3						
160-6793-7	BMAC-DISCRETE-6	80.0						
160-6793-8	BMAC-DISCRETE-7	92.7						
160-6793-9	BMAC-DISCRETE-8	83.8						
160-6793-10	BMAC-DISCRETE-9	81.5						
160-6793-11	BMAC-DISCRETE-10	77.6						
160-6793-12	KOCH-SOIL-1	73.2						
160-6793-13	KOCH-SOIL-2	69.6						
160-6793-14	KOCH-SOIL-3	48.9						
160-6793-15	KOCH-SOIL-4	76.0						
160-6793-16	KOCH-SOIL-5	82.2						
160-6793-17	KOCH-SOIL-6	79.0						
160-6793-18	KOCH-GRASS-1	70.1						
160-6793-19	KOCH-GRASS-2	74.8						
160-6793-20	KOCH-GRASS-3	80.4						
160-6793-21	KOCH-GRASS-4	94.4						
160-6793-21 DU	KOCH-GRASS-4	91.7						
160-6793-22	KOCH-GRASS-5	84.3						
160-6793-23	KOCH-GRASS-6	86.2						
160-6793-24	BLANCHETTE-SOIL-1	87.0						
160-6793-25	BLANCHETTE-SOIL-2	87.5						
160-6793-26	BLANCHETTE-SOIL-3	86.0						
160-6793-27	BLANCHETTE-SOIL-4	89.1						
160-6793-28	BLANCHETTE-SOIL-5	85.2						
160-6793-29	BLANCHETTE-SOIL-6	81.4						
160-6793-30	BLANCHETTE-GRASS-1	86.3						
160-6793-31	BLANCHETTE-GRASS-2	83.6						
160-6793-32	BLANCHETTE-GRASS-3	88.5						
160-6793-33	BLANCHETTE-GRASS-4	89.7						
160-6793-34	BLANCHETTE-GRASS-5	86.4						
160-6793-35	BLANCHETTE-GRASS-6	81.3						
160-6793-36	BMAC-GRASS-1	84.7						
160-6793-36 DU	BMAC-GRASS-1	93.0						
160-6793-37	BMAC-GRASS-2	86.8						
160-6793-38	BMAC-GRASS-3	84.5						
160-6793-39	BMAC-GRASS-4	88.3						
160-6793-40	BMAC-GRASS-5	89.0						
160-6793-41	BMAC-GRASS-6	82.8						
160-6793-42	BMAC-GRASS-7	89.4						
160-6793-43	BMAC-GRASS-8	86.6						
160-6793-44	BMAC-GRASS-9	81.4						
160-6793-45	BMAC-GRASS-10	87.8						
160-6793-46	BMAC-GRASS-11	87.4						

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	Client Sample ID	Th-229 (30-110)						
160-6793-47	BMAC-GRASS-12	82.9						
160-6793-48	BMAC-GRASS-13	85.3						
160-6793-49	BMAC-GRASS-14	85.9						
160-6793-50	BMAC-GRASS-15	95.3						
160-6793-51	BMAC-GRASS-16	91.3						
160-6793-52	BMAC-GRASS-17	78.3						
160-6793-53	BMAC-GRASS-18	97.2						
160-6793-54	BMAC-GRASS-19	89.0						
160-6793-55	BMAC-GRASS-20	89.3						
160-6793-56	BMAC-GRASS-21	79.2						
160-6793-56 DU	BMAC-GRASS-21	80.6						
160-6793-57	BMAC-GRASS-22	88.4						
160-6793-58	BMAC-GRASS-23	85.7						
160-6793-59	BMAC-GRASS-24	89.6						
160-6793-60	BMAC-GRASS-25	83.2						
160-6793-61	BMAC-GRASS-26	89.8						
160-6793-62	BMAC-GRASS-27	89.4						
160-6793-63	BMAC-GRASS-28	85.4						
160-6793-64	BMAC-GRASS-29	89.2						
160-6793-65	BMAC-GRASS-30	89.2						
160-6793-66	BMAC-SOIL-1	89.3						
160-6793-67	BMAC-SOIL-2	91.2						
160-6793-68	BMAC-SOIL-3	88.5						
160-6793-69	BMAC-SOIL-4	78.8						
160-6793-70	BMAC-SOIL-5	83.9						
160-6793-71	BMAC-SOIL-6	79.0						
160-6793-72	BMAC-SOIL-7	92.7						
160-6793-73	BMAC-SOIL-8	88.6						
160-6793-74	BMAC-SOIL-9	81.0						
160-6793-74 DU	BMAC-SOIL-9	94.8						
160-6793-75	BMAC-SOIL-10	80.2						
160-6793-76	BMAC-SOIL-11	83.8						
160-6793-77	BMAC-SOIL-12	81.7						
160-6793-78	BMAC-SOIL-13	86.3						
160-6793-79	BMAC-SOIL-14	84.7						
160-6793-80	BMAC-SOIL-15	79.2						
160-6793-81	BMAC-SOIL-16	83.4						
160-6793-82	BMAC-SOIL-17	82.5						
160-6793-83	BMAC-SOIL-18	98.7						
160-6793-84	BMAC-SOIL-19	81.3						
160-6793-85	BMAC-SOIL-20	82.6						
160-6793-86	BMAC-SOIL-21	95.4						
160-6793-87	BMAC-SOIL-22	91.7						
160-6793-88	BMAC-SOIL-23	74.9						
160-6793-89	BMAC-SOIL-24	77.9						
160-6793-90	BMAC-SOIL-25	91.5						
160-6793-91	BMAC-SOIL-26	83.7						
160-6793-92	BMAC-SOIL-27	88.2						
160-6793-93	BMAC-SOIL-28	85.5						

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	Client Sample ID	Th-229 (30-110)						
160-6793-93 DU	BMAC-SOIL-28	76.5						
160-6793-94	BMAC-SOIL-29	89.7						
160-6793-95	BMAC-SOIL-30	89.9						
160-6793-96	BMAC-OUTFALL-2	95.1						
160-6793-97	BMAC-OUTFALL-3	83.5						
160-6793-98	BMAC-OUTFALL-4	98.3						
160-6793-99	BMAC-OUTFALL-5	83.6						
160-6793-100	BMAC-OUTFALL-6	84.8						
160-6793-101	BMAC-OUTFALL-7	85.9						
160-6793-102	BMAC-OUTFALL-8	80.8						
160-6793-103	BMAC-OUTFALL-9	88.4						
160-6793-104	BMAC-OUTFALL-10	80.3						
160-6793-105	BMAC-OUTFALL-11	91.6						
160-6793-106	BMAC-OUTFALL-14	90.3						
160-6793-107	BMAC-OUTFALL-15	87.9						
160-6793-108	BMAC-OUTFALL-16	83.4						
160-6793-109	BMAC-OUTFALL-17	80.3						
160-6793-110	BMAC-OUTFALL-18	91.6						
160-6793-111	BMAC-OUTFALL-19	82.5						
160-6793-112	BMAC-OUTFALL-20	97.9						
LCS 160-123904/2-A	Lab Control Sample	82.8						
LCS 160-124407/2-A	Lab Control Sample	91.1						
LCS 160-124409/2-A	Lab Control Sample	88.8						
LCS 160-124410/2-A	Lab Control Sample	89.0						
LCS 160-124412/2-A	Lab Control Sample	94.8						
LCS 160-125139/2-A	Lab Control Sample	87.0						
MB 160-123904/1-A	Method Blank	89.3						
MB 160-124407/1-A	Method Blank	88.2						
MB 160-124409/1-A	Method Blank	93.6						
MB 160-124410/1-A	Method Blank	85.9						
MB 160-124412/1-A	Method Blank	89.6						
MB 160-125139/1-A	Method Blank	91.6						

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	Client Sample ID	U-232 (30-110)						
160-6793-1	BMAC-DISCRETE-00	76.4						
160-6793-1 DU	BMAC-DISCRETE-00	77.1						
160-6793-2	BMAC-DISCRETE-1	77.5						
160-6793-3	BMAC-DISCRETE-2	72.3						
160-6793-4	BMAC-DISCRETE-3	73.8						
160-6793-5	BMAC-DISCRETE-4	83.1						
160-6793-6	BMAC-DISCRETE-5	94.5						

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	Client Sample ID	U-232 (30-110)							
160-6793-7	BMAC-DISCRETE-6	73.1							
160-6793-8	BMAC-DISCRETE-7	89.0							
160-6793-9	BMAC-DISCRETE-8	69.9							
160-6793-10	BMAC-DISCRETE-9	85.0							
160-6793-11	BMAC-DISCRETE-10	83.2							
160-6793-12	KOCH-SOIL-1	78.8							
160-6793-13	KOCH-SOIL-2	75.4							
160-6793-14	KOCH-SOIL-3	45.9							
160-6793-15	KOCH-SOIL-4	74.6							
160-6793-16	KOCH-SOIL-5	86.9							
160-6793-17	KOCH-SOIL-6	75.9							
160-6793-18	KOCH-GRASS-1	70.5							
160-6793-19	KOCH-GRASS-2	78.0							
160-6793-20	KOCH-GRASS-3	77.6							
160-6793-21	KOCH-GRASS-4	83.4							
160-6793-21 DU	KOCH-GRASS-4	72.6							
160-6793-22	KOCH-GRASS-5	85.8							
160-6793-23	KOCH-GRASS-6	77.7							
160-6793-24	BLANCHETTE-SOIL-1	81.3							
160-6793-25	BLANCHETTE-SOIL-2	87.8							
160-6793-26	BLANCHETTE-SOIL-3	88.0							
160-6793-27	BLANCHETTE-SOIL-4	94.7							
160-6793-28	BLANCHETTE-SOIL-5	86.9							
160-6793-29	BLANCHETTE-SOIL-6	86.1							
160-6793-30	BLANCHETTE-GRASS-1	64.3							
160-6793-31	BLANCHETTE-GRASS-2	69.1							
160-6793-32	BLANCHETTE-GRASS-3	71.8							
160-6793-33	BLANCHETTE-GRASS-4	71.8							
160-6793-34	BLANCHETTE-GRASS-5	75.2							
160-6793-35	BLANCHETTE-GRASS-6	64.5							
160-6793-36	BMAC-GRASS-1	91.8							
160-6793-36 DU	BMAC-GRASS-1	82.3							
160-6793-37	BMAC-GRASS-2	92.9							
160-6793-38	BMAC-GRASS-3	78.2							
160-6793-39	BMAC-GRASS-4	91.3							
160-6793-40	BMAC-GRASS-5	89.9							
160-6793-41	BMAC-GRASS-6	82.9							
160-6793-42	BMAC-GRASS-7	88.2							
160-6793-43	BMAC-GRASS-8	85.0							
160-6793-44	BMAC-GRASS-9	58.3							
160-6793-45	BMAC-GRASS-10	82.2							
160-6793-46	BMAC-GRASS-11	81.6							
160-6793-47	BMAC-GRASS-12	75.4							
160-6793-48	BMAC-GRASS-13	86.0							
160-6793-49	BMAC-GRASS-14	84.1							
160-6793-50	BMAC-GRASS-15	83.7							
160-6793-51	BMAC-GRASS-16	78.0							
160-6793-52	BMAC-GRASS-17	75.5							
160-6793-53	BMAC-GRASS-18	88.6							

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	Client Sample ID	U-232 (30-110)						
160-6793-54	BMAC-GRASS-19	76.7						
160-6793-55	BMAC-GRASS-20	83.8						
160-6793-56	BMAC-GRASS-21	81.6						
160-6793-56 DU	BMAC-GRASS-21	74.5						
160-6793-57	BMAC-GRASS-22	85.0						
160-6793-58	BMAC-GRASS-23	90.9						
160-6793-59	BMAC-GRASS-24	93.7						
160-6793-60	BMAC-GRASS-25	96.3						
160-6793-61	BMAC-GRASS-26	91.8						
160-6793-62	BMAC-GRASS-27	89.6						
160-6793-63	BMAC-GRASS-28	88.1						
160-6793-64	BMAC-GRASS-29	88.1						
160-6793-65	BMAC-GRASS-30	88.1						
160-6793-66	BMAC-SOIL-1	87.5						
160-6793-67	BMAC-SOIL-2	86.7						
160-6793-68	BMAC-SOIL-3	88.1						
160-6793-69	BMAC-SOIL-4	81.5						
160-6793-70	BMAC-SOIL-5	82.8						
160-6793-71	BMAC-SOIL-6	87.3						
160-6793-72	BMAC-SOIL-7	89.4						
160-6793-73	BMAC-SOIL-8	92.3						
160-6793-74	BMAC-SOIL-9	69.0						
160-6793-74 DU	BMAC-SOIL-9	82.7						
160-6793-75	BMAC-SOIL-10	79.7						
160-6793-76	BMAC-SOIL-11	73.7						
160-6793-77	BMAC-SOIL-12	80.5						
160-6793-78	BMAC-SOIL-13	83.5						
160-6793-79	BMAC-SOIL-14	84.4						
160-6793-80	BMAC-SOIL-15	82.0						
160-6793-81	BMAC-SOIL-16	89.4						
160-6793-82	BMAC-SOIL-17	84.6						
160-6793-83	BMAC-SOIL-18	83.7						
160-6793-84	BMAC-SOIL-19	80.4						
160-6793-85	BMAC-SOIL-20	86.3						
160-6793-86	BMAC-SOIL-21	77.9						
160-6793-87	BMAC-SOIL-22	78.9						
160-6793-88	BMAC-SOIL-23	84.2						
160-6793-89	BMAC-SOIL-24	76.0						
160-6793-90	BMAC-SOIL-25	84.0						
160-6793-91	BMAC-SOIL-26	85.3						
160-6793-92	BMAC-SOIL-27	84.1						
160-6793-93	BMAC-SOIL-28	77.2						
160-6793-93 DU	BMAC-SOIL-28	83.7						
160-6793-94	BMAC-SOIL-29	86.3						
160-6793-95	BMAC-SOIL-30	87.3						
160-6793-96	BMAC-OUTFALL-2	78.3						
160-6793-97	BMAC-OUTFALL-3	77.9						
160-6793-98	BMAC-OUTFALL-4	83.1						
160-6793-99	BMAC-OUTFALL-5	90.8						

