UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

MAY 11 2017

MEMORANDUM

SUBJECT: Results of Bridgeton Dust Pre-CERCLA Screening

FROM: Tom Mahler, OSC Tom Mahler
Superfund Division, REMB Branch

THRU: Lynn Juett, Chief Lynn Juett
Superfund Division, REMB Branch

TO: Mary P. Peterson, Division Director
Superfund Division

The purpose of this memorandum is to obtain your approval of the attached Bridgeton Dust Pre-CERCLA Screening Report, attached Bridgeton Dust Pre-CERCLA Screening Decision Form and the conclusions described in this memorandum. Considering all the screening information and laboratory analytical results generated as a part of this investigation, the U.S. Environmental Protection Agency has determined that there is no evidence of a release of a hazardous substance at the Bridgeton Dust Site and no further action under CERCLA is warranted at this time.

Site Description

The Bridgeton Dust site consists of certain residential properties located in the Spanish Village neighborhood in Bridgeton, Missouri. In November 2016, a lawsuit was filed on behalf of a family residing in the Spanish Village neighborhood. The lawsuit alleged that radioactive contamination consistent with uranium processing waste was present in the home. The EPA has not been provided a complete laboratory report or a quality assurance project plan (QAPP) and has therefore been unable to verify the quality of the reported data or sampling methods applied. This pre-CERCLA screening targeted investigation of two to three residences located as close as possible to the residence identified in the November, 2016 lawsuit. The investigation tested for the presence of radionuclides at concentrations above naturally occurring levels both inside the residences and in the soil outside. The EPA conducted investigations at two residences in Spanish Village but was unable to investigate the home with the alleged contamination. This investigation was performed according to a QAPP which is available at response.epa.gov/bridgetondust. Per the QAPP, the investigation included the collection of soil samples from outside the residence, wipe samples from inside the residence, and bulk dust samples from inside the residence.

Pre-CERCLA Screening Results

The conclusions in this pre-CERCLA screening investigation consider the results of measurements taken with handheld and field scanning equipment as well as data from laboratory analyses. While scanning and field screening results were critical to conducting this investigation, laboratory analysis of samples was required in order to make final determinations. The EPA collected a total of 14 exterior soil samples, 129 indoor wipe samples, and 3 bulk dust samples. All of the soil, bulk dust, and 24 of the wipe samples were sent to ALS laboratory for radionuclide specific analyses. Soil samples were analyzed for uranium and thorium isotopes via alpha spectroscopy, for lead-210 via liquid scintillation counting, and for gamma emitters (including radium-226) via gamma spectroscopy. The wipe samples and the bulk dust samples were analyzed for uranium and thorium isotopes via alpha spectroscopy and for gamma emitters (including radium-226) via gamma spectroscopy.

The results from the soil samples were compared to background levels as determined in EPA's investigation of the Bridgeton Municipal Athletic Complex (BMAC) and other published studies by Oak Ridge National Laboratory (ORNL). With the exception of one soil sample, all the results were found to be within the normal range for background. One sample was reported to contain Ra-226 slightly above the comparison levels; however, this sample was flagged by the laboratory as biased high due to the density of the sample being less than the laboratory source standard. Therefore, EPA's conclusion is that the soil sampling results do not indicate the presence of radionuclides above anthropogenic background[1] concentrations.

For wipe samples, typical residential background concentrations are not available for comparison. Therefore, the results were conservatively compared to the default residential concentrations from EPA's Preliminary Remediation Goals for Radionuclides in Buildings (BPRG). The results from the analysis of the wipe samples were compared to residential BPRG concentrations at a one-in-ten thousand cancer risk. No detected concentration of any radionuclide on a wipe sample exceeded an EPA BPRG.

For the bulk dust samples, similar to the wipe samples, typical background concentrations for naturally occurring radioactive materials are not available. The bulk dust samples were collected over very large areas and from multiple locations within a room wherever large amounts of visible dust could be identified. The EPA collected as close to three grams of dust as possible for each bulk dust sample in order to meet the project quantitation goals specified in the QAPP. Because the samples were collected over wide areas and from multiple locations (including shelving, window sills, exposed duct work, and light fixtures) the concentrations are not comparable to EPA's BPRG values.

Multiple studies have demonstrated significant variability in the contribution of outdoor soil materials to indoor dusts. For example, outdoor soil may contribute to indoor dust by being brought indoors on residents' clothing and footwear, on toys, and in the fur of pets such as cats and dogs. Soil dust may also enter buildings and be deposited as wind-blown dust through open doors and windows (Paustenbach et al., 1997)[2]. Therefore, naturally occurring radioactive materials are expected to be present in indoor dust

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[1] OSWER 9285.6-07P, Role of Background in the CERCLA Cleanup Program, April 26, 2002, pg. 5 https://rais.ornl.gov/documents/bkgpol_jan01.pdf

[2] Environment Agency (E.A.) (2009). Updated technical background to the CLEA model. United Kingdom. SC050021/SR3. pgs. 63 through 65.

and the concentrations of radionuclides measured in the bulk dust samples are not comparable to the background levels determined for soil.

One of the three bulk dust samples contained higher concentrations of thorium isotopes (9.9 picocuries per gram of Thorium-232, 1.8 picocuries per gram of Thorium-230, and 9.8 picocuries per gram of Thorium-228) than the other samples. All other results of radionuclides found in bulk dust samples ranged from non-detect to 0.4 picoCuries per gram. As stated above, typical background concentrations for indoor bulk dust samples are not available. In addition to what was presented in the pre-CERCLA screening report, the EPA calculated an activity ratio of certain radionuclides for the one bulk dust sample and compared this bulk dust sample activity ratio to the same ratio determined from data from the West Lake Landfill and from data provided by the U.S. Army Corps of Engineers St. Louis Office for the Hazelwood Interim Storage Site (HISS). The activity ratios for both of these sites show significantly lower concentrations of Thorium-232 compared to Thorium-230. In contrast, the results from this residential bulk dust sample show higher concentrations of Thorium-232 compared to Thorium-230. Therefore, EPA's conclusion is that the ratio of thorium isotopes in this bulk dust sample is not consistent with sampling data from either the West Lake Landfill Superfund site nor the Hazelwood Interim Storage Site.

In addition, the EPA compared the bulk dust sample activity ratio to what is typically found in commercial products containing thorium. The ratio in the bulk dust sample was found to be consistent with commercial products that contain thorium. These products typically contain concentrations of Thorium-232 that are greater than the concentrations of Thorium-230.

Considering all the screening information and laboratory analytical results generated as a part of this investigation, the EPA has determined that there is no evidence of a release of a hazardous substance at the Bridgeton Dust Site. Furthermore, based on the investigation results summarized above and in more detail in the attached report, no further action under CERCLA is warranted at this time. If additional scientifically valid data becomes available, the EPA may consider whether additional actions under CERCLA are warranted.

These documents have been reviewed by representatives from the Missouri Department of Natural Resources, the Missouri Department of Health and Senior Services, the Agency for Toxic Substances and Disease Registry, and the St. Louis office of the U.S. Army Corps of Engineers. Each of the agencies provided the EPA feedback on the report which has been incorporated.

Attachments

Approved:

Mary P. Peterson _____ 5/11/2017

Mary P. Peterson Date

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

This form is used in conjunction with a site map and any additional information required by the EPA Region to document completion of a Pre-CERCLA Screening (PCS). The form includes a decision on whether a site should be added to the Superfund program's active site inventory for further investigation. Fields marked with an asterisk * are limited to the values available in Attachment B. Attachment C provides a glossary of other terms used in this form.

Region: 7 **State/Territory:** Missouri **Tribe:** NA MON000704549
EPA ID No. (If Available)

Site Name: Bridgeton Dust
Other Site Name(s):

Site Location: See page A-2
(Street)

1st Congressional District | Bridgeton (City) | St. Louis (County) | Missouri (State/Terr.) | 63044 - 2430 (Zip+4)

If no street address is available: NA (Township-Range) NA (Section)

Checklist Preparer:

Tom Mahler/ On-Scene Coordinator (Name / Title) 5/11/17 (Date)

U.S. EPA Region 7 (Organization) 913-551-7416 (Phone)

11201 Renner Blvd. (Street) mahler.tom@epa.gov (Email)

Lenexa (City) | Johnson (County) | KS (State/Terr.) | 66219 - 9601 (Zip+4)

Site Contact Info/Mailing Address:

CERCLA 105d Petition for Preliminary Assessment? ☐ Yes ☒ No **If Yes, Petition Date (mm/dd/yyyy):**

RCRA Subtitle C Site Status: Is site in RCRAInfo? ☐ Yes ☒ No **If Yes, RCRAInfo Handler ID #:**

Ownership Type*: Private **Additional RCRAInfo ID #(s):**

Site Type*: Other **State ID #(s):**

Site Sub-Type*: Residential **Other ID #(s):**

Federal Facility? ☐ Yes ☒ No ☐ Undetermined **Federal Facility Owner*:**

Formerly Used Defense Site (FUDS)? ☐ Yes ☒ No ☐ Undetermined **Federal Facility Operator*:**

Federal Facility Docket? ☐ Yes ☒ No **If Yes, FF Docket Listing Date (mm/dd/yyyy):**

Federal Facility Docket Reporting Mechanism*:

Native American Interest? ☐ Yes ☒ No ☐ Undetermined **If Yes, list Tribe:**

Additional Tribe (s):

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

Site Description
Use this section to briefly describe site background and conditions if known or (easily) available, such as: operational history; physical setting and land use; site surface description, soils, geology and hydrogeology; source and waste characteristics; hazardous substances/contaminants of concern; historical releases, previous investigations and cleanup activities; previous regulatory actions, including permitting and enforcement actions; institutional controls; and community interest.
Insert text here: These details are included in the corresponding Bridgeton Dust Pre-CERCLA Screening memo dated 5/11/17.

Geospatial Information

Latitude: + 38.754136 **Longitude:** - 90.445286

Decimal Degree North (e.g., +38.859156) **Decimal Degree West (e.g., -77.036783)**

Provide 4 significant digits at a minimum, more if your collection method generates them.

Except for certain territories in the Pacific Ocean, all sites in U.S. states and territories are located within the northern and western hemispheres and will have a positive latitude sign and negative longitude sign. The coordinate signs should be changed as necessary for sites in the southern and/or eastern hemispheres.

Point Description: Select the option below that best represents the site point for future reference and to distinguish it from any nearby sites — see Attachment B.

- ☐ Geocoded (address-matched) Site Address
- ☐ Site Entrance (approximate center of curb-cut)
- ☐ Approximate Center of Site
- ☒ Other Distinguishing Site Feature (briefly describe below):

Intersection of Spanish Village Drive and El Ferrol Ct. and San Clemente Dr. within the Spanish Village sub-division

Point Collection Method: Check the method used to collect the coordinates above and enter the date of collection – see Attachment B.

- ☒ Online Map Interpolation
- ☐ GPS (handheld, smartphone, other device or technology with accuracy range < 25 meters)
- ☐ GPS Other (accuracy range is ≥ 25 meters or unspecified)
- ☐ Address Matching: Urban
- ☐ Address Matching: Rural
- ☐ Other Method: _____

Collection Date (mm/dd/yyyy): 05/08/2017

POINT-SELECTION CONSIDERATIONS

- Often the best point is a feature associated with the environmental release or that identifies the site visually. Attachment B contains examples.
- Use the curb cut of the entrance to the site if there is a clear primary entrance and it is a good identifier for the overall location.
- The approximate center of the site (a guess at the centroid) is useful for large-area sites or where there are no appropriate distinguishing features.
- Use the geocoded address if that is the only or best option available, but if possible use something more representative for sites larger than 50 acres.

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

Complete this checklist to help determine if a site should be added to the Superfund Active site inventory. See Section 3.6 of the PCS guidance for additional information.	YES	NO	Unknown
1. An initial search for the site in EPA's Superfund active, archive and non-site inventories should be performed prior to starting a PCS. Is this a new site that does not already exist in these site inventories?	☒	☐	☐
2. Is there evidence of an actual release or a potential to release?	☐	☒	☐
3. Are there possible targets that could be impacted by a release of contamination at the site?	☒	☐	☐
4. Is there documentation indicating that a target has been exposed to a hazardous substance released from the site?	☐	☒	☐
5. Is the release of a naturally occurring substance in its unaltered form, or is it altered solely through naturally occurring processes or phenomena, from a location where it is naturally found?	☐	☒	☐
6. Is the release from products which are part of the structure of, and result in exposure within, residential buildings or business or community structures?	☐	☒	☐
7. If there has been a release into a public or private drinking water supply, is it due to deterioration of the system through ordinary use?	☐	☒	☐
8. Are the hazardous substances possibly released at the site, or is the release itself, excluded from being addressed under CERCLA?	☐	☒	☐
9. Is the site being addressed under RCRA corrective action or by the Nuclear Regulatory Commission?	☐	☒	☐
10. Is another federal, state, tribe or local government environmental cleanup program other than site assessment actively involved with the site (e.g., state voluntary cleanup program)?	☐	☒	☐
11. Is there sufficient documentation or evidence that demonstrates there is no likelihood of a significant release that could cause adverse environmental or human health impacts?	☒	☐	☐
12. Are there other site-specific situations or factors that warrant further CERCLA remedial/integrated assessment or response?	☐	☒	☐

Attachment A: Pre-CERCLA Screening Checklist/Decision Form

Preparer's Recommendation: ☐ **Add** site to the Superfund active site inventory.

☒ **Do not add** site to the Superfund active site inventory.

Please explain recommendation below:

PCS Summary and Decision Rationale
Use this section to summarize PCS findings and support the decision to add or not add the site to the Superfund active site inventory for further investigation. Information does not need to be specific but, where known, can include key factors such as source and waste characteristics (e.g., drums, contaminated soil); evidence of release or potential release; threatened targets (e.g., drinking water wells); key sampling results (if available); CERCLA eligibility; involvement of other cleanup programs; and other supporting factors. Attach additional pages as necessary.
Insert text here:
These details are included in the corresponding Bridgeton Dust Pre-CERCLA Screening memo dated 5/11/17.

Site Assessor: Tom Maller (Print Name/Signature) 5-11-17 (Date)

EPA Regional Review and Pre-CERCLA Screening Decision

Add site to the Superfund active site inventory for completion of a:

- ☐ Standard/full preliminary assessment (PA)
- ☐ Abbreviated preliminary assessment (APA)
- ☐ Combined preliminary assessment/site inspection (PA/SI)
- ☐ Integrated removal assessment and preliminary assessment
- ☐ Integrated removal assessment and combined PA/SI
- ☐ Other: _____

Do not add site to the Superfund active site inventory. Site is:

- ☒ Not a valid site or incident
- ☐ Being addressed by EPA's removal program
- ☐ Being addressed by a state cleanup program
- ☐ Being addressed by a tribal cleanup program
- ☐ Being addressed under the Resource Conservation and Recovery Act
- ☐ Being addressed by the Nuclear Regulatory Commission
- ☐ Other: _____

EPA Regional Reviewer: Ryan M Scott (Print Name/Signature) 5/11/2017 (Date)

TETRA TECH

May 11, 2017

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

Subject: **Pre-CERCLA Screening at Bridgeton Dust Site**
Bridgeton, Missouri
U.S. EPA Region 7 START 4, Contract No. EP-S7-13-06, Task Order No. 0104.003
Task Monitor: Tom Mahler, On-Scene Coordinator

Dear Mr. Mahler:

Tetra Tech, Inc. is submitting the attached report regarding a Pre-CERCLA screening investigation of residential properties in the Spanish Village subdivision in Bridgeton, Missouri. If you have any questions or comments, please contact the Project Manager, at (816) 412-1775.

Sincerely,

Robert Monnig, PE, CHP
START Project Manager

Ted Faile, PG, CHMM
START Program Manager

Enclosures

cc: Debra Dorsey, Region 7 START Project Officer (cover letter only)

415 Oak Street, Kansas City, MO 64106
Tel 816.412.1741 Fax 816.410.1748 www.tetratech.com

PRE-CERCLA SCREENING REPORT
BRIDGETON DUST SITE
BRIDGETON, MISSOURI

Superfund Technical Assessment and Response Team (START) 4 Contract
Contract No. EP-S7-13-06, Task Order 0104.003

Prepared For:

U.S. Environmental Protection Agency
Region 7
Superfund Division
11201 Renner Boulevard
Lenexa, Kansas 66219

May 11, 2017

Prepared By:

Tetra Tech, Inc.
415 Oak Street
Kansas City, Missouri 64106
(816) 412-1741

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EXHIBITS

1.0 INTRODUCTION

The Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) has been tasked by the U.S. Environmental Protection Agency (EPA) to assist with a Pre-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) screening at residential properties in the Spanish Village subdivision in Bridgeton, Missouri. The site of the screening is known as the Bridgeton Dust Site (BDS). The Pre-CERCLA screening was conducted to evaluate whether further CERCLA assessment would be warranted, and to investigate concerns regarding concentrations of radionuclides above naturally occurring levels reported inside a residence in the Spanish Village subdivision. EPA has been unable to verify the quality of the reported data or the sampling methods applied. The allegation of contamination inside a residence has been made public, creating additional concerns for nearby residents.

Tetra Tech's tasks included, but were not limited to supporting EPA with: (1) acquisition of real-time gross gamma measurements of surface soil; (2) collection of discrete and composite soil samples for laboratory analysis; (3) acquisition of real-time measurements of alpha, beta, and gamma emissions from indoor building surfaces; (4) acquisition of indoor radon measurements, (5) collection of wipe samples inside residences for laboratory analysis, (6) collection of bulk dust samples via vacuum cartridge for laboratory analysis, and (7) documentation of site activities. Rob Monnig was the START Project Manager of the investigation, and the EPA Region 7 On-Scene Coordinator (OSC) was Tom Mahler.

2.0 SITE LOCATION AND BACKGROUND

The following sections provide information on the site location, describes the site, and discusses the site background.

2.1 SITE LOCATION AND DESCRIPTION

The Pre-CERCLA screening described herein occurred at two single-family residences (referred to herein as "House 1" and "House 2") in the Spanish Village subdivision in Bridgeton, Missouri. The addresses of House 1, House 2, and the residence with alleged contamination are:

House 1: [redacted]
House 2: [redacted]
Residence with alleged contamination: [redacted]

[redacted]. The House 1 and House 2 properties each consists of an approximately [redacted]. [redacted] According to St. Louis County Assessor's information, House 1 was built in [redacted] and House 2 was built in [redacted]. The location of these homes are shown on Figure 1 in Appendix A.

2.2 PRESENT OWNERS

The family residences where Pre-CERCLA screening occurred are privately owned.

2.3 PROBLEM DEFINITION

The Pre-CERCLA screening was conducted to investigate concerns regarding reported concentrations of radionuclides above naturally-occurring levels inside a residence in the Spanish Village subdivision in Bridgeton, Missouri. EPA has not been provided a complete laboratory report or a quality assurance project plan (QAPP) and has therefore been unable to verify the quality of the reported data or sampling methods applied. The allegation of contamination inside a residence has been made public, creating additional concerns for nearby residents. At the time of the Pre-CERCLA screening activities, EPA was unable to obtain access to conduct a screening at the allegedly contaminated residence; however, EPA received permission to screen two residences (House 1 and House 2) near the allegedly contaminated residence, and did so. The purpose of these screenings was to investigate each residence for the possible

presence of elevated levels of radionuclides beyond what is naturally occurring, and to assess whether further investigation or response under CERCLA may be warranted.