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
Lab Sample ID	Client Sample ID	U-232 (30-110)						
160-6793-100	BMAC-OUTFALL-6	79.0						
160-6793-101	BMAC-OUTFALL-7	85.3						
160-6793-102	BMAC-OUTFALL-8	79.4						
160-6793-103	BMAC-OUTFALL-9	84.4						
160-6793-104	BMAC-OUTFALL-10	90.8						
160-6793-105	BMAC-OUTFALL-11	76.5						
160-6793-106	BMAC-OUTFALL-14	88.3						
160-6793-107	BMAC-OUTFALL-15	94.6						
160-6793-108	BMAC-OUTFALL-16	82.3						
160-6793-109	BMAC-OUTFALL-17	84.5						
160-6793-110	BMAC-OUTFALL-18	84.6						
160-6793-111	BMAC-OUTFALL-19	84.8						
160-6793-112	BMAC-OUTFALL-20	76.6						
LCS 160-123926/2-A	Lab Control Sample	77.8						
LCS 160-123942/2-A	Lab Control Sample	85.0						
LCS 160-124608/2-A	Lab Control Sample	84.3						
LCS 160-124609/2-A	Lab Control Sample	91.9						
LCS 160-124610/2-A	Lab Control Sample	76.8						
LCS 160-124634/2-A	Lab Control Sample	81.5						
MB 160-123926/1-A	Method Blank	89.2						
MB 160-123942/1-A	Method Blank	88.0						
MB 160-124608/1-A	Method Blank	86.9						
MB 160-124609/1-A	Method Blank	85.4						
MB 160-124610/1-A	Method Blank	82.9						
MB 160-124634/1-A	Method Blank	79.7						

Tracer/Carrier Legend

U-232 = Uranium-232

APPENDIX F

DATA VALIDATION REPORT

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL II

Site:	Bridgeton Municipal Athletic Complex
Laboratory:	TestAmerica Laboratories, St. Louis, Missouri
Data Reviewer:	Jessica Vickers, Tetra Tech, Inc. (Tetra Tech)
Review Date	June 23, 2014
Sample Delivery Group (SDG):	160-6793-1

Sample Numbers:
BLANCHETTE-GRASS-1, BLANCHETTE-GRASS-2, BLANCHETTE-GRASS-3, BLANCHETTE-GRASS-4, BLANCHETTE-GRASS-5, BLANCHETTE-GRASS-6, BLANCHETTE-SOIL-1, BLANCHETTE-SOIL-2, BLANCHETTE-SOIL-3, BLANCHETTE-SOIL-4, BLANCHETTE-SOIL-5, BLANCHETTE-SOIL-6, BMAC-DISCRETE-00, BMAC-DISCRETE-1, BMAC-DISCRETE-2, BMAC-DISCRETE-3, BMAC-DISCRETE-4, BMAC-DISCRETE-5, BMAC-DISCRETE-6, BMAC-DISCRETE-7, BMAC-DISCRETE-8, BMAC-DISCRETE-9, BMAC-DISCRETE-10, BMAC-GRASS-1, BMAC-GRASS-2, BMAC-GRASS-3, BMAC-GRASS-4, BMAC-GRASS-5, BMAC-GRASS-6, BMAC-GRASS-7, BMAC-GRASS-8, BMAC-GRASS-9, BMAC-GRASS-10, BMAC-GRASS-11, BMAC-GRASS-12, BMAC-GRASS-13, BMAC-GRASS-14, BMAC-GRASS-15, BMAC-GRASS-16, BMAC-GRASS-17, BMAC-GRASS-18, BMAC-GRASS-19, BMAC-GRASS-20, BMAC-GRASS-21, BMAC-GRASS-22, BMAC-GRASS-23, BMAC-GRASS-24, BMAC-GRASS-25, BMAC-GRASS-26, BMAC-GRASS-27, BMAC-GRASS-28, BMAC-GRASS-29, BMAC-GRASS-30, BMAC-OUTFALL-2, BMAC-OUTFALL-3, BMAC-OUTFALL-4, BMAC-OUTFALL-5, BMAC-OUTFALL-6, BMAC-OUTFALL-7, BMAC-OUTFALL-8, BMAC-OUTFALL-9, BMAC-OUTFALL-10, BMAC-OUTFALL-11, BMAC-OUTFALL-14, BMAC-OUTFALL-15, BMAC-OUTFALL-16, BMAC-OUTFALL-17, BMAC-OUTFALL-18, BMAC-OUTFALL-19, BMAC-OUTFALL-20, BMAC-SOIL-1, BMAC-SOIL-2, BMAC-SOIL-3, BMAC-SOIL-4, BMAC-SOIL-5, BMAC-SOIL-6, BMAC-SOIL-7, BMAC-SOIL-8, BMAC-SOIL-9, BMAC-SOIL-10, BMAC-SOIL-11, BMAC-SOIL-12, BMAC-SOIL-13, BMAC-SOIL-14, BMAC-SOIL-15, BMAC-SOIL-16, BMAC-SOIL-17, BMAC-SOIL-18, BMAC-SOIL-19, BMAC-SOIL-20, BMAC-SOIL-21, BMAC-SOIL-22, BMAC-SOIL-23, BMAC-SOIL-24, BMAC-SOIL-25, BMAC-SOIL-26, BMAC-SOIL-27, BMAC-SOIL-28, BMAC-SOIL-29, BMAC-SOIL-30, KOCH-GRASS-1, KOCH-GRASS-2, KOCH-GRASS-3, KOCH-GRASS-4, KOCH-GRASS-5, KOCH-GRASS-6, KOCH-SOIL-1, KOCH-SOIL-2, KOCH-SOIL-3, KOCH-SOIL-4, KOCH-SOIL-5, and KOCH-SOIL-6

Matrix /Number of Samples: 112 Solid Samples

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" (9240.1-51, January 2010) and Chapter 8 of "Multi-Agency Radiological Laboratory Analytical Procedures Manual (MARLAP, 402-B-04-001A, July 2004). In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) was used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project specific data package.

I, Jessica A. Vickers, certify that all data validation criteria outlined in the above referenced documents were assessed, and any qualifications made to the data were in accordance with those documents.

Jessica A. Vickers

June 23, 2014

Certified by Jessica A. Vickers, Chemist Date

DATA VALIDATION QUALIFIERS

U — The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased high.

J- — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased low.

UJ — The analyte was analyzed for, but was not detected above the reported sample quantitation limit, which is estimated.

R — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) 160-6783-1 included one hundred twelve (112) environmental solid samples collected on May 21 through 23, 2014. The samples were analyzed for radioactive isotopes of uranium and thorium using alpha spectroscopy (Method A-01-R) and radioactive isotopes using gamma spectroscopy (Method GA-01-R) following the Department of Energy's Environmental Measurements Laboratory (EML) Procedures Manual HASL-300. The following summarizes the data validation that was performed.

RADIOLOGICAL ANALYSIS

I. Holding Time and Chain of Custody (COC) Requirements

All samples were received by the laboratory and analyzed within the customary holding time of 6 months from sample collection to analysis. No data were qualified.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not used with radiological analyses. The laboratory duplicate and LCS results provided adequate data on precision and accuracy. No data were qualified.

III. Blanks

Measurable detections of thorium-230, thorium-232, uranium-238, and/or lead-214 were detected in at least one of the method blanks associated with this SDG. The NFGs state that results below the blank value should be considered non-detectable (flagged "U") at the MDC, and that results above the blank concentration but less than 10 times the value should be flagged "J+". Thus, the following data were qualified:

- The lead-212 results (by gamma spectroscopy) for these samples were qualified as estimated with a possible high bias (flagged "J+"):

BMAC-SOIL-11	BMAC-OUTFALL-14	BMAC-OUTFALL-18
BMAC-OUTFALL-7	BMAC-OUTFALL-16	
BMAC-OUTFALL-8	BMAC-OUTFALL-17	

- The thorium-230 (by isotopic thorium analysis) results for these samples were qualified as estimated with a possible high bias (flagged "J+"):

BMAC-GRASS-1	BMAC-GRASS-19	BMAC-SOIL-14
BMAC-GRASS-2	BMAC-GRASS-20	BMAC-SOIL-15
BMAC-GRASS-3	BMAC-GRASS-23	BMAC-SOIL-16
BMAC-GRASS-6	BMAC-GRASS-27	BMAC-SOIL-17
BMAC-GRASS-8	BMAC-GRASS-29	BMAC-SOIL-18
BMAC-GRASS-9	BMAC-SOIL-1	BMAC-SOIL-19
BMAC-GRASS-11	BMAC-SOIL-2	BMAC-SOIL-20
BMAC-GRASS-12	BMAC-SOIL-3	BMAC-SOIL-21
BMAC-GRASS-13	BMAC-SOIL-7	BMAC-SOIL-22
BMAC-GRASS-14	BMAC-SOIL-9	BMAC-SOIL-23

BMAC-GRASS-15	BMAC-SOIL-10	BMAC-SOIL-26
BMAC-GRASS-16	BMAC-SOIL-11	BMAC-SOIL-27
BMAC-GRASS-17	BMAC-SOIL-12	
BMAC-GRASS-18	BMAC-SOIL-13	

- The uranium-238 results (by alpha spectroscopy) for these samples were qualified as estimated with a possible high bias (flagged "J+"):

BMAC-DISCRETE-5	BMAC-DISCRETE-8	KOCH-SOIL-1
BMAC-DISCRETE-7	BMAC-DISCRETE-9	KOCH-SOIL-2

- In addition, the thorium-230 (by isotopic thorium analysis) results for these samples were qualified as non-detect (flagged "U").

BMAC-SOIL-24	BMAC-SOIL-25

IV. Laboratory Control Sample (LCS)

Percent recoveries for the LCS analyses were within established control limits. No data were qualified.

V. Comments

Most laboratory duplicate results were well within their quality control limits for relative error ratio (RER). The exceptions were related to the gamma spectroscopy analyses of bismuth-212 for sample BMAC-GRASS-21 and actinium-227, actinium-228, radium-228, and thorium-232 for sample BMAC-OUTFALL-6, which all had RERs greater than 1. Therefore, the associated results were qualified as estimated (flagged "J").

VI. Overall Assessment of Data

Overall data quality is acceptable, with no unusual qualifications added. All data are usable as qualified for their intended purposes.