2.4 CURRENT LAND USE

The Pre-CERCLA Screening described herein occurred at two residential properties (House 1 and House 2) in the Spanish Village subdivision in Bridgeton, Missouri. Each property consists of an occupied single-family home on an approximately [redacted]

2.5 PAST ACTIONS

No previous investigations are known to have occurred at House 1 or House 2.

3.0 SAMPLING PROCESS DESIGN

The following sections summarize the sampling strategy and methodology for this Pre-CERCLA screening. A more detailed description of the sampling strategy and methodology is presented in the EPA-approved QAPP (see Tetra Tech 2016a, b).

3.1 EXTERIOR MONITORING AND SAMPLING

The following describes exterior monitoring and sampling strategy:

Real-time Monitoring for Surface Soil Gamma Activity

A surface soil gamma scan was proposed in the QAPP to evaluate the distribution of gross gamma activity from surface soils throughout the area of investigation, and to help guide selection of locations for soil sampling. Elevated gross gamma activity would be identified by distinguishing any individual measurements exceeding the 75th percentile plus 1.5 times the interquartile range (IQR) of the measurements logged at the property (a methodology often applied to identify outliers on box-and-whisker plots). This monitoring occurred as described in the QAPP, and is discussed in Section 4.1.1.

Soil Sampling

The QAPP proposed collection and laboratory analysis of both discrete (grab) and composite soil samples to determine concentrations of radionuclides in soil. Discrete soil samples were to be collected in areas (1) with greatest potential for contamination, including elevated gross gamma activity identified during the surface soil survey (if any); and/or (2) selected on the basis of site features (such as near downspouts). Each soil sample was to be submitted for laboratory analysis to yield radionuclide concentrations that would be compared to soil concentrations determined from (1) sampling by EPA in May 2014 during pre-CERCLA screening at the Bridgeton Municipal Athletic Complex (BMAC) site in Bridgeton, Missouri; and (2) other studies. This sampling occurred as described in the QAPP and is discussed in Sections 4.1.2 and 6.1.

3.2 INTERIOR MONITORING AND SAMPLING

The following describes interior monitoring and sampling strategy:

Exposure Rate, Radon, and Surface Activity Characterization Surveys

The QAPP specified interior monitoring that included (1) measurement of exposure rate to assess presence of gamma sources such as historical consumer products containing radioactive material or

building materials with natural radionuclide content, (2) measurement of indoor radon to inform surveyors of potential presence of radon decay products that can deposit onto surfaces and contribute to surface activity levels, and (3) measurements of surface activity from various building surface materials by use of hand-held detectors. Any elevated surface activity measurement would prompt collection of a surface dust wipe sample. This monitoring occurred as described in the QAPP, and is discussed in Section 4.2.1.

Interior Surface Dust Sampling (Wipe Sampling)

The QAPP specified collection of wipe samples to assess presence of radionuclides in indoor settled dust. Surfaces to be sampled included floors, walls, and other accessible surfaces; floor surfaces near entrances; and floor and wall surfaces near clothes dryers. The wipe samples were to be counted with a drawer counter to assess for gross alpha and beta activity of each wipe sample. The QAPP specified the following procedure for selection of wipe samples for laboratory analysis: (1) select the three wipes with highest alpha counts; (2) select the wipe with highest alpha count from each high-occupancy room; and (3) select the wipe with highest alpha count from each entrance. The selected wipe samples were to be submitted for laboratory analyses for isotopic uranium, isotopic thorium, and radium-226. This type of sampling and analysis would yield radionuclide concentrations on an activity per surface area basis (e.g. picoCuries per square centimeter), and the results would be compared to the EPA Building Preliminary Remedial Goals (BPRG) (see EPA 2016b) for residential exposure scenarios that correspond to a one in ten thousand (1E-4) cancer risk. This sampling occurred as described in the QAPP, and is discussed in Sections 4.2.2 and 6.2. As described in Section 6.2, no wipe sample yielded a radionuclide concentration exceeding an EPA BPRG for residential exposure scenario corresponding to a 1 in 10,000 (1E-4) cancer risk.

Interior Bulk Dust Sampling

The QAPP specified collection of bulk samples of accumulated indoor dust by use of micro-vacuum cartridges if areas containing significant quantities of accumulated dust would be encountered. Each bulk dust sample was to be submitted for laboratory analysis that would yield radionuclide concentrations on an activity per mass basis (e.g., picoCuries per gram). This unit of concentration (activity per mass basis) can be used to characterize radionuclide concentrations and relative ratios, but is not comparable to the EPA BPRGs, which are expressed as activities per unit surface area. Relative ratios of radionuclides can be compared to radionuclide ratios of other materials such as commercially available products known to contain radionuclides. This sampling occurred as described in the QAPP, and is discussed in Sections 4.2.3 and 6.3.

4.0 PRE-CERCLA SCREENING ACTIVITIES

Field activities for the Pre-CERCLA screening occurred from December 26 to 29, 2016, and on January 19, 2017, and included the following:

- Collection of real-time measurements of gamma emissions from soils on residential properties
- Collection of soil samples for laboratory analysis for radionuclides
- Collection of real-time measurements of alpha, beta, and gamma emissions from indoor building surfaces
- Collection of real-time measurements of gamma radiation exposure within the interiors of residential properties
- Collection of real-time measurements of radon indoors
- Collection of wipe samples inside residences for measurements of gross alpha and gross beta activities, and for laboratory analysis for specific radionuclides
- Collection of bulk dust samples via vacuum cartridge for laboratory analysis for specific radionuclides.

START members included Rob Monnig, James Christopher, Megan Sawyer, and Jenna Pratt. EPA personnel included Tom Mahler, Chuck Hooper, Doug Ferguson, Danny O'Connor, Dave Kappelman, Randy Brown, and Justin Barker. During the week of December 26, 2016, two teams of field personnel were formed from the individuals listed above. One team was primarily tasked with conducting investigation activities inside each residence while the other team was primarily tasked with conducting field activities outside each residence. Both teams were comprised of multiple EPA personnel and START members. On January 19, 2017, one team consisting of two EPA personnel and one START member conducted surface soil gamma surveys. Photographic documentation of field activities is in Appendix B. START documented field activities in the site logbook (see Appendix C). Instrument calibration and daily instrument response check forms are in Appendix D.

4.1 EXTERIOR MONITORING AND SAMPLING

Investigation of exterior areas included a real-time surface soil gamma scan and collection of soil samples submitted for laboratory analysis for radionuclides. The following describes the exterior sampling:

4.1.1 Real-time Monitoring for Surface Soil Gamma Activity

To scan surface soils at the residences, START used a Ludlum Model 44-20 sodium iodide (NaI) scintillation detector, global positioning system (GPS) unit, and data logging software. The detector was held approximately 6 inches above ground surface while the surveyor moved the detector at approximately 1 to 2 feet per second. By referencing the detector readings to their recorded GPS locations, mapping software was used to display the survey data in real time over aerial imagery. The resulting graphical illustration was used to evaluate the distribution of gamma activity from surface soils throughout the area of investigation. Surface soil scanning measurements, summary statistics, and box plots of the measurements are in Appendix E.

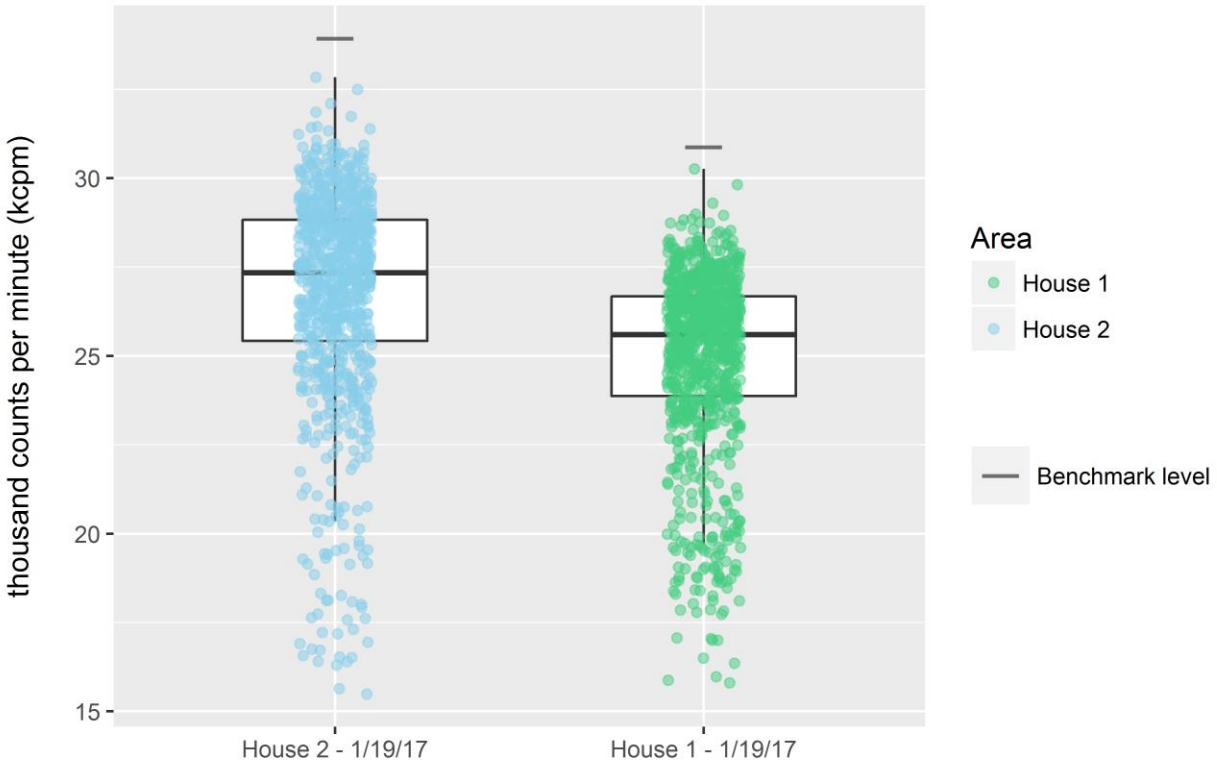
Initial real-time surface soil gamma scans occurred during the week of December 26, 2016, the first on December 27 in the yard of House 1. Reviewing the data on the same day, EPA and START noted that several measurements which appeared elevated had been recorded near an EPA vehicle parked on the street in front of House 1, and that those measurements had been influenced by an instrument check source (a cesium-137 source) stored in the vehicle. To confirm that the elevated readings had been caused by the check source, a new scan of House 1 occurred on December 28, 2016 (vehicles with check sources were moved away from House 1 during the scan). This re-scan was interrupted by rain, and two datasets were designated—pre- and post-rain datasets. Because precipitation events are known to cause temporary spikes in exposure rate readings measured in air near ground surface due to "precipitation scavenging" (or washout) of airborne radionuclides (e.g., see Paatero and Hatakka 1999), the pre- and post-rain datasets were evaluated separately. The datasets were evaluated as described in the QAPP to identify any potentially elevated gross gamma activity (Tetra Tech 2016a, b). That is, each gamma scan measurement was compared to a benchmark level equal to the 75th percentile plus 1.5 times the IQR of measurements logged at the property. No measurements exceeded the benchmark levels (see Table E-1 and Exhibit E-1 in Appendix E). On December 28, 2016, a surface soil gamma scan at House 2 (following the rain event that had interrupted the House 1 scan) yielded no measurements exceeding the benchmark level (see Table E-1 and Exhibit E-1 in Appendix E). Furthermore, no unusual patterns of gross gamma activity, or areas of discrete elevated levels, were observed.