APPENDIX G

BACKGROUND THRESHOLD VALUE CALCULATION SPREADSHEETS DATA

	A	B	C	D	E	F	G	H	I	J	K	L
1				**Background Statistics for Uncensored Full Data Sets**								
2			**User Selected Options**									
3			Date/Time of Computation	7/15/2014 4:35:56 PM								
4			From File	C:\Users\david.homer.TT\Documents\START Rg 7\BMAC\Alpha Spec Data@2014-07-07T13;57;57.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	95%								
7			Coverage	95%								
8			New or Future K Observations	1								
9			Number of Bootstrap Operations	2000								
10												
11	**Th230**											
12												
13	**General Statistics**											
14			Total Number of Observations			24			Number of Distinct Observations			23
15			Minimum			0.636			First Quartile			0.777
16			Second Largest			1.19			Median			0.905
17			Maximum			1.22			Third Quartile			1.043
18			Mean			0.92			SD			0.164
19			Coefficient of Variation			0.178			Skewness			0.307
20			Mean of logged Data			-0.098			SD of logged Data			0.178
21												
22						**Critical Values for Background Threshold Values (BTVs)**						
23			Tolerance Factor K (For UTL)			2.309			d2max (for USL)			2.644
24												
25						**Normal GOF Test**						
26			Shapiro Wilk Test Statistic			0.958			**Shapiro Wilk GOF Test**			
27			5% Shapiro Wilk Critical Value			0.916			Data appear Normal at 5% Significance Level			
28			Lilliefors Test Statistic			0.109			**Lilliefors GOF Test**			
29			5% Lilliefors Critical Value			0.181			Data appear Normal at 5% Significance Level			
30						**Data appear Normal at 5% Significance Level**						
31												
32						**Background Statistics Assuming Normal Distribution**						
33			95% UTL with 95% Coverage			1.299			90% Percentile (z)			1.131
34			95% UPL (t)			1.207			95% Percentile (z)			1.19
35			95% USL			1.354			99% Percentile (z)			1.302
36												
37						**Gamma GOF Test**						
38			A-D Test Statistic			0.31			**Anderson-Darling Gamma GOF Test**			
39			5% A-D Critical Value			0.742			Detected data appear Gamma Distributed at 5% Significance Level			
40			K-S Test Statistic			0.101			**Kolmogrov-Smirnoff Gamma GOF Test**			
41			5% K-S Critical Value			0.177			Detected data appear Gamma Distributed at 5% Significance Level			
42						**Detected data appear Gamma Distributed at 5% Significance Level**						
43												
44						**Gamma Statistics**						
45			k hat (MLE)			33.18			k star (bias corrected MLE)			29.06
46			Theta hat (MLE)			0.0277			Theta star (bias corrected MLE)			0.0317
47			nu hat (MLE)			1593			nu star (bias corrected)			1395
48			MLE Mean (bias corrected)			0.92			MLE Sd (bias corrected)			0.171
49												

	A	B	C	D	E	F	G	H	I	J	K	L
50	**Background Statistics Assuming Gamma Distribution**											
51	95% Wilson Hilferty (WH) Approx. Gamma UPL					1.225	90% Percentile					1.145
52	95% Hawkins Wixley (HW) Approx. Gamma UPL					1.228	95% Percentile					1.218
53	95% WH Approx. Gamma UTL with 95% Coverage					1.339	99% Percentile					1.363
54	95% HW Approx. Gamma UTL with 95% Coverage					1.346						
55	95% WH USL					1.411	95% HW USL					1.42
56												
57	**Lognormal GOF Test**											
58	Shapiro Wilk Test Statistic					0.969	**Shapiro Wilk Lognormal GOF Test**					
59	5% Shapiro Wilk Critical Value					0.916	Data appear Lognormal at 5% Significance Level					
60	Lilliefors Test Statistic					0.0948	**Lilliefors Lognormal GOF Test**					
61	5% Lilliefors Critical Value					0.181	Data appear Lognormal at 5% Significance Level					
62	**Data appear Lognormal at 5% Significance Level**											
63												
64	**Background Statistics assuming Lognormal Distribution**											
65	95% UTL with 95% Coverage					1.367	90% Percentile (z)					1.139
66	95% UPL (t)					1.237	95% Percentile (z)					1.215
67	95% USL					1.451	99% Percentile (z)					1.371
68												
69	**Nonparametric Distribution Free Background Statistics**											
70	**Data appear Normal at 5% Significance Level**											
71												
72	**Nonparametric Upper Limits for Background Threshold Values**											
73	Order of Statistic, r					24	95% UTL with 95% Coverage					1.22
74	Approximate f					1.263	Confidence Coefficient (CC) achieved by UTL					0.708
75	95% Percentile Bootstrap UTL with 95% Coverage					1.22	95% BCA Bootstrap UTL with 95% Coverage					1.22
76	95% UPL					1.213	90% Percentile					1.148
77	90% Chebyshev UPL					1.422	95% Percentile					1.186
78	95% Chebyshev UPL					1.65	99% Percentile					1.213
79	95% USL					1.22						
80												
81	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
82	data set free of outliers and consists of observations collected from clean unimpacted locations.											
83	The use of USL tends to provide a balance between false positives and false negatives provided the data											
84	represents a background data set and when many onsite observations need to be compared with the BTV.											
85												
86	**U238**											
87												
88	**General Statistics**											
89	Total Number of Observations					24	Number of Distinct Observations					23
90	Minimum					0.512	First Quartile					0.554
91	Second Largest					0.847	Median					0.613
92	Maximum					0.896	Third Quartile					0.672
93	Mean					0.636	SD					0.105
94	Coefficient of Variation					0.166	Skewness					1.056
95	Mean of logged Data					-0.465	SD of logged Data					0.157
96												
97	**Critical Values for Background Threshold Values (BTVs)**											
98	Tolerance Factor K (For UTL)					2.309	d2max (for USL)					2.644
99												

	A	B	C	D	E	F	G	H	I	J	K	L
100	**Normal GOF Test**											
101					Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**					
102					5% Shapiro Wilk Critical Value	0.916	Data Not Normal at 5% Significance Level					
103					Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**					
104					5% Lilliefors Critical Value	0.181	Data appear Normal at 5% Significance Level					
105	**Data appear Approximate Normal at 5% Significance Level**											
106												
107	**Background Statistics Assuming Normal Distribution**											
108					95% UTL with 95% Coverage	0.879				90% Percentile (z)		0.771
109					95% UPL (t)	0.82				95% Percentile (z)		0.809
110					95% USL	0.915				99% Percentile (z)		0.881
111												
112	**Gamma GOF Test**											
113					A-D Test Statistic	0.553	**Anderson-Darling Gamma GOF Test**					
114					5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.114	**Kolmogrov-Smirnoff Gamma GOF Test**					
116					5% K-S Critical Value	0.177	Detected data appear Gamma Distributed at 5% Significance Level					
117	**Detected data appear Gamma Distributed at 5% Significance Level**											
118												
119	**Gamma Statistics**											
120					k hat (MLE)	41.1				k star (bias corrected MLE)		35.99
121					Theta hat (MLE)	0.0155				Theta star (bias corrected MLE)		0.0177
122					nu hat (MLE)	1973				nu star (bias corrected)		1727
123					MLE Mean (bias corrected)	0.636				MLE Sd (bias corrected)		0.106
124												
125	**Background Statistics Assuming Gamma Distribution**											
126					95% Wilson Hilferty (WH) Approx. Gamma UPL	0.824				90% Percentile		0.775
127					95% Hawkins Wixley (HW) Approx. Gamma UPL	0.825				95% Percentile		0.82
128					95% WH Approx. Gamma UTL with 95% Coverage	0.893				99% Percentile		0.908
129					95% HW Approx. Gamma UTL with 95% Coverage	0.895						
130					95% WH USL	0.937				95% HW USL		0.94
131												
132	**Lognormal GOF Test**											
133					Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk Lognormal GOF Test**					
134					5% Shapiro Wilk Critical Value	0.916	Data appear Lognormal at 5% Significance Level					
135					Lilliefors Test Statistic	0.104	**Lilliefors Lognormal GOF Test**					
136					5% Lilliefors Critical Value	0.181	Data appear Lognormal at 5% Significance Level					
137	**Data appear Lognormal at 5% Significance Level**											
138												
139	**Background Statistics assuming Lognormal Distribution**											
140					95% UTL with 95% Coverage	0.903				90% Percentile (z)		0.768
141					95% UPL (t)	0.827				95% Percentile (z)		0.813
142					95% USL	0.951				99% Percentile (z)		0.905
143												
144	**Nonparametric Distribution Free Background Statistics**											
145	**Data appear Approximate Normal at 5% Significance Level**											
146												
147	**Nonparametric Upper Limits for Background Threshold Values**											
148					Order of Statistic, r	24				95% UTL with 95% Coverage		0.896
149					Approximate f	1.263				Confidence Coefficient (CC) achieved by UTL		0.708

	A	B	C	D	E	F	G	H	I	J	K	L
150				95% Percentile Bootstrap UTL with	95% Coverage	0.896				95% BCA Bootstrap UTL with	95% Coverage	0.896
151					95% UPL	0.884					90% Percentile	0.797
152					90% Chebyshev UPL	0.959					95% Percentile	0.843
153					95% Chebyshev UPL	1.105					99% Percentile	0.885
154					95% USL	0.896						
155												
156	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
157	data set free of outliers and consists of observations collected from clean unimpacted locations.											
158	The use of USL tends to provide a balance between false positives and false negatives provided the data											
159	represents a background data set and when many onsite observations need to be compared with the BTV.											
160												

	A	B	C	D	E	F	G	H	I	J	K	L
1				**Background Statistics for Data Sets with Non-Detects**								
2			**User Selected Options**									
3			Date/Time of Computation	7/9/2014 10:56:32 AM								
4			From File	Gamma Spec Data@2014-07-07T14;03;42@2014-07-07T15;36;00.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	95%								
7			Coverage	95%								
8			Different or Future K Observations	1								
9			Number of Bootstrap Operations	2000								
10												
11	**U238**											
12												
13						**General Statistics**						
14						Total Number of Observations	24			Number of Missing Observations		0
15						Number of Distinct Observations	23					
16						Number of Detects	3			Number of Non-Detects		21
17						Number of Distinct Detects	3			Number of Distinct Non-Detects		20
18						Minimum Detect	2.67			Minimum Non-Detect		0.384
19						Maximum Detect	3.66			Maximum Non-Detect		3.21
20						Variance Detected	0.278			Percent Non-Detects		87.5%
21						Mean Detected	3.27			SD Detected		0.527
22						Mean of Detected Logged Data	1.176			SD of Detected Logged Data		0.169
23												
24						**Warning: Data set has only 3 Detected Values.**						
25						**This is not enough to compute meaningful or reliable statistics and estimates.**						
26												
27												
28						**Critical Values for Background Threshold Values (BTVs)**						
29						Tolerance Factor K (For UTL)	2.309			d2max (for USL)		2.644
30												
31						**Normal GOF Test on Detects Only**						
32						Shapiro Wilk Test Statistic	0.881			**Shapiro Wilk GOF Test**		
33						5% Shapiro Wilk Critical Value	0.767			Detected Data appear Normal at 5% Significance Level		
34						Lilliefors Test Statistic	0.321			**Lilliefors GOF Test**		
35						5% Lilliefors Critical Value	0.512			Detected Data appear Normal at 5% Significance Level		
36						**Detected Data appear Normal at 5% Significance Level**						
37												
38						**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**						
39						Mean	0.749			SD		0.97
40						95% UTL95% Coverage	2.989			95% KM UPL (t)		2.446
41						90% KM Percentile (z)	1.993			95% KM Percentile (z)		2.345
42						99% KM Percentile (z)	3.006			95% KM USL		3.314
43												
44						**DL/2 Substitution Background Statistics Assuming Normal Distribution**						
45						Mean	0.961			SD		0.958
46						95% UTL95% Coverage	3.172			95% UPL (t)		2.636
47						90% Percentile (z)	2.188			95% Percentile (z)		2.536
48						99% Percentile (z)	3.189			95% USL		3.493
49						**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**						
50												

	A	B	C	D	E	F	G	H	I	J	K	L
51	Gamma GOF Tests on Detected Observations Only											
52	Not Enough Data to Perform GOF Test											
53												
54	Gamma Statistics on Detected Data Only											
55					k hat (MLE)	54.13			k star (bias corrected MLE)			N/A
56					Theta hat (MLE)	0.0604			Theta star (bias corrected MLE)			N/A
57					nu hat (MLE)	324.8			nu star (bias corrected)			N/A
58					MLE Mean (bias corrected)	N/A						
59					MLE Sd (bias corrected)	N/A			95% Percentile of Chisquare (2k)			N/A
60												
61	Gamma ROS Statistics using Imputed Non-Detects											
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
63	GROS may not be used when kstar of detected data is small such as < 0.1											
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
66					Minimum	0.337			Mean			1.138
67					Maximum	3.66			Median			0.831
68					SD	0.85			CV			0.747
69					k hat (MLE)	3.287			k star (bias corrected MLE)			2.904
70					Theta hat (MLE)	0.346			Theta star (bias corrected MLE)			0.392
71					nu hat (MLE)	157.8			nu star (bias corrected)			139.4
72					MLE Mean (bias corrected)	1.138			MLE Sd (bias corrected)			0.668
73					95% Percentile of Chisquare (2k)	12.3			90% Percentile			2.034
74					95% Percentile	2.411			99% Percentile			3.231
75	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
76	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
77					WH	HW					WH	HW
78				95% Approx. Gamma UTL with 95% Coverage	3.083	3.095			95% Approx. Gamma UPL		2.44	2.422
79				95% Gamma USL	3.517	3.56						
80												
81	The following statistics are computed using gamma distribution and KM estimates											
82	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
83					k hat (KM)	0.596			nu hat (KM)			28.63
84					WH	HW					WH	HW
85				95% Approx. Gamma UTL with 95% Coverage	2.768	2.73			95% Approx. Gamma UPL		2.015	1.95
86				95% Gamma USL	3.297	3.296						
87												
88	Lognormal GOF Test on Detected Observations Only											
89					Shapiro Wilk Test Statistic	0.866			Shapiro Wilk GOF Test			
90					5% Shapiro Wilk Critical Value	0.767			Detected Data appear Lognormal at 5% Significance Level			
91					Lilliefors Test Statistic	0.33			Lilliefors GOF Test			
92					5% Lilliefors Critical Value	0.512			Detected Data appear Lognormal at 5% Significance Level			
93	Detected Data appear Lognormal at 5% Significance Level											
94												
95	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
96					Mean in Original Scale	1.638			Mean in Log Scale			0.443
97					SD in Original Scale	0.653			SD in Log Scale			0.292
98					95% UTL95% Coverage	3.058			95% BCA UTL95% Coverage			3.66
99					95% Bootstrap (%) UTL95% Coverage	3.66			95% UPL (t)			2.597
100					90% Percentile (z)	2.265			95% Percentile (z)			2.519
101					99% Percentile (z)	3.073			95% USL			3.372