Some GPS measurements from the aforementioned scans could not be plotted graphically or were plotted inaccurately because of poor GPS signal. Subsequently, on January 19, 2017, surface soil gamma scans of Houses 1 and 2 by use of more precise GPS equipment generated results shown over aerial imagery on Figures 2 and 3 in Appendix A. These results appear on Exhibit 1 as boxplots overlain by the individual measurements. These gamma scan measurements were also compared to benchmark levels, also depicted

on Exhibit 1, and this comparison showed no measurement exceeding a benchmark level. Noticeable on Exhibit 1 is a tendency of House 2 measurements to exceed House 1 measurements. This difference is likely related to the aforementioned effects of precipitation scavenging, as rain occurred prior to scanning on the morning of January 19, 2017, and the scan of House 2 was prior to that of House 1 later in the day, when effects of the precipitation scavenging would have subsided due to attenuation with time of the scavenged radionuclides.

EXHIBIT 1

JANUARY 17, 2017 SURFACE SOIL GAMMA SCAN RESULTS



4.1.2 Soil Sampling

Soil sampling proceeded as described in the QAPP, with both discrete and composite soil samples collected. Because the surface soil gamma scan did not identify discrete areas of elevated gamma activity, discrete soil samples were collected, as prescribed in the QAPP, from beneath downspouts and low-lying areas—areas of potentially greatest impact from off-site sources of contamination. Discrete soil samples were also collected [redacted]. Composite soil samples were collected within front and back yards to assess for presence of radionuclides over wide areas. Each composite sample consisted of five aliquots. The discrete

samples and the composite aliquots were collected within 0 to 2 inches below ground surface (bgs) by use of disposable stainless steel spoons. Samples were transferred to labeled sealable plastic bags, placed in coolers, and shipped to the ALS Environmental laboratory (ALS) in Fort Collins, Colorado. The samples were analyzed for uranium and thorium isotopes via alpha spectroscopy, gamma emitting radionuclides (including radium-226 by measurement of progeny) via gamma spectroscopy, and lead-210 via liquid scintillation counting. Descriptions of collected soil samples are in Table 1. Soil sampling locations are shown on Figures 4 and 5 in Appendix A. Soil sample results are presented and evaluated in Section 6.1.

TABLE 1

SOIL SAMPLING SUMMARY
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample	Sample Description	Sampling Rationale
House 1	BDS-[redacted]SG001	Grab sample of surface soil beneath downspout at [redacted]	No discrete areas of elevated gross gamma activity were detected in the yard; therefore, samples were collected from beneath downspouts and low-lying areas.
	BDS-[redacted]SG002	Grab sample of surface soil beneath downspout at [redacted]	
	BDS-[redacted]SG003	Grab sample of surface soil from low area [redacted]	
	BDS-[redacted]SG004	Grab sample of surface soil from [redacted]	To assess [redacted] soil
	BDS-[redacted]SG005	Grab sample of surface soil [redacted]	
	BDS-[redacted]SC006	Composite sample of surface soil in front yard	Determine if naturally occurring radionuclides are present over wide areas at concentrations distinguishable from background.
	BDS-[redacted]SC007	Composite sample of surface soil in back yard	
House 2	BDS-[redacted]C-S001	Composite sample of surface soil in front yard	Determine if naturally occurring radionuclides are present over wide areas at concentrations distinguishable from background.
	BDS-[redacted]C-S002	Composite sample of surface soil in back yard	
	BDS-[redacted]G-S003	Grab sample of surface soil beneath downspout at [redacted]	No discrete areas of elevated gross gamma activity were detected in the yard; therefore, samples were collected from beneath downspouts and low-lying areas.
	BDS-[redacted]G-S004	Grab sample of surface soil [redacted]	
	BDS-[redacted]G-S005	Grab sample of surface soil [redacted]	To assess [redacted] soil
	BDS-[redacted]G-S006	Grab sample of surface soil [redacted]	To assess [redacted] soil
	BDS-[redacted]G-S007	Grab sample of surface soil beneath downspout [redacted]	No discrete areas of elevated gross gamma activity were detected in the yard; therefore, samples were collected from beneath downspouts and low-lying areas.

4.2 INTERIOR MONITORING AND SAMPLING

Investigation of interior areas included general characterization surveys (including exposure rate, radon, and surface activity surveys) and collection and laboratory analysis of surface dust and bulk dust samples. The following describes interior monitoring and sampling:

4.2.1 Exposure Rate, Radon, and Surface Activity Characterization Surveys

Initial interior walkthroughs of the residences occurred on December 27 and 28, 2016 with homeowners. The intent of the initial walkthrough was to identify living spaces, uses of these spaces, and frequency of occupation. Following initial walkthroughs, exposure rate monitoring, radon monitoring, and surface activity characterization surveys proceeded as follows:

Exposure Rate Measurements

During the walkthrough, a Ludlum Model 44-10 NaI scintillation probe and ratemeter were used to measure exposure rate and to identify presence of gamma sources such as historical consumer products containing radioactive material (e.g., glassware, clocks and watches with radioluminescent painted dials) or building materials with natural radionuclide content (such as stone or brick building materials that may have higher natural radiation levels [U.S. Nuclear Regulatory Commission [NRC] 2011]). These measurements were recorded in the logbook (see Appendix C). During the surveys, some building materials (e.g., [redacted]) induced marginally higher exposure rate readings (expected from some earthen building materials); however, overall exposure rate measurements were typical of background environments (e.g., see National Council on Radiation Protection and Measurements [NCRP] 1987, Table 5.4).

Continuous exposure rate measurements were also taken by use of high pressure ionization chambers (HPIC) deployed by EPA at locations within each residence. Continuous measurements from the HPICs are documented in Appendix F, and summarized in Tables 2 and 3 below.

TABLE 2

INTERIOR EXPOSURE RATE MEASUREMENTS – HOUSE 1
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Location	Exposure Rate Measurement	
	Ludlum 44-10 Sodium Iodide Gamma Scintillator	GE Reuter-Stokes RSS-131 High Pressure Ionization Chamber
[redacted]	5-6 µR/hr	-
[redacted]	5-7 µR/hr	-
[redacted]	5-6 µR/hr	7.1 µR/hr (average over 5.6 hours)
[redacted]	5-6 µR/hr	-
[redacted]	5-6 µR/hr	-
[redacted]	5-6 µR/hr	-
[redacted]	5-6 µR/hr	-
[redacted]	5-6 µR/hr	-
[redacted]	6-7 µR/hr	-
[redacted]	6-7 µR/hr	-
[redacted]	6-7 µR/hr	-
[redacted]	5-6 µR/hr	7.4 µR/hr (average over 5.6 hours)
[redacted]	5-6 µR/hr	-
[redacted]	6-7 µR/hr	-

Notes:

µR/hr Microroentgens per hour

TABLE 3

INTERIOR EXPOSURE RATE MEASUREMENTS – HOUSE 2
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Location	Exposure Rate Measurement	
	Ludlum 44-10 Sodium Iodide Gamma Scintillator	GE Reuter-Stokes RSS-131 High Pressure Ionization Chamber
[redacted]	9-10 µR/hr	-
[redacted]	14 µR/hr	-
[redacted]	15 µR/hr	-
[redacted]	10-11 µR/hr	8.6 µR/hr (average over 16.9 hours)
[redacted]	8-9 µR/hr	-
[redacted]	8-9 µR/hr	-
[redacted]	9-10 µR/hr	-
[redacted]	8-9 µR/hr	-
[redacted]	8-9 µR/hr	-
[redacted]	9-10 µR/hr	-
[redacted]	10-11 µR/hr	-
[redacted]	10-11 µR/hr	-
[redacted]	10-11 µR/hr	-
[redacted]	10-11 µR/hr	-
[redacted]	9-10 µR/hr	8.6 µR/hr (average over 16.9 hours)
[redacted]	9-10 µR/hr	-
[redacted]	9-10 µR/hr	-