	A	B	C	D	E	F	G	H	I	J	K	L
102												
103						**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**						
104					KM Mean of Logged Data	-0.687				95% KM UTL (Lognormal)95% Coverage		2.598
105					KM SD of Logged Data	0.711				95% KM UPL (Lognormal)		1.745
106					95% KM Percentile Lognormal (z)	1.62				95% KM USL (Lognormal)		3.296
107												
108						**Background DL/2 Statistics Assuming Lognormal Distribution**						
109					Mean in Original Scale	0.961				Mean in Log Scale		-0.369
110					SD in Original Scale	0.958				SD in Log Scale		0.775
111					95% UTL95% Coverage	4.141				95% UPL (t)		2.683
112					90% Percentile (z)	1.867				95% Percentile (z)		2.474
113					99% Percentile (z)	4.197				95% USL		5.369
114						**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**						
115												
116						**Nonparametric Distribution Free Background Statistics**						
117						**Data appear to follow a Discernible Distribution at 5% Significance Level**						
118												
119						**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**						
120					Order of Statistic, r	24				95% UTL with95% Coverage		3.66
121					Approximate f	1.263				Confidence Coefficient (CC) achieved by UTL		0.708
122					95% UPL	3.615				95% USL		3.66
123					95% KM Chebyshev UPL	5.065						
124												
125						Note: The use of USL to estimate a BTV is recommended only when the data set represents a background						
126						data set free of outliers and consists of observations collected from clean unimpacted locations.						
127						The use of USL tends to provide a balance between false positives and false negatives provided the data						
128						represents a background data set and when many onsite observations need to be compared with the BTV.						
129												
130	**Ra226**											
131												
132	**General Statistics**											
133					Total Number of Observations	24				Number of Distinct Observations		22
134					Minimum	0.794				First Quartile		1.033
135					Second Largest	1.36				Median		1.175
136					Maximum	1.65				Third Quartile		1.293
137					Mean	1.158				SD		0.199
138					Coefficient of Variation	0.172				Skewness		0.0291
139					Mean of logged Data	0.132				SD of logged Data		0.178
140												
141						**Critical Values for Background Threshold Values (BTVs)**						
142					Tolerance Factor K (For UTL)	2.309				d2max (for USL)		2.644
143												
144						**Normal GOF Test**						
145					Shapiro Wilk Test Statistic	0.958				**Shapiro Wilk GOF Test**		
146					5% Shapiro Wilk Critical Value	0.916				Data appear Normal at 5% Significance Level		
147					Lilliefors Test Statistic	0.114				**Lilliefors GOF Test**		
148					5% Lilliefors Critical Value	0.181				Data appear Normal at 5% Significance Level		
149						**Data appear Normal at 5% Significance Level**						
150												

	A	B	C	D	E	F	G	H	I	J	K	L
151						Background Statistics Assuming Normal Distribution						
152					95% UTL with 95% Coverage	1.618				90% Percentile (z)		1.413
153					95% UPL (t)	1.507				95% Percentile (z)		1.486
154					95% USL	1.685				99% Percentile (z)		1.622
155												
156						Gamma GOF Test						
157					A-D Test Statistic	0.487				Anderson-Darling Gamma GOF Test		
158					5% A-D Critical Value	0.742				Detected data appear Gamma Distributed at 5% Significance Level		
159					K-S Test Statistic	0.133				Kolmogrov-Smirnoff Gamma GOF Test		
160					5% K-S Critical Value	0.177				Detected data appear Gamma Distributed at 5% Significance Level		
161						Detected data appear Gamma Distributed at 5% Significance Level						
162												
163						Gamma Statistics						
164					k hat (MLE)	33.96				k star (bias corrected MLE)		29.74
165					Theta hat (MLE)	0.0341				Theta star (bias corrected MLE)		0.0389
166					nu hat (MLE)	1630				nu star (bias corrected)		1428
167					MLE Mean (bias corrected)	1.158				MLE Sd (bias corrected)		0.212
168												
169						Background Statistics Assuming Gamma Distribution						
170					95% Wilson Hilferty (WH) Approx. Gamma UPL	1.537				90% Percentile		1.437
171					95% Hawkins Wixley (HW) Approx. Gamma UPL	1.542				95% Percentile		1.528
172					95% WH Approx. Gamma UTL with 95% Coverage	1.678				99% Percentile		1.708
173					95% HW Approx. Gamma UTL with 95% Coverage	1.688						
174					95% WH USL	1.767				95% HW USL		1.78
175												
176						Lognormal GOF Test						
177					Shapiro Wilk Test Statistic	0.945				Shapiro Wilk Lognormal GOF Test		
178					5% Shapiro Wilk Critical Value	0.916				Data appear Lognormal at 5% Significance Level		
179					Lilliefors Test Statistic	0.145				Lilliefors Lognormal GOF Test		
180					5% Lilliefors Critical Value	0.181				Data appear Lognormal at 5% Significance Level		
181						Data appear Lognormal at 5% Significance Level						
182												
183						Background Statistics assuming Lognormal Distribution						
184					95% UTL with 95% Coverage	1.722				90% Percentile (z)		1.434
185					95% UPL (t)	1.558				95% Percentile (z)		1.529
186					95% USL	1.827				99% Percentile (z)		1.727
187												
188						Nonparametric Distribution Free Background Statistics						
189						Data appear Normal at 5% Significance Level						
190												
191						Nonparametric Upper Limits for Background Threshold Values						
192					Order of Statistic, r	24				95% UTL with 95% Coverage		1.65
193					Approximate f	1.263				Confidence Coefficient (CC) achieved by UTL		0.708
194					95% Percentile Bootstrap UTL with 95% Coverage	1.65				95% BCA Bootstrap UTL with 95% Coverage		1.65
195					95% UPL	1.578				90% Percentile		1.334
196					90% Chebyshev UPL	1.768				95% Percentile		1.357
197					95% Chebyshev UPL	2.045				99% Percentile		1.583
198					95% USL	1.65						
199												

	A	B	C	D	E	F	G	H	I	J	K	L
200	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
201	data set free of outliers and consists of observations collected from clean unimpacted locations.											
202	The use of USL tends to provide a balance between false positives and false negatives provided the data											
203	represents a background data set and when many onsite observations need to be compared with the BTV.											
204												
205	Pb210											
206												
207	General Statistics											
208	Total Number of Observations					24	Number of Missing Observations					0
209	Number of Distinct Observations					22						
210	Number of Detects					2	Number of Non-Detects					22
211	Number of Distinct Detects					2	Number of Distinct Non-Detects					20
212	Minimum Detect					2.79	Minimum Non-Detect					-0.0589
213	Maximum Detect					4.12	Maximum Non-Detect					3.34
214	Variance Detected					0.884	Percent Non-Detects					91.67%
215	Mean Detected					3.455	SD Detected					0.94
216												
217	Warning: Data set has only 2 Detected Values.											
218	This is not enough to compute meaningful or reliable statistics and estimates.											
219												
220												
221	Critical Values for Background Threshold Values (BTVs)											
222	Tolerance Factor K (For UTL)					2.309	d2max (for USL)					2.644
223												
224	Normal GOF Test on Detects Only											
225	Not Enough Data to Perform GOF Test											
226												
227	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
228	Mean					0.252	SD					1.01
229	95% UTL95% Coverage					2.584	95% KM UPL (t)					2.018
230	90% KM Percentile (z)					1.546	95% KM Percentile (z)					1.913
231	99% KM Percentile (z)					2.601	95% KM USL					2.922
232												
233	DL/2 Substitution Background Statistics Assuming Normal Distribution											
234	Mean					1.129	SD					0.889
235	95% UTL95% Coverage					3.182	95% UPL (t)					2.684
236	90% Percentile (z)					2.268	95% Percentile (z)					2.591
237	99% Percentile (z)					3.197	95% USL					3.479
238	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
239												
240	Gamma GOF Tests on Detected Observations Only											
241	Not Enough Data to Perform GOF Test											
242												
243	Gamma Statistics on Detected Data Only											
244	k hat (MLE)					26.66	k star (bias corrected MLE)					N/A
245	Theta hat (MLE)					0.13	Theta star (bias corrected MLE)					N/A
246	nu hat (MLE)					106.6	nu star (bias corrected)					N/A
247	MLE Mean (bias corrected)					N/A						
248	MLE Sd (bias corrected)					N/A	95% Percentile of Chisquare (2k)					N/A
249												

	A	B	C	D	E	F	G	H	I	J	K	L
250	The following statistics are computed using gamma distribution and KM estimates											
251	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
252					k hat (KM)	0.0621					nu hat (KM)	2.982
253					WH	HW					WH	HW
254	95% Approx. Gamma UTL with 95% Coverage				N/A	N/A				95% Approx. Gamma UPL	N/A	N/A
255				95% Gamma USL	N/A	N/A						
256												
257	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
258	Data not Log Transformable!											
259												
260	Nonparametric Distribution Free Background Statistics											
261	Data do not follow a Discernible Distribution (0.05)											
262												
263	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
264				Order of Statistic, r		24				95% UTL with95% Coverage		4.12
265				Approximate f		1.263				Confidence Coefficient (CC) achieved by UTL		0.708
266				95% UPL		3.925				95% USL		4.12
267				95% KM Chebyshev UPL		4.745						
268												
269	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
270	data set free of outliers and consists of observations collected from clean unimpacted locations.											
271	The use of USL tends to provide a balance between false positives and false negatives provided the data											
272	represents a background data set and when many onsite observations need to be compared with the BTV.											
273												
274												
275												
276												

APPENDIX H

ANALYTICAL DATA TABLE

Sample Information		Gamma Spectrometery Analysis (pCi/g)															Alpha Spectrometery Analysis (pCi/g)					
		U-238 Decay Series						U-235 Decay Series			Th-232 Decay Series						Isotopic Thorium			Isotopic Uranium		
Sample ID	Date Collected	U-238	Th-234	Ra-226	Pb-214	Bi-214	Pb-210	U-235	Pa-231	Ac-227	Th-232	Ra-228	Ac-228	Pb-212	Bi-212	Tl-208	Th-228	Th-230	Th-232	U-233/ 234	U-235 /236	U-238
Reference Samples - Blanchette Park																						
Blanchette-Grass-1	5/22/2014	1.73 U	1.73 U	1.32	1.17	1.32	2.69 U	0.368 U	0.583 U	0.0551 U	1.38	1.38	1.38	1.09	2.05	0.382	0.810	0.823	0.706	0.671	0.0524 U	0.896
Blanchette-Grass-2	5/22/2014	3.21 U	3.21 U	1.28	1.14	1.28	3.34 U	0.159 U	0.0103 U	-0.818 U	0.499 U	0.499 U	0.499 U	1.09	1.10 U	0.439	0.536	0.968	0.688	0.781	0.0347 U	0.659
Blanchette-Grass-3	5/22/2014	1.20 U	1.20 U	1.16	1.14	1.16	2.65 U	0.166 U	0.355 U	0.101 U	1.18	1.18	1.18	1.08	0.450 U	0.247	0.522	0.986	0.387	0.655	0.000 U	0.613
Blanchette-Grass-4	5/22/2014	1.31 U	1.31 U	1.15	1.47	1.15	1.53 U	0.189 U	0.610 U	-0.403 U	1.38	1.38	1.38	1.04	1.09	0.287	0.607	0.772	0.511	0.703	0.0164 U	0.541
Blanchette-Grass-5	5/22/2014	2.24 U	2.24 U	1.14	1.22	1.14	0.359 U	0.297 U	0.0453 U	0.162 U	1.41	1.41	1.41	0.905	0.896 U	0.273	0.651	0.779	0.560	0.635	0.0324 U	0.707
Blanchette-Grass-6	5/22/2014	0.565 U	0.565 U	1.04	1.19	1.04	3.24 U	0.180 U	-0.841 U	0.0500 U	1.15	1.15	1.15	1.00	0.623 U	0.449	0.738	1.08	0.644	0.656	0.0336	0.512
Blanchette-Soil-1	5/22/2014	1.35 U	1.35 U	0.935	0.836	0.935	0.402 U	0.0534 U	0.0528 U	-0.409 U	1.12	1.12	1.12	0.908	0.505 U	0.308	0.729	0.636	0.672	0.522	0.0282 U	0.847
Blanchette-Soil-2	5/22/2014	0.384 U	0.384 U	1.09	1.02	1.09	1.06 U	0.248 U	0.332 U	0.0996 U	1.15	1.15	1.15	0.830	0.482 U	0.305	0.759	0.769	0.692	0.632	0.0248 U	0.819
Blanchette-Soil-3	5/22/2014	1.71 U	1.71 U	1.01	1.16	1.01	1.47 U	0.125 U	0.320 U	0.0655 U	1.04	1.04	1.04	0.878	0.406 U	0.410	0.688	0.734	0.867	0.464	0.00866 U	0.549
Blanchette-Soil-4	5/22/2014	0.974 U	0.974 U	0.843	0.676	0.843	0.793 U	-0.0302 U	-0.0550 U	0.121 U	0.603	0.603	0.603	0.616	1.91	0.300	0.495	0.720	0.715	0.780	0.0387	0.584
Blanchette-Soil-5	5/22/2014	1.22 U	1.22 U	0.794	0.889	0.794	1.81 U	-0.0107 U	-0.190 U	0.101 U	1.16	1.16	1.16	0.893	0.843 U	0.331	0.658	0.857	0.752	0.578	0.0187	0.641
Blanchette-Soil-6	5/22/2014	0.498 U	0.498 U	0.804	0.909	0.804	2.50 U	0.0623 U	0.500 U	-0.546 U	0.635	0.635	0.635	0.753	0.0173 U	0.255	0.667	0.764	0.538	0.540	0.0133 U	0.520
Reference Samples - Koch Park																						
Koch-Grass-1	5/22/2014	1.92 U	1.92 U	1.19	1.46	1.19	2.79	0.145 U	0.439 U	0.122 U	1.04	1.04	1.04	1.23	1.78	0.378	0.707	0.906	0.876	0.698	0.0141 U	0.610
Koch-Grass-2	5/22/2014	0.900 U	0.900 U	1.29	1.29	1.29	2.14 U	0.386 U	0.701 U	0.131 U	1.26	1.26	1.26	1.03	0.234 U	0.398	0.751	1.12	0.865	0.582	0.0429	0.567
Koch-Grass-3	5/22/2014	0.741 U	0.741 U	1.19	1.34	1.19	3.34 U	0.148 U	0.576 U	0.0992 U	0.980	0.980	0.980	1.07	1.75	0.348	1.04	1.16	0.748	0.691	0.00653 U	0.664
Koch-Grass-4	5/22/2014	1.71 U	1.71 U	1.32	1.50	1.32	4.12	0.424 U	1.49 U	0.0458 U	0.716 U	0.716 U	0.716 U	1.23	0.879 U	0.273	0.716	0.947	0.678	0.561	0.0118 U	0.613
Koch-Grass-5	5/22/2014	0.707 U	0.707 U	1.30	1.49	1.30	1.53 U	0.259 U	0.255 U	0.384	1.16	1.16	1.16	1.02	1.13 U	0.361	0.733	1.19	0.981	0.434	-0.00524 U	0.523
Koch-Grass-6	5/22/2014	3.66	3.66	1.13	1.41	1.13	2.16 U	0.311 U	0.613 U	0.0433 U	0.860	0.860	0.860	1.04	0.809 U	0.456	0.721	0.932	0.836	0.732	0.0472	0.745
Koch-Soil-1	5/22/2014	0.876 U	0.876 U	1.36	1.49	1.36	0.724 U	0.242 U	0.878 U	0.188 U	1.30	1.30	1.30	1.20	0.661 U	0.389	0.724	1.03	0.822	0.574	0.0979	0.555 J+
Koch-Soil-2	5/22/2014	3.48	3.48	1.34	1.37	1.34	2.17 U	0.128 U	0.678 U	-0.614 U	0.910	0.910	0.910	1.14	1.58	0.448	0.851	1.22	0.800	0.515	0.0466	0.529 J+
Koch-Soil-3	5/22/2014	1.48 U	1.48 U	0.986	1.44	0.986	2.73	0.230 U	0.479 U	0.434	1.28	1.28	1.28	1.07	0.902 U	0.486	0.654	0.904	0.714	0.614	0.0315 U	0.667
Koch-Soil-4	5/22/2014	1.08 U	1.08 U	1.65	1.28	1.65	2.74 U	0.415 U	-0.227 U	-0.000380 U	1.31	1.31	1.31	1.29	0.177 U	0.405	0.919	0.850	0.533	0.442	0.0477	0.686
Koch-Soil-5	5/22/2014	2.67	2.67	1.21	1.24	1.21	-0.0589 U	0.137 U	0.775 U	0.123 U	0.928	0.928	0.928	1.22	1.14 U	0.449	0.617	1.12	0.814	0.594	0.0409	0.582
Koch-Soil-6	5/22/2014	0.692 U	0.692 U	1.26	1.17	1.26	1.04 U	0.173 U	0.282 U	0.0696 U	1.30	1.30	1.30	0.911	0.386 U	0.412	0.576	0.824	0.636	0.405	0.0310 U	0.635
BMAC Discrete Samples																						
BMAC-Discrete-00	5/21/2014	1.07 U	1.07 U	1.08	1.34	1.08	0.387 U	0.0282 U	0.589 U	-0.855 U	1.62	1.62	1.62	1.08	0.643 U	0.348	1.05	0.960	0.894	0.722	0.0315 U	0.704
BMAC-Discrete-01	5/21/2014	0.600 U	0.600 U	1.41	1.37	1.41	6.55	0.180 U	0.599 U	0.0703 U	1.05	1.05	1.05	0.743	1.39	0.335	0.636	1.23	0.646	0.883	0.0310 U	0.831
BMAC-Discrete-02	5/21/2014	1.11 U	1.11 U	1.26	1.17	1.26	4.34	0.223 U	1.03 U	-0.575 U	0.748	0.748	0.748	0.980	-0.00916 U	0.250	0.654	1.05	0.683	0.699	0.0671	0.808
BMAC-Discrete-03	5/21/2014	0.942 U	0.942 U	1.14	1.26	1.14	2.77	0.105 U	0.172 U	-0.241 U	1.31	1.31	1.31	1.11	0.723 U	0.374	0.836	0.792	0.707	0.625	0.0291 U	0.562
BMAC-Discrete-04	5/21/2014	0.705 U	0.705 U	0.943	0.876	0.943	9.45	0.241 U	0.279 U	-0.400 U	0.851	0.851	0.851	0.660	0.914 U	0.367	0.546	0.899	0.528	0.561	0.0287 U	0.593
BMAC-Discrete-05	5/21/2014	0.928 U	0.928 U	0.772	0.718	0.772	0.988 U	0.298 U	0.214 U	0.0765 U	0.751	0.751	0.751	0.787	0.710 U	0.265	0.475	0.637	0.487	0.338	0.0420 U	0.400 J+
BMAC-Discrete-06	5/21/2014	0.737 U	0.737 U	1.23	1.15	1.23	2.13 U	0.233 U	0.120 U	0.0500 U	1.43	1.43	1.43	1.03	0.893 U	0.228	0.710	0.784	0.726	0.457	0.000 U	0.579
BMAC-Discrete-07	5/21/2014	0.171 U	0.171 U	0.891	0.823	0.891	2.32 U	-0.0257 U	0.573 U	0.0709 U	0.657	0.657	0.657	0.779	0.285 U	0.276	0.545	0.720	0.479	0.477	0.0408	0.448 J+
BMAC-Discrete-08	5/21/2014	0.980 U	0.980 U	1.14	1.27	1.14	3.94	0.295 U	0.138 U	0.269	1.10	1.10	1.10	1.07	0.607 U	0.420	0.739	0.918	0.711	0.480	0.0936 U	0.539 J+
BMAC-Discrete-09	5/21/2014	0.636 U	0.636 U	0.844	0.887	0.844	2.91	0.0954 U	0.954 U	-0.0205 U	0.751	0.751	0.751	0.659	0.446 U	0.312	0.753	0.887	0.523	0.442	0.0112 U	0.500 J+
BMAC-Discrete-10	5/21/2014	0.920 U	0.920 U	1.13	0.960	1.13	2.18 U	0.185 U	0.671 U	0.0257 U	0.589	0.589	0.589	0.792	0.426 U	0.263	0.944	0.792	0.891	0.641	0.0262 U	0.621
BMAC-Outfall-2	5/23/2014	1.66 U	1.66 U	1.22	1.44	1.22	3.32	0.258 U	0.561 U	0.0555 U	1.15	1.15	1.15	0.986	0.781 U	0.443	0.815	1.04	0.705	0.717	0.0123 U	0.669
BMAC-Outfall-3	5/23/2014	1.64 U	1.64 U	1.21	0.984	1.21	6.53	0.231 U	0.658 U	0.0425 U	1.23	1.23	1.23	1.10	1.11 U	0.374	0.942	1.14	0.837	0.485	0.0239 U	0.625
BMAC-Outfall-4	5/23/2014	1.62 U	1.62 U	1.10	1.27	1.10	3.67	0.0474 U	0.713 U	0.218 U	1.13	1.13	1.13	1.25	0.613 U	0.397	1.02	1.00	0.841	0.537	0.0573	0.748
BMAC-Outfall-5	5/23/2014	1.34 U	1.34 U	1.14	1.17	1.14	1.55 U	-0.0409 U	0.382 U	0.314 U	1.11	1.11	1.11	1.04	0.538 U	0.360	0.752	0.985	0.710	0.524	0.0190 U	0.595
BMAC-Outfall-6	5/23/2014	2.10	2.10	0.728	1.12	0.728	2.91	0.236 U	0.728 U	-0.606 UJ	1.26 J	1.26 J	1.26 J	0.963	1.57	0.287	0.709	0.797	0.548	0.639	0.00896 U	0.507
BMAC-Outfall-7	5/23/2014	0.763 U	0.763 U	0.777	0.971	0.777	3.83	0.0794 U	0.396 U	0.0325 U	0.638	0.638	0.638	0.567	0.549 U	0.301	0.671	0.845	0.424	0.557	0.0257 U	0.553
BMAC-Outfall-8	5/23/2014	0.954 U	0.954 U	0.787	0.838 J+	0.787	6.60	0.208 U	0.117 U	0.106 U	0.0511 U	0.0511 U	0.0511 U	0.354	0.596 U	0.178	0.645	1.03	0.582	0.679	0.0373 U	0.689
BMAC-Outfall-9	5/23/2014	1.43 U	1.43 U	1.08	1.07	1.08	3.50	0.140 U	0.752 U	0.0278 U	0.809	0.809	0.809	0.972	1.00 U	0.413	0.880	1.18	0.670	0.830	0.0821	0.569
BMAC-Outfall-10	5/23/2014	1.55 U	1.55 U	0.916	1.10	0.916	1.40 U	-0.0474 U	0.660 U	-0.441 U	0.405	0.405	0.405	0.923	0.596 U	0.337	0.918	1.01	0.789	0.581	0.0373 U	0.786
BMAC-Outfall-11	5/23/2014	1.54 U	1.54 U	1.09	1.23	1.09	2.24	0.208 U	0.298 U	-0.452 U	1.41	1.41	1.41	1.32	0.626 U	0.438	0.999	1.08	0.762	0.619	0.103	0.520
BMAC-Outfall-14	5/23/2014	0.802 U	0.802 U	1.03	1.15	1.03	2.86 U	0.139 U	0.567 U	-0.281 U	0.551	0.551	0.551	0.888	1.56	0.364	1.02	1.48	0.852	0.594	0.0198 U	0.614
BMAC-Outfall-15	5/23/2014	1.60 U	1.60 U	0.978	1.15	0.978	2.88	0.263 U	0.0614 U	0.202 U	0.945	0.945	0.945	0.994	0.862 U	0.321	0.845	1.02	0.542	0.626	0.0600	0.657
BMAC-Outfall-16	5/23/2014	0.406 U	0.406 U	1.17	1.04	1.17	2.24 U	0.202 U	0.766 U	0.148 U	1.20	1.20	1.20	0.898	0.000 U	0.430	0.868	1.13	0.713	0.523	0.0519 U	0.651
BMAC-Outfall-17	5/23/2014	0.569 U	0.569 U	0.740	0.780 J+	0.740	-0.885 U	0.109 U	-0.113 U	0.0727 U	0.648	0.648	0.648	0.482	0.234 U	0.242	0.965	0.855	0.721	0.525	0.0829	0.690
BMAC-Outfall-18	5/23/2014	0.828 U	0.828 U	0.918	1.04	0.918	3.40	0.157 U	-0.521 U	0.0967 U	0.593	0.593	0.593	0.672	0.00643 U	0.306	0.817	0.742	0.591	0.693	0.128	0.694
BMAC-Outfall-19	5/23/2014	2.76	2.76	1.04	1.29	1.04	4.99	0.219 U	0.443 U	0.0614 U	0.608 U	0.608 U	0.608 U	0.938	0.262 U	0.388	0.994	0.958	0.735	0.487	0.0253 U	0.544
BMAC-Outfall-20	5/23/2014	0.788 U	0.788 U	1.12	1.30	1.12	4.46	0.0278 U	0.341 U	0.111 U	1.10	1.10	1.10	1.01	0.675 U	0.231	0.869	0.853	0.697	0.535	0.109	0.644