Notes:

µR/hr Microroentgens per hour

Radon Measurements

Levels of radon (found in homes all over the United States from natural breakdown of uranium in soil, rock, and water) were measured by use of Durridge RAD7 real-time radon detectors. A detector to take radon measurements was placed in the homes (in the basement, if present) during interior sampling activities. A detector was also placed outside to take outdoor ambient radon measurements. During the monitoring, each Durridge RAD7 detector recorded an individual radon measurement every 10 minutes. As specified in the QAPP, these measurements were taken to inform surveyors of potential presence of radon decay products that can deposit onto surfaces and contribute to surface activity levels. Radon measurements are documented in Appendix G, summarized in Table 4 below, and presented as a time-series plot on Exhibit 2. Average radon measurements at House 1 and House 2 (2.0 picoCuries per liter [pCi/L] in the [redacted] of House 2 and 1.3 pCi/L in the [redacted] of House 2) were

typical of homes in St. Louis County. (The Missouri Department of Health and Senior Services [MDHSS] reports an average residential radon test result of 3.97 pCi/g in St. Louis County [MDHSS 017].) The average outdoor radon measurement of 0.15 pCi/L was also typical of outdoor environments. (EPA cites an average outdoor radon level of 0.4 pCi/L [EPA 2016a].) Overall, the radon measurements suggested that unusually high concentrations of radon decay products would not be encountered on surfaces during interior monitoring and sampling.

TABLE 4

RADON MEASUREMENTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

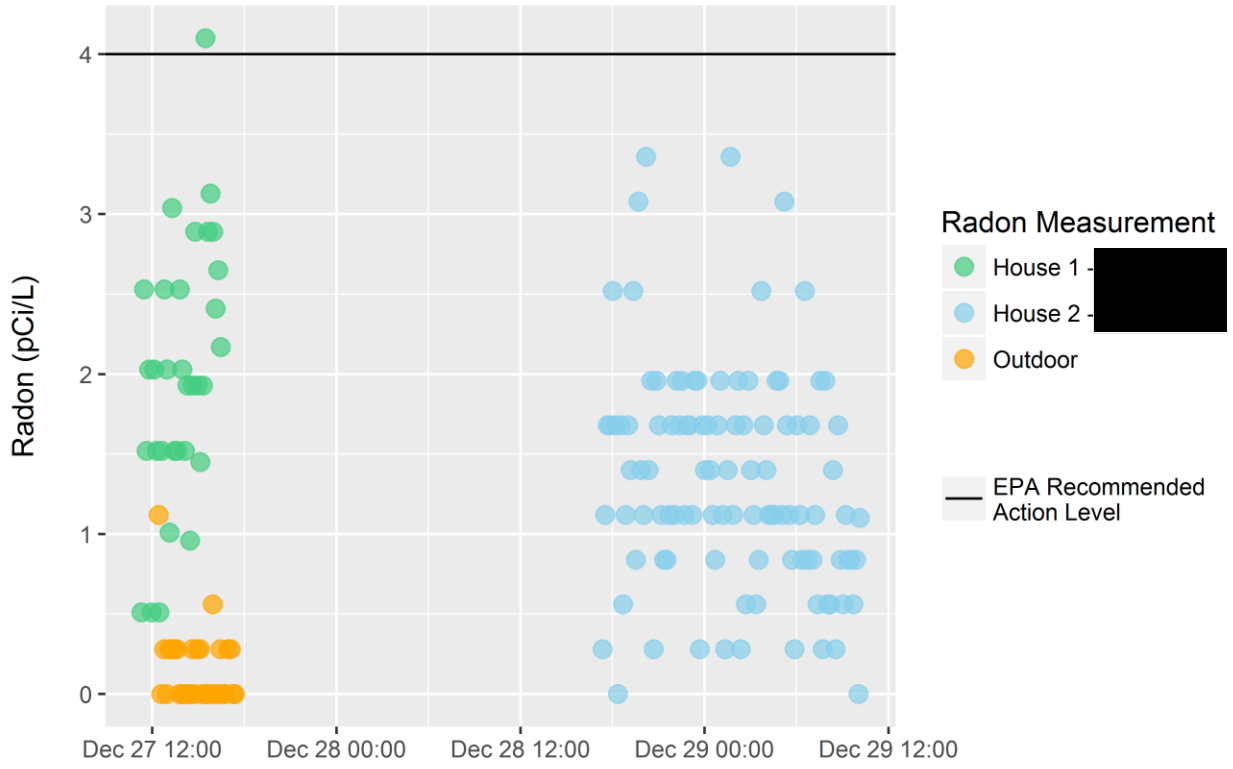
Location	**Radon Measurement**
	Durridge RAD 7 Radon Detector
Outdoor	0.15 pCi/L (average over 5.0 hours)
House 1: [redacted]	2.0 pCi/L (average over 5.2 hours)
House 2: [redacted]	1.3 pCi/L (average over 16.8 hours)

Notes:

pCi/L picoCuries per liter

EXHIBIT 2

INDOOR AND OUTDOOR RADON MEASUREMENTS



The radon measurements were also compared to the EPA-recommended action level of 4 pCi/L (see *A Citizen's Guide to Radon: The guide to Protecting Yourself and Your Family from Radon* [EPA 2016a]). Average radon measurements did not exceed the EPA-recommended action level of 4 pCi/L. However, due to the short duration of the radon testing (about 5 hours in House 1 and 17 hours in House 2), and because no attempts were made to provide "closed-house conditions" during the testing, the results should not be used to assess whether action is warranted to reduce radon levels in the homes. To assess for risks from radon in homes, EPA and the MDHSS recommend testing that begins with an initial short-term test lasting at least 2 days and with the house in a "closed-house" condition. MDHSS recommends testing all homes for radon every 5 to 10 years, and Missouri property owners or residents may request a free residential radon test kit from MDHSS (http://health.mo.gov/living/environment/radon/).

Surface Activity Measurements by Use of Hand-Held Detectors

Measurements of surface activity from various building surface materials were taken by use of hand-held detectors to establish baseline activity levels. Surface activity can include contributions from alpha/beta activity of naturally occurring radioactive materials incorporated into surface materials, deposition of

radon daughter products onto surfaces, and contributions from instrument background. Because building materials differ in background activity levels, various surface types (drywall, tile, [redacted] floors, [redacted], etc.) were surveyed. During this survey, Ludlum Model 43-90 zinc sulfide (ZnS) scintillation detectors (for alpha activity) and Ludlum Model 44-9 Geiger Muller detectors (for beta and gamma activities) were used to obtain 10 1-minute static measurements from each predominant surface type identified in the home. By use of these measurements, benchmark gross alpha and beta/gamma activities from each surface were determined as the 75th percentile plus 1.5 times the IQR of the approximately 10 static measurements recorded from the surface (as specified in the QAPP). After acquisition of baseline measurements and determination of benchmark values, scanning and static surveys by use of Ludlum Model 43-90 and 44-9 detectors proceeded over numerous surface locations to identify any discrete areas of elevated surface activity. A static 1-minute count of alpha and beta/gamma activity was initiated if a scanning survey identified a suspect discrete elevated area of surface activity. If the static measurement exceeded the corresponding benchmark value, a wipe sample was collected within that area. Most scanning surveys did not identify discrete elevated areas of surface activity, and in those cases, wipe sampling locations were selected as described in Table 3 of the QAPP to investigate both high- and low-occupancy rooms, all entrances to the home, and the [redacted] (see Section 4.2.2).

Each of the 1-minute static counts and derivation of benchmark values are documented in the field sheets (see Appendix C) and in Table H-1 of Appendix H. The 1-minute count alpha and beta/gamma activity measurements and the corresponding benchmark values are plotted on Exhibit 3 (House 1 measurements) and Exhibit 4 (House 2 measurements) for each interior surface type (more detailed descriptions of surface types are in Table H-1 of Appendix H). These exhibits distinguish measurements taken during the initial surface characterization survey and used to establish benchmark values (the “baseline” measurements) from measurements prompted by scanning surveys and wipe sampling (the “investigation” measurements). Each 1-minute static count “investigation” measurement was associated with a co-located wipe sample subsequently screened for alpha and beta activity by use of a Ludlum 3030 drawer counter (see Section 4.2.2). Alpha activity measurements of the wipe samples were then used, in part, to select wipe samples for laboratory analysis for specific radionuclides (see Section 4.2.2). As described in Section 6.2, no wipe sample yielded a radionuclide concentration exceeding an EPA BPRG for residential exposure scenario corresponding to a 1 in 10,000 (1E-4) cancer risk.