Sample Information		Gamma Spectrometery Analysis (pCi/g)															Alpha Spectrometery Analysis (pCi/g)					
		U-238 Decay Series						U-235 Decay Series			Th-232 Decay Series						Isotopic Thorium			Isotopic Uranium		
Sample ID	Date Collected	U-238	Th-234	Ra-226	Pb-214	Bi-214	Pb-210	U-235	Pa-231	Ac-227	Th-232	Ra-228	Ac-228	Pb-212	Bi-212	Tl-208	Th-228	Th-230	Th-232	U-233/ 234	U-235 /236	U-238
BMAC Composite Samples																						
BMAC-Grass-1	5/23/2014	1.27 U	1.27 U	1.16	1.43	1.16	1.83 U	0.222 U	0.810 U	-0.557 U	1.18	1.18	1.18	1.25	-0.0296 U	0.315	0.756	0.994 J+	0.817	0.657	0.0107 U	0.652
BMAC-Grass-2	5/23/2014	1.29 U	1.29 U	0.791	1.37	0.791	3.59	0.262 U	0.424 U	-0.0592 U	1.29	1.29	1.29	1.30	0.603 U	0.506	0.935	0.906 J+	0.926	0.682	0.0236 U	0.546
BMAC-Grass-3	5/23/2014	1.66 U	1.66 U	1.18	1.43	1.18	2.29 U	0.548 U	1.49 U	0.133 U	0.788	0.788	0.788	1.45	0.221 U	0.637	0.874	0.965 J+	0.846	0.502	0.0359 U	0.684
BMAC-Grass-4	5/23/2014	0.832 U	0.832 U	1.13	1.07	1.13	1.18 U	0.00107 U	0.816 U	0.0188 U	1.34	1.34	1.34	1.18	2.62	0.391	0.917	1.11	0.794	0.787	0.0126 U	0.639
BMAC-Grass-5	5/23/2014	1.36 U	1.36 U	1.39	1.58	1.39	4.44	0.220 U	0.554 U	-0.0808 U	1.45	1.45	1.45	1.30	0.464 U	0.481	1.03	1.08	0.777	0.626	0.0243 U	0.606
BMAC-Grass-6	5/23/2014	0.853 U	0.853 U	0.665	0.523	0.665	0.944 U	0.0651 U	0.190 U	-0.202 U	0.254	0.254	0.254	0.551	0.00 U	0.211	0.454	0.686 J+	0.485	0.384	0.0508 U	0.529
BMAC-Grass-7	5/23/2014	1.76 U	1.76 U	1.14	1.15	1.14	1.78 U	-0.0231 U	0.451 U	-0.531 U	0.711	0.711	0.711	1.07	0.846 U	0.410	1.02	1.08	1.01	0.840	0.0682	0.778
BMAC-Grass-8	5/23/2014	1.13 U	1.13 U	0.625	0.640	0.625	1.36 U	0.114 U	0.494 U	-0.216 U	0.769	0.769	0.769	0.538	1.03	0.203	0.544	0.566 J+	0.533	0.401	0.00616 U	0.409
BMAC-Grass-9	5/23/2014	0.0240 U	0.0240 U	0.458	0.576	0.458	0.0377 U	0.0729 U	0.306 U	-0.295 U	0.533	0.533	0.533	0.493	0.0415 U	0.178	0.501	0.766 J+	0.468	0.577	0.0127 U	0.472
BMAC-Grass-10	5/23/2014	1.76 U	1.76 U	1.35	1.44	1.35	3.44	0.145 U	0.871 U	0.0818 U	0.904	0.904	0.904	1.25	0.946 U	0.308	1.24	1.18	0.843	0.844	0.0713	0.898
BMAC-Grass-11	5/23/2014	0.908 U	0.908 U	0.950	1.21	0.950	0.843 U	0.133 U	0.737 U	-0.0442 U	0.984	0.984	0.984	0.988	1.07 U	0.464	0.940	0.918 J+	0.848	0.673	0.0229 U	0.682
BMAC-Grass-12	5/23/2014	0.974 U	0.974 U	0.883	0.937	0.883	1.30 U	0.170 U	0.394 U	0.106 U	1.02	1.02	1.02	0.914	1.06	0.341	0.786	0.999 J+	0.689	0.577	0.0129 U	0.540
BMAC-Grass-13	5/23/2014	1.79 U	1.79 U	0.929	1.30	0.929	2.34 U	0.146 U	0.267 U	0.379	0.640	0.640	0.640	1.04	1.38	0.367	0.783	0.883 J+	0.702	0.612	-0.00267 U	0.672
BMAC-Grass-14	5/23/2014	0.739 U	0.739 U	0.467	0.767	0.467	0.938 U	0.141 U	0.355 U	-0.433 U	0.749	0.749	0.749	0.495	0.499 U	0.221	0.599	0.676 J+	0.637	0.407	0.0383 U	0.466
BMAC-Grass-15	5/23/2014	1.70 U	1.70 U	1.20	1.16	1.20	0.604 U	0.00159 U	0.993 U	0.165 U	0.907	0.907	0.907	1.06	0.540 U	0.394	1.09	0.806 J+	0.812	0.652	0.0355 U	0.580
BMAC-Grass-16	5/23/2014	1.08 U	1.08 U	0.606	0.502	0.606	1.68	0.219 U	0.389 U	-0.114 U	0.318	0.318	0.318	0.451	0.393 U	0.152	0.509	0.441 J+	0.380	0.422	0.0285 U	0.323
BMAC-Grass-17	5/23/2014	0.531 U	0.531 U	0.580	0.572	0.580	-0.156 U	0.151 U	0.414 U	0.0707 U	0.708	0.708	0.708	0.656	0.599 U	0.181	0.711	0.831 J+	0.435	0.506	0.0259 U	0.457
BMAC-Grass-18	5/23/2014	0.203 U	0.203 U	0.954	0.987	0.954	1.61 U	0.160 U	0.547 U	-0.00315 U	0.867	0.867	0.867	0.960	0.510 U	0.277	0.636	0.752 J+	0.640	0.593	0.0668	0.453
BMAC-Grass-19	5/23/2014	0.846 U	0.846 U	1.18	1.25	1.18	2.18 U	0.206 U	0.704 U	0.0224 U	1.08	1.08	1.08	0.905	0.445 U	0.472	0.751	0.959 J+	0.889	0.552	-0.0155 U	0.674
BMAC-Grass-20	5/23/2014	1.03 U	1.03 U	1.08	1.24	1.08	2.63	0.118 U	0.828 U	0.120 U	0.828	0.828	0.828	1.14	1.14	0.453	0.901	0.945 J+	0.901	0.630	0.0356 U	0.845
BMAC-Grass-21	5/23/2014	0.640 U	0.640 U	0.551	0.570	0.551	1.06 U	0.0411 U	0.320 U	0.0318 U	0.618	0.618	0.618	0.454	0.148 UJ	0.205	0.531	0.963	0.432	0.440	0.0297 U	0.286
BMAC-Grass-22	5/23/2014	0.810 U	0.810 U	1.04	1.12	1.04	3.05	0.259 U	0.704 U	0.113 U	1.52	1.52	1.52	1.13	1.05 U	0.477	0.798	1.03	0.862	0.743	0.0845	0.615
BMAC-Grass-23	5/23/2014	0.285 U	0.285 U	0.962	1.44	0.962	0.436 U	0.297 U	0.765 U	-1.07 U	0.844	0.844	0.844	1.03	1.01 U	0.431	0.714	0.884 J+	1.01	0.469	0.0313 U	0.657
BMAC-Grass-24	5/23/2014	0.664 U	0.664 U	1.23	1.21	1.23	3.27 U	0.198 U	0.473 U	0.180 U	1.18	1.18	1.18	1.19	1.03 U	0.409	0.721	1.08	0.776	0.793	0.0258 U	0.506
BMAC-Grass-25	5/23/2014	2.25 U	2.25 U	0.890	1.14	0.890	0.902 U	0.245 U	0.211 U	-0.577 U	1.19	1.19	1.19	1.15	0.965 U	0.431	0.848	1.17	0.852	0.481	0.0628	0.635
BMAC-Grass-26	5/23/2014	2.15 U	2.15 U	1.09	1.20	1.09	3.08	0.250 U	-0.0832 U	0.00193 U	1.29	1.29	1.29	1.10	1.41	0.376	0.810	0.985	0.893	0.554	0.0288 U	0.677
BMAC-Grass-27	5/23/2014	2.18	2.18	1.39	1.35	1.39	2.47	0.218 U	0.391 U	0.301 U	1.29	1.29	1.29	1.06	0.626 U	0.400	0.644	0.856 J+	0.600	0.471	0.0629	0.520
BMAC-Grass-28	5/23/2014	0.828 U	0.828 U	1.20	1.21	1.20	1.20 U	0.162 U	0.325 U	-0.864 U	0.841	0.841	0.841	0.877	0.886 U	0.420	0.869	1.02	0.708	0.598	0.0645	0.557
BMAC-Grass-29	5/23/2014	1.57 U	1.57 U	0.990	1.04	0.990	2.23	0.00400 U	0.120 U	-0.518 U	1.19	1.19	1.19	0.962	1.62	0.337	0.683	0.902 J+	0.754	0.818	0.0247 U	0.873
BMAC-Grass-30	5/23/2014	0.947 U	0.947 U	1.11	1.17	1.11	3.42 U	0.149 U	0.721 U	0.462 U	1.30	1.30	1.30	0.971	0.752 U	0.420	0.772	1.12	0.678	0.725	0.0137 U	0.826
BMAC-Soil-1	5/23/2014	1.02 U	1.02 U	0.652	0.714	0.652	1.11 U	0.195 U	0.00417 U	0.0711 U	0.865	0.865	0.865	0.735	0.237 U	0.158	0.532	0.602 J+	0.407	0.373	0.0591	0.386
BMAC-Soil-2	5/23/2014	0.728 U	0.728 U	0.588	0.733	0.588	3.18	0.0550 U	0.575 U	-0.258 U	0.472	0.472	0.472	0.561	0.175 U	0.273	0.582	0.597 J+	0.475	0.474	0.0136 U	0.438
BMAC-Soil-3	5/23/2014	0.673 U	0.673 U	0.585	0.629	0.585	0.703 U	0.134 U	-0.306 U	0.0148 U	0.820	0.820	0.820	0.554	0.468 U	0.239	0.539	0.547 J+	0.527	0.531	0.0415	0.348
BMAC-Soil-4	5/23/2014	0.953 U	0.953 U	1.20	1.23	1.20	1.58 U	0.103 U	0.972 U	-0.0232 U	1.55	1.55	1.55	1.28	2.06	0.397	1.11	1.37	0.749	1.12	0.0118 U	1.04
BMAC-Soil-5	5/23/2014	1.03 U	1.03 U	1.36	1.39	1.36	2.77	0.248 U	0.601 U	0.00466 U	1.31	1.31	1.31	1.30	2.18	0.475	0.922	1.17	0.724	0.700	0.0586	0.952
BMAC-Soil-6	5/23/2014	1.40 U	1.40 U	1.28	1.40	1.28	0.901 U	0.0904 U	0.678 U	-0.0105 U	1.01	1.01	1.01	1.15	0.482 U	0.393	1.16	1.10	1.05	0.904	0.0278 U	0.686
BMAC-Soil-7	5/23/2014	0.645 U	0.645 U	0.819	0.960	0.819	1.91 U	0.0640 U	0.463 U	0.0220 U	0.786	0.786	0.786	0.647	0.0521 U	0.289	0.579	0.583 J+	0.427	0.480	-0.00247 U	0.327
BMAC-Soil-8	5/23/2014	0.593 U	0.593 U	0.701	0.642	0.701	1.15 U	0.0766 U	0.437 U	-0.436 U	0.501	0.501	0.501	0.609	0.235 U	0.231	0.473	0.587 J+	0.426	0.332	0.000 U	0.498
BMAC-Soil-9	5/23/2014	0.948 U	0.948 U	0.771	0.649	0.771	0.278 U	0.0828 U	0.355 U	0.183 U	0.734	0.734	0.734	0.649	0.836 U	0.265	0.514	0.726 J+	0.653	0.370	0.0174 U	0.467
BMAC-Soil-10	5/23/2014	1.20 U	1.20 U	1.45	1.52	1.45	1.46 U	0.297 U	1.24 U	-0.506 U	1.79	1.79	1.79	1.47	1.67	0.563	1.05	1.24 J+	0.881	0.798	-0.00287 U	0.882
BMAC-Soil-11	5/23/2014	1.09 U	1.09 U	0.602	0.686 J+	0.602	0.612 U	0.174 U	0.775 U	0.0798 U	0.652	0.652	0.652	0.510	0.429 U	0.229	0.633	0.566 J+	0.666	0.364	0.0289 U	0.318
BMAC-Soil-12	5/23/2014	0.956 U	0.956 U	1.58	1.46	1.58	2.08 U	0.126 U	0.623 U	0.499	1.35	1.35	1.35	1.18	0.554 U	0.550	1.21	1.36 J+	1.17	0.988	0.0234 U	1.11
BMAC-Soil-13	5/23/2014	1.15 U	1.15 U	1.22	1.52	1.22	0.500 U	0.261 U	1.09 U	0.114 U	1.23	1.23	1.23	1.35	1.50	0.494	1.47	1.77 J+	1.65	1.46	0.0511 U	1.74
BMAC-Soil-14	5/23/2014	1.34 U	1.34 U	1.71	1.59	1.71	1.92 U	0.159 U	0.888 U	0.703	1.41	1.41	1.41	1.37	0.687 U	0.555	1.25	1.35 J+	1.06	1.34	0.0372 U	1.00
BMAC-Soil-15	5/23/2014	1.21 U	1.21 U	1.28	1.28	1.28	3.04	0.195 U	0.497 U	-0.634 U	1.35	1.35	1.35	1.11	0.591 U	0.416	0.925	1.02 J+	0.728	0.409	0.0426	0.774
BMAC-Soil-16	5/23/2014	2.07 U	2.07 U	1.02	0.996	1.02	3.25	0.189 U	0.0853 U	0.0467 U	0.673	0.673	0.673	0.778	0.154 U	0.274	0.785	0.985 J+	0.808	0.555	0.0380 U	0.647
BMAC-Soil-17	5/23/2014	1.56 U	1.56 U	0.761	1.04	0.761	2.17 U	-0.104 U	0.186 U	0.0880 U	0.948	0.948	0.948	0.922	0.799 U	0.369	0.787	1.02 J+	0.732	0.739	0.0232 U	0.629
BMAC-Soil-18	5/23/2014	0.454 U	0.454 U	0.983	1.05	0.983	1.61 U	0.305 U	0.910 U	0.176 U	1.29	1.29	1.29	0.973	1.23	0.215	0.612	0.855 J+	0.517	0.602	0.0374 U	0.521
BMAC-Soil-19	5/23/2014	1.08 U	1.08 U	0.766	0.853	0.766	3.74	0.176 U	0.676 U	0.137 U	1.11	1.11	1.11	0.725	0.304 U	0.298	0.658	0.690 J+	0.761	0.519	0.0301 U	0.531
BMAC-Soil-20	5/23/2014	1.15 U	1.15 U	0.847	0.786	0.847	0.852 U	0.154 U	0.226 U	0.0631 U	0.877	0.877	0.877	0.857	0.337 U	0.314	0.730	0.633 J+	0.764	0.528	0.0134 U	0.569
BMAC-Soil-21	5/23/2014	0.719 U	0.719 U	0.883	0.948	0.883	-0.257 U	0.198 U	0.442 U	-0.689 U	0.779	0.779	0.779	0.792	0.241 U	0.319	0.636	0.641 J+	0.487	0.611	0.0125 U	0.464
BMAC-Soil-22	5/23/2014	0.864 U	0.864 U	0.966	0.758	0.966	2.79 U	0.288 U	0.692 U	0.0389 U	0.718	0.718	0.718	0.899	0.902 U	0.271	0.718	0.844 J+	0.650	0.717	0.00968 U	0.726
BMAC-Soil-23	5/23/2014	0.603 U	0.603 U	0.869	0.994	0.869	0.637 U	0.127 U	0.634 U	0.0163 U	0.429	0.429	0.429	0.703	0.585 U	0.280	0.874	0.881 J+	1.16	0.677	0.0144 U	0.562
BMAC-Soil-24	5/23/2014	2.43 U	2.43 U	0.208 U	0.127 U	0.208 U	7.79	-0.205 U	1.27 U	0.000 U	0.0546 U	0.0546 U	0.0546 U	-0.0214 U	-0.00632 U	0.0596 U	0.189	0.170 U	0.111 U	0.133	0.000 U	0.140
BMAC-Soil-25	5/23/2014	5.14	5.14	0.00541 U	-0.0318 U	0.00541 U	3.68 U	0.0467 U	0.299 U	-0.00706 U	0.0865 U	0.0865 U	0.0865 U	0.0595 U	0.00838 U	-0.114 U	0.0655 U	0.179 U	0.0799	0.103	0.000 U	0.0862
BMAC-Soil-26	5/23/2014	0.728 U	0.728 U	0.686	0.690	0.686	2.56	0.0596 U	0.279 U	-0.623 U	0.798	0.798	0.798	0.701	0.287 U	0.212	0.675	0.563 J+	0.467	0.522	0.0276 U	0.482
BMAC-Soil-27	5/23/2014	1.14 U	1.14 U	0.909	0.871	0.909	0.977 U	0.0527 U	0.420 U	-0.381 U	0.957	0.957	0.957	0.785	0.174 U	0.240	0.518	0.703 J+	0.717	0.423	0.0530 U	0.589

Sample Information		Gamma Spectrometery Analysis (pCi/g)															Alpha Spectrometery Analysis (pCi/g)					
		U-238 Decay Series						U-235 Decay Series			Th-232 Decay Series						Isotopic Thorium			Isotopic Uranium		
Sample ID	Date Collected	U-238	Th-234	Ra-226	Pb-214	Bi-214	Pb-210	U-235	Pa-231	Ac-227	Th-232	Ra-228	Ac-228	Pb-212	Bi-212	Tl-208	Th-228	Th-230	Th-232	U-233/ 234	U-235 /236	U-238
BMAC-Soil-28	5/23/2014	0.432 U	0.432 U	0.742	0.916	0.742	0.00836 U	0.125 U	0.188 U	0.0157 U	0.846	0.846	0.846	0.694	0.406 U	0.303	0.622	0.714	0.588	0.392	0.0379 U	0.618
BMAC-Soil-29	5/23/2014	0.196 U	0.196 U	0.783	0.834	0.783	1.36 U	0.285 U	0.573 U	-0.490 U	0.635	0.635	0.635	0.733	0.229 U	0.243	0.684	0.706	0.603	0.423	-0.00752 U	0.513
BMAC-Soil-30	5/23/2014	0.871 U	0.871 U	0.803	0.937	0.803	2.57 U	0.204 U	0.162 U	-0.0804 U	0.556 U	0.556 U	0.556 U	0.681	0.477 U	0.330	0.644	0.851	0.530	0.492	0.000 U	0.529

Notes:

Ac-227	Actinium-227
Ac-228	Actinium-228
Bi-212	Bismuth-212
Bi-214	Bismuth-214
BMAC	Bridgeton Municipal Athletic Complex
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased high.
Pa-231	Protactinium-231
Pb-210	Lead-210
Pb-212	Lead-212
Pb-214	Lead-214
pCi/g	picoCuries per gram
PRG	Preliminary Remediation Goal
PRG +D	Preliminary Remediation Goal including daughters
Ra-226	Radium-226
Ra-228	Radium-228
Th-228	Thorium-228
Th-230	Thorium-230
Th-232	Thorium-232
Th-234	Thorium-234
Tl-208	Thallium-208
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
U-233	Uranium-233
U-234	Uranium-234
U-235	Uranium-235
U-236	Uranium-236
U-238	Uranium-238
UJ	The analyte was analyzed for, but was not detected above the reported sample quantitation limit, which is estimated.

APPENDIX I

PRE-CERCLIS SCREENING FORM

REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

I. SITE NAME AND LOCATION:		
NAME: Bridgeton Municipal Athletic Complex		
ADDRESS OR OTHER LOCATION IDENTIFIER: 13161 Taussig Road		
CITY: Bridgeton	**STATE:** Missouri	**ZIP:** 63044
DIRECTIONS TO SITE: From Kansas City, Missouri, go east on Interstate 70 for approximately 221 miles to exit 224. Take MO-370 east for approximately 11 miles. Take exit 11 for Saint Louis Mills Boulevard and turn left. Turn right on Taussig Road and continue for approximately 0.6 mile. **MAP ATTACHED**: see Appendix A of Pre-CERCLIS Screening report		

II. PROGRAM CONTACTS:		
REQUESTED BY: Todd Campbell	**DATE OF REQUEST:** 05/05/2014	
AGENCY/OFFICE: Environmental Protection Agency (EPA)/Region 7 Superfund Division		
MAILING ADDRESS: 11201 Renner Boulevard		
CITY: Lenexa	**STATE:** Kansas	**ZIP:** 66219
TELEPHONE: (913) 551-7115	**FAX:** (913) 551-7066	
EVALUATOR: Danny O'Connor		
AGENCY/OFFICE: Tetra Tech, Inc.		
MAILING ADDRESS: 415 Oak Street		
CITY: Kansas City	**STATE:** Missouri	**ZIP:** 64106
TELEPHONE: (816) 412-1777	**FAX:** (816) 410-1748	

III. SITE INFORMATION:	
TYPE OF FACILITY: City Park	**TYPE OF OWNERSHIP:** City
OWNER/OPERATOR INFORMATION: See page 5	
SITE STATUS (active/inactive): Active	**YEARS OF OPERATION:** 40 years

OPERATIONAL HISTORY: (How was the site identified?) On May 5, 2014, the Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to assist with a Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (Pre-CERCLIS) Screening at the Bridgeton Municipal Athletic Complex (BMAC) in Bridgeton, Missouri. The Pre-CERCLIS Screening was conducted to determine if further Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response would be warranted. The screening activity was in response to a request by the Missouri Attorney General to the EPA Regional Administrator after a community group conducted field screening of soil at BMAC and reported detection of elevated radiation readings.

IV. PRE-CERCLIS SCREENING ASSESSMENT CHECKLIST/DECISIONS
(Criteria from "Improving Site Assessment: Pre-CERCLIS Screening Assessments," OSWER Directive #9375.2-11FS, EPA-540-F-98-039, PB98-963310, October 1999)

1. Does the site already appear in CERCLIS? **YES** ☐ **or NO** ☒
(If YES, this form may be inappropriate to document site decisions, i.e., a CERCLA PA (at a minimum) is required.)

2. Is the release from products that are part of the structure of, and result in exposure within, residential buildings or businesses or community structures? **YES** ☐ **or NO** ☒
(If YES, then explain in Section V.)

3. Does the site consist of a release of a naturally occurring substance in its unaltered form, or solely through naturally occurring processes or phenomena, from a location where it is naturally found? **YES** ☐ **or NO** ☒
(If YES, then explain in Section V).

4. Is the release into a public or private drinking water supply due to deterioration of the system through ordinary use? **YES** ☐ **or NO** ☒
(If YES, then explain in Section V.)

5. Is some other program actively involved with the site (i.e., another Federal, State, or Tribal program?
YES ☐ or NO ☒
(If YES, then explain in Section V.)

6. Are the hazardous substances potentially released at the site regulated under a statutory exclusion (i.e., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?
YES ☐ or NO ☒
(If YES, then explain in Section V).

7. Are the hazardous substances potentially released at the site excluded by policy considerations (e.g., deferral to RCRA Corrective Action)? **YES ☐ or NO ☒**
(If YES, then explain in Section V).

Check one, either 8.a or 8.b, whichever applies

8. a. Is there sufficient documentation that clearly demonstrates that there is no potential for a release that could cause adverse environmental or human health impacts (e.g., comprehensive remedial investigation equivalent data showing no release above ARARs, completed removal action, documentation showing that no hazardous substance releases have occurred, EPA approved risk assessment completed)?
YES ☒ or NO ☐
(Explain in Section V).