EXHIBIT 3

1-MINUTE STATIC COUNTS OF INTERIOR SURFACES – HOUSE 1

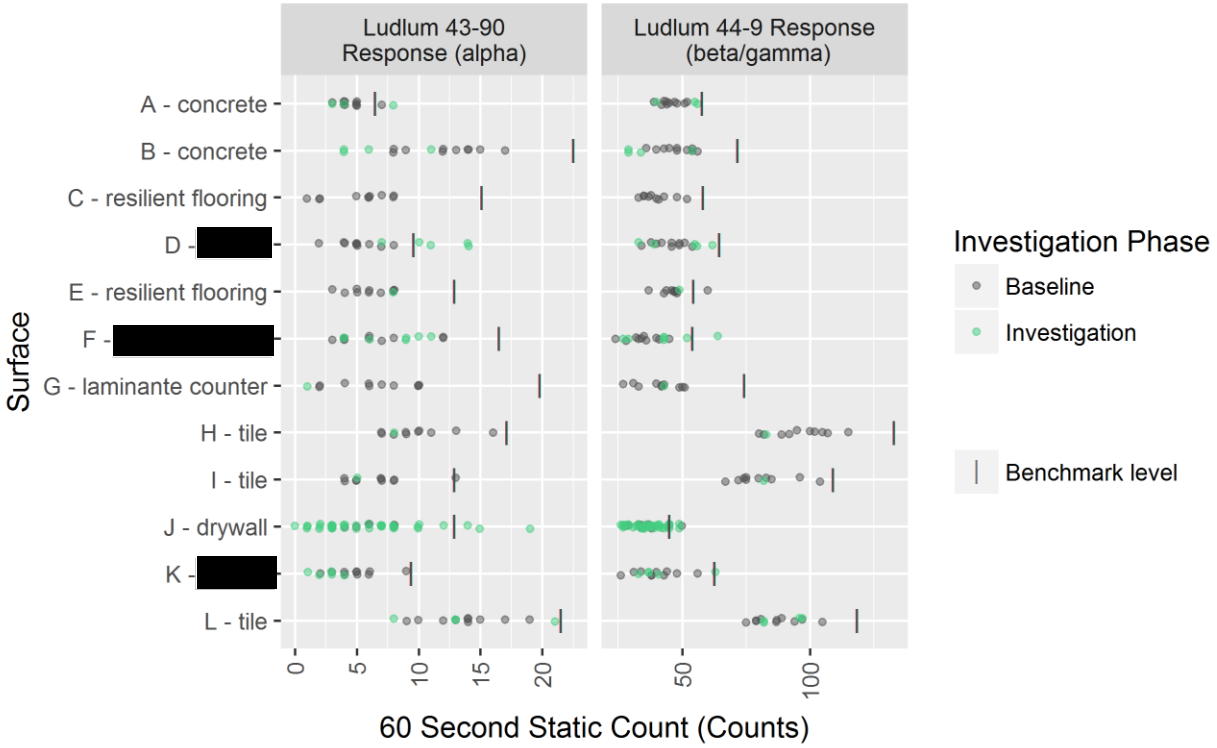
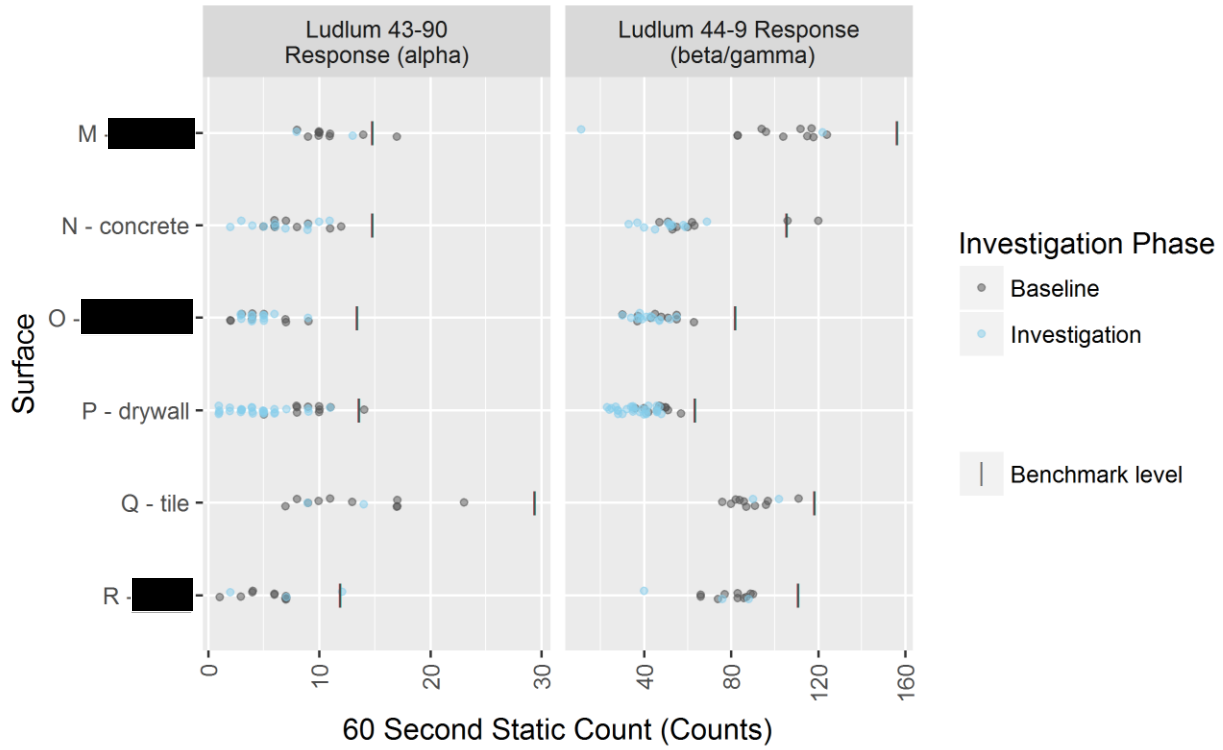


EXHIBIT 4

1-MINUTE STATIC COUNTS OF INTERIOR SURFACES – HOUSE 2



4.2.2 Interior Surface Dust Sampling

Wipe samples were collected to assess presence of radionuclides in settled dust. Surfaces sampled included floors, walls, and other accessible surfaces; floor surfaces near entrances; and floor and wall surfaces near clothes dryers. The surface dust samples were collected onto 1.75-inch-diameter cotton twill coated wipes (or "smears"). At each sample location, a paper template with a 200-square-centimeter (cm^2) cutout (an approximately 14- by 14-inch square) was held over the sampling surface while a wipe was pressed against the sampling surface with moderate pressure and swept over the sampling surface in multiple "S" pattern passes. A new sampling template was used for each wipe sample. The collected wipe samples were placed in glassine envelopes or food-grade releasable plastic bags. Table 5 lists the number of wipe samples collected within each type of area—high-occupancy, low-occupancy, and entrance areas.

TABLE 5

NUMBER OF WIPE SAMPLES COLLECTED
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Room/Location	**Number of Wipes Collected (Houses 1 and 2)**
High-Occupancy Areas ([redacted], etc.)	92
Low-Occupancy Areas ([redacted] etc.)	55
Entrances	8
Total	129

Each wipe sample was screened by use of a Ludlum 3030 drawer counter to measure gross alpha and beta activity of the wipe sample. A portion of the wipe samples were measured on site to provide preliminary information to field team members (these measurements are recorded on field sheets in Appendix C). The wipe samples were held for several days following collection to allow for decay of short-lived radon daughter products, and then each wipe sample was measured on the Ludlum 3030 drawer counter (on January 4 or 5, 2017); these measurements are detailed in Table H-2 of Appendix H. Per the QAPP, alpha activity results served partly to aid selection of wipe samples to be submitted for laboratory analysis. As prescribed in Table 3 of the QAPP, from each house, wipes selected for laboratory analysis were: (1) the three wipes with the highest alpha counts, (2) the wipe with highest alpha count from each high-occupancy room, and (3) the wipe with highest alpha count from each entrance. Alpha count measurements referenced for this determination were obtained on January 4 and 5, 2017. In this manner, 12 wipe samples per house were selected for laboratory analysis. Two additional field blank wipes per house also were selected. The wipe samples were submitted to ALS in Fort Collins, Colorado, for analyses for uranium and thorium isotopes via alpha spectroscopy, and for radium-226 via detection of radon emanation. Tables 6 and 7 list wipe samples selected for laboratory analysis.

TABLE 6

WIPE SAMPLES SUBMITTED FOR LABORATORY ANALYSIS – HOUSE 1
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample Identifier	Sample Description	Area Type	Reason Selected for Laboratory Analysis
BDS-[redacted]W002	[redacted], floor	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W006	[redacted], wall	High Occupancy	Second highest alpha count among all samples and highest alpha count of [redacted]
BDS-[redacted]W014	[redacted], wall	High Occupancy	Highest alpha count of high-occupancy room
BDS-[redacted]W019	[redacted] wall	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W034	[redacted], west wall	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W036	[redacted], floor	Entrance	Entrance sample
BDS-[redacted]W048	[redacted], floor	Entrance	Entrance sample
BDS-[redacted]W049	[redacted], west wall	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W052	[redacted], west wall	Low Occupancy	Highest alpha count among all samples
BDS-[redacted]W058	[redacted], west wall	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W061	[redacted] floor	High Occupancy	Third-highest alpha count among all samples and highest alpha count of [redacted]
BDS-[redacted]W074	[redacted], floor, entrance	Entrance	Entrance sample
BDS-[redacted]W001	Field blank	Not Applicable	Field blank sample
BDS-[redacted]W021	Field blank	Not Applicable	Field blank sample

Wipe sample results are presented and evaluated in Section 6.2. As described in Section 6.2, no wipe sample yielded a radionuclide concentration exceeding an EPA BPRG for residential exposure scenario corresponding to a 1 in 10,000 (1E-4) cancer risk.

TABLE 7

WIPE SAMPLES SUBMITTED FOR LABORATORY ANALYSIS – HOUSE 2
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample Identifier	Sample Description	Area Type	Reason Selected for Laboratory Analysis
BDS-[redacted]W003	[redacted]	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W004	[redacted] entrance, floor	Entrance	Entrance sample
BDS-[redacted]W005	[redacted] entrance, floor	Entrance	Entrance sample
BDS-[redacted]W006	[redacted] entrance, floor	Entrance	Highest alpha count among all samples and an entrance sample
BDS-[redacted]W007	[redacted]entrance, floor	Entrance	Entrance sample
BDS-[redacted]W010	[redacted], floor	High Occupancy	Second highest alpha count among all samples and highest alpha count of [redacted]
BDS-[redacted]W016	[redacted] wall	High Occupancy	Highest alpha count of living room
BDS-[redacted]W024	[redacted], floor	Low Occupancy	Third-highest alpha count among all samples
BDS-[redacted]W034	[redacted], floor	High Occupancy	Highest alpha count of [redacted] [redacted]
BDS-[redacted]W036	[redacted] wall	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W042	[redacted] [redacted]wall	High Occupancy	Highest alpha count of [redacted]
BDS-[redacted]W055	[redacted] floor	Entrance	Entrance sample
BDS-[redacted]W001	Field blank	Not Applicable	Field blank sample
BDS-[redacted]W061	Field blank	Not Applicable	Field blank sample

Wipe sample results are presented and evaluated in Section 6.2. As described in Section 6.2, no wipe sample yielded a radionuclide concentration exceeding an EPA BPRG for residential exposure scenario corresponding to a 1 in 10,000 (1E-4) cancer risk.

4.2.3 Interior Bulk Dust Sampling

Bulk dust samples of accumulated dust were collected by use of micro-vacuum cartridges to characterize radionuclide concentrations and relative radionuclide ratios in dust. The dust samples were collected by use of a pre-weighed micro-vacuum cassette in accordance with ASTM International (ASTM) D7144 "Standard Practice for Collection of Surface Dust by Micro-vacuum Sampling for Subsequent Metals Determination." To collect a sufficient amount of dust for analysis (the laboratory requested about 3 grams), each bulk dust sample had to include dust collected over multiple surfaces within the selected sampling area. Bulk dust samples, in addition to a field blank samples, were submitted to ALS in Fort

Collins, Colorado, for analyses for uranium and thorium isotopes via alpha spectroscopy, and for radium-226 via detection of radon emanation. Table 8 lists bulk dust samples collected.

TABLE 8

BULK DUST SAMPLES
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Property	Sample Identifier	Location	Sample Description
House 1	BDS-[redacted]BD01	[redacted]	Collected from several surfaces including [redacted]
	BDS-[redacted]BD01	[redacted]	Collected from several surfaces in the garage including [redacted]
	BDS-[redacted]FB	Field blank	Field blank
House 2	BDS-[redacted]BD01	[redacted]	Collected from several surfaces including [redacted]
	BDS-[redacted]FB	Field blank	Field blank

Bulk dust sample results are presented and evaluated in Section 6.3.

5.0 DATA VALIDATION, VERIFICATION, AND USABILITY

START reviewed and qualified the data according to EPA Contract Laboratory Program guidelines (EPA 2008), the Multi-Agency Radiological Laboratory Analytical Protocols Manual (EPA 2004), and other criteria specified in the applicable methods. Copies of analytical data packages and chain-of-custody (COC) documents are in Appendix I. Findings of this review are documented in data validation reports (individual repots pertaining to data associated with House 1 and House 2) in Appendix J. The following are brief descriptions, findings, and suggested qualifiers:

House 1

- COC – A typographical error occurred on the COC form for the composite soil sample BDS-[redacted]SC007. The COC indicated "BDS-[redacted]SG007." Data users should be aware that analytical laboratory reports will refer to this sample as such.

- Detection Limits – In analyses of some wipe samples, the laboratory could not meet the requested minimum detectable concentration (MDC), and the laboratory flagged the affected result with an "M". Requested MDCs for the wipe samples were established based on project-specific quantitation goals (PQG) established in the QAPP. PQGs for the wipe samples were established for uranium-238, thorium-230, and radium-226. Generally, the laboratory applied the uranium-238 and thorium-230 requested MDCs to all other uranium and thorium isotopes. In all cases, achieved MDCs for uranium-238, thorium-230, and radium-226 wipe sample results were below benchmark criteria, and the data were deemed usable (see Section 6.2); therefore, no further qualifications were assigned, and the "M" flags were not retained.

- Liquid Scintillation Counting (Pb-210) – This method involves a solution of non-radioactive lead nitrate as a "carrier." Recovery of the carrier is determined, and this parameter provides the same information as a surrogate. All carrier recoveries were within acceptance limits. However, the laboratory noted that the pre-extraction measurement of elemental lead in the samples yielded a result below the amounts known to have been added to samples BDS-[redacted]SG004, BDS-[redacted]SG005, BDS-[redacted]SG006, and BDS-[redacted]SC007. The laboratory's calculations adjusted for this, but lead-210 results (including the total propagated uncertainty [TPU]) from those samples possibly are biased low. These results were flagged "J" to indicate the uncertainty.

- Alpha Spectroscopy Analyses (Isotopic Uranium and Thorium) – Laboratory blanks for the wipe and filter samples yielded low activities of uranium-234, and the blank for soil samples yielded a low activity of uranium-238. Similar activities of uranium-234 in wipe and filter samples were qualified as estimated, possibly biased high, and flagged "J". All soil uranium-238 activities were much larger than the blank activity, so these were not qualified.

- Gamma Spectroscopy Analyses (Gamma Emitters) – Some prepared samples had densities less than the standard range of 85 to 115 percent of the densities of the calibration standards. ALS flagged these "G" to indicate that detected results may be biased high due to less self-absorption. No further qualifications were applied. In results from some samples, it was difficult to distinguish spectral peaks or (occasionally) to recognize definite presence of a peak. ALS indicated the various irregularities with flags of "TI" or "J". All such results were qualified as estimated and flagged "J".

House 2

- Detection Limits – In analyses of some wipe samples, the laboratory could not meet the requested MDC, and the laboratory flagged the affected result with an "M". Requested MDCs for the wipe samples were established based on PQGs specified in the QAPP. PQGs for the wipe samples were established for uranium-238, thorium-230, and radium-226. Generally, the laboratory applied the uranium-238 and thorium-230 requested MDCs to all other uranium and thorium isotopes. In all cases, achieved MDCs for uranium-238, thorium-230, and radium-226 wipe sample results were below benchmark criteria, and the data were deemed usable (see Section 6.2); therefore, no further qualifications were assigned, and the "M" flags were not retained.

- Liquid Scintillation Counting (Pb-210) – All calibration (initial and continuing) results were within their various quality control (QC) limits. However, analysis of sample BDS-[redacted]G-S006 yielded a low recovery of the "spectral quench parameter"—a low quantitative result indicating matrix interference. Therefore, the lead-210 result for sample BDS-[redacted]B-S-006 was qualified as estimated, possibly biased low, and flagged "J".

- Alpha Spectroscopy Analyses (Isotopic Uranium and Thorium) – Laboratory (method) blanks yielded low activities of thorium-232 and all three uranium isotopes. Most field sample results for the related isotopes were non-detect or much higher than results from the associated blank, so no qualifications were applied. A few detected results, such as the uranium-235 concentration in sample BDS-[redacted]G-S004, were similar to concentrations in the blank, and were qualified as estimated, possibly biased high, and flagged "J". The filter (bulk dust) field blank yielded a low activity of uranium-234. Therefore, the similar concentration in sample BDS-[redacted]BD01 was also qualified as estimated, possibly biased high, and flagged "J".

- Gamma Spectroscopy Analyses (Gamma Emitters) – Some prepared samples had densities less than the standard range of 85 to 115 percent of the densities of the calibration standards. ALS flagged these "G" to indicate that detected results may be biased high due to less self-absorption. No qualifications were applied. In results from some samples, it was difficult to distinguish spectral peaks or (occasionally) to recognize definite presence of a peak. ALS indicated the various irregularities with flags of "TI" or "J". All such results were qualified as estimated and flagged "J". If no peaks associated with a radionuclide are evident, the software performing the quantitation applies a "net quantification" method. ALS indicates that this method of quantitation can yield positive activity results for radionuclides whose presence cannot be determined definitively. ALS flags these results with an "NQ" qualifier and indicates that the radionuclide is not detected or supported at any level above the reported MDC. All such results were qualified as non-detect and flagged "UJ".

Overall, review of the laboratory analytical report indicated that quality of the data was acceptable and usable as qualified for the intended purposes of those data. The qualifiers described above have been applied to the data and have been considered in evaluations of the data presented herein. Both laboratory-assigned and data validation-assigned qualifiers are listed in analytical data summary tables in Appendix K.

6.0 EVALUATION OF SAMPLE RESULTS

As part of the Pre-CERCLA screening, 14 exterior soil samples, 24 indoor dust wipe samples (plus four field blanks), and three bulk dust sample(s) (plus two field blank samples) were collected and submitted for analysis to ALS in Fort Collins, Colorado. Copies of the analytical data package and corresponding COC documents are in Appendix I. Analytical data from soil, wipe, and bulk dust samples are tabulated and presented in Appendix J; these tables list sample results along with uncertainty values, laboratory-assigned data qualifiers, and data validator-assigned qualifiers. The following sections summarize and evaluate radionuclide concentrations detected in soil, wipe, and bulk dust samples.

6.1 SOIL SAMPLES

Soil samples were analyzed for uranium and thorium isotopes via alpha spectroscopy, for lead-210 via liquid scintillation counting, and for gamma emitters (including radium-226) via gamma spectroscopy. The following summarizes radionuclides detected, and compares detected concentrations to background datasets.

6.1.1 Summary of Soil Sample Results

Detected radionuclides included (1) radionuclides in the uranium-238, thorium-232, and uranium-235 decay series (including actinium-228, bismuth-214, lead-210, lead-212, lead-214, radium-226, thorium-228, thorium-230, thorium-232, thallium-208, uranium-234, uranium-235, and uranium-238); and (2) the non-series radionuclide potassium-40. Each of these radionuclides is naturally occurring and ubiquitous in the earth's crust, being incorporated into surface soil and rocks. Detected concentrations of these naturally occurring radionuclides are summarized in Tables 9 and 10.