8. b. Based on limited sampling that has been performed at/near the site in conjunction with Pre-CERCLIS Screening Assessment, is there a potential for a release that could cause adverse environmental or human health impacts?
YES ☐ or NO ☐
(Explain in Section V)
Yes *-> Explain in the following Sections whether or not a CERCLA response action (CERCLIS entry) is warranted.*
No *-> No CERCLIS entry is warranted. Explain in the following Sections.*

V. SUPERFUND SITE SCREENING CRITERIA

A. REMEDIAL CRITERIA

1. SOURCE AND WASTE CHARACTERISTICS

KNOWN OR SUSPECTED SOURCE TYPES AND LOCATIONS:

SIZE OF SOURCES AND QUANTITIES (Volume, Area):

WASTE TYPES OR HAZARDOUS SUBSTANCES KNOWN OR SUSPECTED TO BE PRESENT:

2. GROUND WATER PATHWAY:

What is the likelihood that a release to groundwater has occurred at the site? Groundwater sampling was not included with the Pre-CERCLIS Screening. However, a release to groundwater is unlikely, due to no significant surface soil findings resulting from the Pre-CERCLIS Screening.

If a release is not suspected proceed to A.3.

a. USE AND CHARACTERISTICS:

GENERAL STRATIGRAPHY AND HYDROLOGY:

PRESENCE OF KARST TERRAIN:

DEPTH TO SHALLOWEST AQUIFER:

PRIVATE WELLS WITHIN 4 MILES (locations and population served):

MUNICIPAL WELLS WITHIN 4 MILES (locations and population served):

DISTANCE TO NEAREST DRINKING WATER WELL:

WELLHEAD PROTECTION AREAS:

3. SURFACE WATER PATHWAY:
What is the likelihood that a release to surface water has occurred at the site? Surface water sampling was not included with the Pre-CERCLIS Screening. However, a release to surface water is unlikely, due to no significant surface soil findings resulting from the Pre-CERCLIS Screening. **If a release is not suspected proceed to A.4.**
a. USE AND CHARACTERISTICS:
FLOOD FREQUENCY:
DISTANCE TO NEAREST SURFACE WATER:
SURFACE WATER BODIES WITHIN 15 DOWNSTREAM MILES:
DESIGNATED AND/OR PROTECTED USES OF SURFACE WATER BODIES:
DRINKING WATER INTAKES WITHIN 15 DOWNSTREAM MILES (locations and populations served):
FISHERIES WITHIN 15 DOWNSTREAM MILES:
KNOWN OR POTENTIAL SENSITIVE ENVIRONMENTS AND WETLANDS WITHIN 15 DOWNSTREAM MILES:
4. SOIL EXPOSURE PATHWAY:
What is the likelihood of exposure to hazardous substances at the site? A release to soil is unlikely, due to no significant findings during the gross gamma survey or soil sampling conducted at the site.
a. CHARACTERISTICS:
NUMBER OF PEOPLE LIVING WITHIN 200 FEET:
SCHOOLS OR DAY-CARES WITHIN 200 FEET:
POPULATIONS WITHIN 1 MILE:
NUMBER OF WORKERS AT THE FACILITY OR ADJACENT FACILITIES WHERE CONTAMINATION IS SUSPECTED:
LOCATIONS OF KNOWN OR POTENTIAL TERRESTRIAL SENSITIVE ENVIRONMENTS:
5. AIR PATHWAY:
What is the likelihood that a release of hazardous substances is migrating from the site to the air? Air sampling was not included with the Pre-CERCLIS Screening. A release to air is unlikely, due to no significant surface soil findings resulting from the Pre-CERCLIS Screening. **If a release is not suspected proceed to B.**
a. CHARACTERISTICS
POPULATIONS WITHIN 4 MILES:
DISTANCE TO NEAREST INDIVIDUAL:
LOCATIONS OF KNOWN OR POTENTIAL SENSITIVE ENVIRONMENTS WITHIN 0 TO 1/4 MILE AND 1/4 TO ½ MILE:
B. REMOVAL CRITERIA
IS THERE A RELEASE AS DEFINED BY THE NCP? **YES** ☐ **or NO** ☒ **EXPLAIN:** Review of gross gamma survey data and soil sample data from BMAC did not indicate a release. *(A **RELEASE** is defined as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment of barrels, containers, and other closed receptacles containing any hazardous substances or pollutant or contaminant), but excludes: workplace exposures; engine exhaust emissions; nuclear releases otherwise regulated; and the normal application of fertilizer. For purposes of the NCP, release also means threat of release.[40 CFR 300.410(e)])*

IS THE SOURCE A FACILITY OR VESSEL AS DEFINED BY THE NCP? **YES** ☐ **or NO** ☒

EXPLAIN: No release was identified at the site.

*(A **FACILITY** is defined as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or POTW), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft or any site or area, where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel. A VESSEL is defined as any description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel. [40 CFR 300.410(e)]*

DOES THE RELEASE INVOLVE A HAZARDOUS SUBSTANCE, POLLUTANT, OR CONTAMINANT AS DEFINED BY THE NCP? **YES** ☐ **or NO** ☒

EXPLAIN: No hazardous substance, pollutant, or contaminant was documented at the site.

*(A **HAZARDOUS SUBSTANCE** means any substance, element, compound, mixture, solution, hazardous waste, toxic pollutant, hazardous air pollutant, or imminently hazardous chemical substance or mixture designated pursuant to the CWA, CERCLA, SDWA, CAA or TSCA. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas. The definition of POLLUTANT or CONTAMINANT includes, but is not limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions or physical deformations, in such organisms or their offspring. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas.).[40 CFR 300.410(e)]*

IS THE RELEASE SUBJECT TO THE LIMITATIONS ON RESPONSE? **YES** ☐ **or NO** ☒

EXPLAIN: No limitations on response apply.

*(The **LIMITATIONS ON RESPONSE** provisions of the NCP (40 CFR 300.400(B) states that removals shall not be undertaken in response to a release: of a naturally occurring substance in its unaltered or natural form; from products that are a part of the structure of, and result in exposure within, residential buildings or business or community structures; or into public or private drinking water supplies due to deterioration of the system through ordinary use.).[40 CFR 300.410(e)]*

DOES THE QUANTITY OR CONCENTRATION WARRANT RESPONSE? **YES** ☒ **or NO** ☒

EXPLAIN: No release was identified at the site.

[40 CFR 300.410(e)]

B. REMOVAL CRITERIA (continued):

HAS A PRP BEEN IDENTIFIED? (Include name, address and telephone number) **YES ☐ or NO ☒**

EXPLAIN: No release was identified at the site; therefore, there is no PRP.
[40 CFR 300.410(e)]

IS THERE AN ACTUAL OR POTENTIAL EXPOSURE TO HAZARDOUS SUBSTANCES OR POLLUTANTS, OR CONTAMINANTS? **YES ☐ or NO ☒**

EXPLAIN: No release was identified at the site.

IS THERE ACTUAL OR A POTENTIAL FOR CONTAMINATION OF DRINKING WATER SUPPLIES? **YES ☐ or NO ☒**

EXPLAIN: No release was identified at the site; therefore, no drinking water contamination is suspected.

ARE THERE HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN DRUMS, BARRELS, OR BULK STORAGE CONTAINERS? **YES ☐ or NO ☒**

EXPLAIN:

ARE THERE HIGH LEVELS OF HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN NEAR-SURFACE SOILS? **YES ☐ or NO ☒**

EXPLAIN: All reported radionuclides were below comparative risk-based standards.

("High levels" may be determined by streamlined risk assessments, health consultations, state or federal soil screening criteria, and/or Superfund program policies or directives.)

ARE THERE CONDITIONS ON SITE WHICH MAY BE SUSCEPTIBLE TO IMPACT FROM ADVERSE WEATHER CONDITIONS? **YES ☐ or NO ☒**

EXPLAIN: No release was identified at the site.

IS THERE A THREAT OF FIRE OR EXPLOSION? **YES ☐ or NO ☒**

EXPLAIN:

IS THERE A POTENTIAL FOR OTHER FEDERAL OR STATE RESPONSE MECHANISMS? **YES ☐ or NO ☒**
IF SO, IDENTIFY THE APPROPRIATE PROGRAM:

☐ **RCRA** ☐ **NRC** ☐ **FIFRA** ☐ **UST** ☐ **OTHER FEDERAL( )** ☐ **STATE DEFERRAL**

EXPLAIN:

ARE THERE OTHER SITUATIONS OR FACTORS WHICH WARRANT FURTHER SUPERFUND RESPONSE? **YES ☐ or NO ☒**

EXPLAIN:

VI. SUPERFUND SITE SCREENING FINDINGS AND RECOMMENDATIONS:

	NO FURTHER SUPERFUND RESPONSE ACTION REQUIRED - SUPERFUND CERCLIS ENTRY **NOT** WARRANTED

(Cite the appropriate criteria from SECTION V as the basis for the above determination.)

Yes	No	Unknown	Issue	Yes	No	Unknown	Issue
	X		Ground Water Pathway Threat		X		Direct Exposure Pathway Threat
	X		Surface Water Pathway Threat		X		Air Pathway Threat
	X		Release or Threat of Release		X		A Facility or Vessel
	X		Hazardous Substance, Pollutant, or Contaminant		X		Subject To Response Limitations
	X		Contaminants present in Significant Quantity and/or Concentration		X		Exposure To Hazardous Substances or Pollutants or Contaminants
	X		Drums, Barrels or Bulk Containers Present		X		High Levels of Contaminants In Surface Soils
	X		Site Susceptible To Adverse Weather Conditions		X		Threat of Fire or Explosion
	X		Willing/Capable PRP Response		X		Referred To Another Program

COMMENT: The Pre-CERCLIS Screening of BMAC included a gross gamma survey of exterior surfaces at BMAC and reference areas along with collection of soil samples for laboratory analysis. The gross gamma survey of exterior ground surfaces at BMAC included collection of 58,716 data points across three surface types (grass-covered areas, exposed soil areas, and improved surfaces). No survey data acquired within BMAC were above twice the mean, a level at which EPA Region 7 typically conducts further investigation. In addition, geographic plots of the data reveal natural differences in gamma activity exhibited by different soil types, or surface materials. No unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed. In addition to surveying exterior ground surfaces, 112 soil samples were collected and analyzed for isotopic uranium, isotopic thorium, radium-226, and other naturally occurring radionuclides. Reference area data were used to calculate a background threshold value (BTV) for each isotope. BMAC analytical data exceeding the BTV was then compared to risk-based standards. To account for naturally occurring radioactive material (NORM), the mean reference area value was subtracted from values exceeding the BTV. Radionuclide concentrations in excess of their BTV were compared with the selected risk-based standards to determine if further data review or investigation was warranted. Two risk-based standards were used for comparison to BMAC analytical data: the EPA total exposure preliminary remediation goals (PRG) for radionuclides in residential soil at a 1 in 10,000 lifetime cancer risk to an individual and the Formerly Utilized Sites Remedial Action Plan (FUSRAP) remediation goals (RG). None of the sample values exceed the PRGs or FUSRAP RGs. Results from the Pre-CERCLIS Screening do not indicate need for further CERCLA assessment at the BMAC site.

	REMOVAL ACTION RECOMMENDED: ☐ EMERGENCY ☐ TIME-CRITICAL ☐ NON-TIME-CRITICAL

(Cite one or more of the conditions or factors from Section V. REMOVAL CRITERIA, as a basis for recommending that a removal action be conducted.)

Yes	No	Unknown	Issue	Yes	No	Unknown	Issue
			Exposure To Hazardous Substances or Pollutants or Contaminants				Actual or A Potential For Contamination of Drinking Water Supplies
			Drums, Barrels or Bulk Containers Present				High Levels of Contaminants Near-Surface Soils
			Site Susceptible To Adverse Weather Conditions				Fire/Explosion Threat
			Other Response Mechanism				Other Factors

COMMENT:

REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

VI. SUPERFUND SITE SCREENING RECOMMENDATIONS (continued):

ADDITIONAL INTEGRATED ASSESSMENT RECOMMENDED

(Cite the appropriate criteria from Section Vas a basis for recommending that additional site evaluation be performed.)

Yes	No	Unknown	Issue	Yes	No	Unknown	Issue
			Ground Water Pathway Threat				Direct Exposure Pathway Threat
			Surface Water Pathway Threat				Air Pathway Threat
			Release or Threat of Release				A Facility or Vessel
			Hazardous Substance, Pollutant, or Contaminant				Subject To Response Limitations
			Contaminants present in Significant Quantity and/or Concentration				Exposure To Hazardous Substances or Pollutants or Contaminants
			Drums, Barrels or Bulk Containers Present				High Levels of Contaminants In Surface Soils
			Site Susceptible To Adverse Weather Conditions				Threat of Fire or Explosion
			Willing/Capable PRP Response				Referred To Another Program

COMMENT:

VII. ADDITIONAL INFORMATION OR COMMENTS

(NOTE: Complete Site Prioritization Information Summary Attachment for sites recommended for further Integrated Assessment work.)

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VIII. DETERMINATION

SIGNATURE: _____ **DATE:** _____

Name/Title/Office