Potassium-40 concentrations detected in the House 1 and 2 soil samples (8.1-20.4 pCi/g) are within the concentration range for potassium-40 in soil of 1 to 30 pCi/g often cited in literature (Idaho State University 2017). Thus, detected potassium-40 concentrations appear to be typical of ambient soil concentrations, and no further comparisons are presented.

The following sections evaluate concentrations of uranium, thorium, and actinium series radionuclides detected in BDS soil.

TABLE 9

SOIL SAMPLE RESULTS – HOUSE 1
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample	Ac-228	Bi-214	K-40	Pb-210	Pb-212	Pb-214	Ra-226	Th-228[α]	Th-230[α]	Th-232[α]	Tl-208	U-234[α]	U-235	U-235[α]	U-238[α]
BDS-[redacted]SG001	1.21 J,G	1.41 J,G	15.2 G	6.6	1.02 G	0.9 J,G	1.43 G	1.12	1.14	1.08	0.52 G	1.22	< 0.76	0.042	1.19
BDS-[redacted]SG002	< 1.40	1.53 J,G	20.4 G	5.2	1.42 G	1.79 J,G	2.43 G	1.06	1.01	0.97	< 0.43	0.77	< 1.54	0.044	0.89
BDS-[redacted]SG003	0.95 J,G	1.09 J,G	11.8 G	1.28	1.25 G	1.25 J,G	1.57 G	1.04	1.01	0.93	0.27 G	0.70	< 0.82	0.018	0.85
BDS-[redacted]SG004	0.77	0.78 J	13.7	1.24 J	0.99	1.05 J	1.33	1.02	0.98	0.97	0.40	0.63	< 0.69	0.039	0.82
BDS-[redacted]SG005	1.21 J,G	0.92 J,G	8.1 G	1.16 J	0.87 G	0.82 J,G	1.23 G	0.96	0.89	0.86	0.24 G	0.78	< 0.88	0.048	0.65
BDS-[redacted]SC006	1.26 J,G	0.96 J,G	9.6 G	1.86 J	1.12 G	1.08 J,G	1.37 G	1.03	1.17	1.06	0.48 G	0.89	< 0.81	0.040	0.80
BDS-[redacted]SC007	1.08 J,G	1.12 J,G	15.1 G	1.45 J	1.07 G	1.1 J,G	1.53 G	1.03	1.10	1.06	0.32 G	0.75	< 0.78	< 0.032	0.75

Notes:

All concentrations in picoCuries per gram (pCi/g)

[α] Indicates result is via alpha spectroscopy analysis; all other results are via gamma spectroscopy.

G Laboratory flag indicating a significant difference between density of the sample and the calibration standard; the result may be biased high
J Laboratory flag indicating the concentration is estimated

Ac Actinium
Bi Bismuth
K Potassium
Pb Lead
Ra Radium
Th Thorium
Tl Thallium
U Uranium

TABLE 10

SOIL SAMPLE RESULTS – HOUSE 2
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample	Ac-228	Bi-214	K-40	Pb-210	Pb-212	Pb-214	Ra-226	Th-228[α]	Th-230[α]	Th-232[α]	Tl-208	U-234[α]	U-235	U-235[α]	U-238[α]
BDS-[redacted]C-S001	1.29 J,G	1.35 J,G	14 G	1.95	0.79 G	0.91 J,G	1.46 G	1.00	1.04	0.95	0.31 G	0.68	< 0.95	0.072	0.85
BDS-[redacted]C-S002	1.26 J,G	1.00 J,G	13.6 G	1.46	0.83 G	1.07 J,G	1.52 G	1.10	1.18	1.16	0.25 G	0.78	< 0.92	< 0.044	0.88
BDS-[redacted]C-S002 (DUP)	- [b]	- [b]	- [b]	- [b]	- [b]	- [b]	- [b]	1.05	1.11	0.96	- [b]	0.87	- [b]	0.040	0.83
BDS-[redacted]G-S003	1.12 J,G	1.12 J,G	18.6 G	14.4	0.77 G	1.21 J,G	1.68 G	1.16	1.29	1.04	0.26 G	0.78	< 1.09	0.053 J	0.86
BDS-[redacted]G-S004	< 0.96 J	1.03 J,G	16.9 G	1.54	1.06 G	0.86 J,G	1.31 G	1.05	1.15	1.09	0.28 G	0.79	< 0.94	0.040 J	0.85
BDS-[redacted]G-S005	1.31 J,G	1.17 J,G	11.4 G	1.41	1.16 G	1.3 J,G	1.65 G	1.01	1.04	0.99	0.47 G	0.94	< 1.10	0.053 J	0.75
BDS-[redacted]G-S005 (DUP)	0.96 G	0.86 G	14 G	- [b]	0.98 G	0.84 G	1.18 G	- [b]	- [b]	- [b]	0.22 G	- [b]	< 0.89	- [b]	- [b]
BDS-[redacted]G-S006	< 1.26	1.07 J,G	9.7 G	2.3 J	1.08 G	1 J,G	1.43 G	0.74	0.85	0.72	0.31 G	0.69	< 1.11	< 0.041	0.77
BDS-[redacted]G-S007	1.00	1.33 J	16.3	6.4	1.16	1.23 J	1.66	1.30	1.17	1.16	0.36	0.86	< 0.90	0.051 J	0.95

Notes:

All concentrations in picoCuries per gram (pCi/g)

[α] Indicates result is via alpha spectroscopy analysis; all other results are via gamma spectroscopy.

[b] The laboratory conducted duplicate alpha spectroscopy analysis of sample BDS-[redacted]C-S002 and duplicate gamma spectroscopy analysis of sample BDS-[redacted]G-S005.

DUP	Indicates a laboratory duplicate analysis
G	Laboratory flag indicating a significant difference between density of the sample and the calibration standard; the result may be biased high
J	Laboratory flag indicating the concentration is estimated
-	Not analyzed

Ac	Actinium
Bi	Bismuth
K	Potassium
Pb	Lead
Ra	Radium
Th	Thorium
Tl	Thallium
U	Uranium

6.1.2 Reference Study Data Sets

The following describes datasets to which detected concentrations of uranium, thorium, and actinium series radionuclides in the House 1 and House 2 soil samples were compared.

Bridgeton Municipal Athletic Complex (BMAC Study)

In 2014, EPA Region 7 conducted a Pre-CERCLA screening at BMAC in Bridgeton, Missouri. The study occurred after a community group had reported detections of elevated radiation readings at BMAC. Results of the Pre-CERCLA screening did not indicate a release of radionuclides to surface soil at BMAC. During the study, 112 surface soil samples were collected: 88 samples from BMAC in Bridgeton, Missouri; 12 samples from Blanchette Park in St. Charles, Missouri; and 12 samples from Koch Park in Florissant, Missouri. The samples included both composite and grab samples collected from publically accessible areas of ballfields, grass-covered park areas, and drainage areas. The "BMAC Study" soil samples were analyzed for gamma-emitting radionuclides (including radium-226 by in-growth of progeny) via gamma spectroscopy, and for uranium and thorium isotopes via alpha spectroscopy. BMAC Study data are in Appendix L.

Oak Ridge National Laboratory (ORNL) Background Study

Myrick, Berven, and Haywood (1983) reported findings from a study by ORNL to measure background radionuclide concentrations in surface soils across the United States. The study included determinations of radium-226, thorium-232, and uranium-238 concentrations. Reported Missouri and nationwide results are:

	Ra-226 (pCi/g)	Th-232 (pCi/g)	U-238 (pCi/g)
Missouri (10 samples)	0.31-1.4	0.32-1.3	0.33-1.7
United States	0.23-4.2	0.10-3.4	0.12-3.8

Number of United States samples was 327 for Ra-226, 331 for Th-232, and 355 for U-238.

Sedimentation Studies Referencing Pb-210 Concentrations

Comparisons of lead-210 concentrations to background concentrations require particular care because of presence of lead-210 in surface soil and sediments from the naturally occurring radon progeny "fallout" process. Lead-210 is a naturally occurring radionuclide of the uranium-238 decay series. Among other short-lived progeny, its production in the decay chain follows radium-226 and radon-222. As a result of this decay sequence, soils containing radium-226 also contain lead-210. The level of lead-210 in soil in equilibrium with that of its radium-226 parent is termed "supported lead-210." A level of lead-210 exceeding supported lead-210 (termed "unsupported lead-210") can naturally occur in soil and sediments

due to deposition ("fallout") of lead-210 from the atmosphere (along with deposition of other short-lived decay products of atmospheric radon-222). These atmospheric inputs of lead-210 occur in surficial soil and sediments in contact with the atmosphere, and via precipitation that acts to "wash out" airborne particles containing lead-210 (and other radon daughter products). Lead-210 coming into contact with soils from this fallout/washout process strongly adheres to soil particles and thus accumulates in surface soil and sediment. These soils and sediments containing unsupported lead-210 may ultimately be redistributed by erosion, sedimentation, and other transport processes (as cited in Walling, Collins, and Sichingabula 2003). Those processes have been well documented and, indeed, unsupported lead-210 often serves as a natural tracer to characterize soil sedimentation and erosion rates (Walling, Collins, and Sichingabula 2003).

Some unsupported lead-210 soil and sediment concentrations cited in studies include:

Study	Media Sampled	Pb-210 (pCi/g)
Appleby (2008)	Sediment in four international lakes	14 – 27
Robbins and Edginton (1975)	Lake Michigan sediment	7 – 23
McCall, Robbins, and Matisoff (1984)	Sediments in Lake Rockwell (Ohio)	20 – 24

These lead-210 concentration ranges were compared to BDS property results.

6.1.3 Soil Sample Results Compared to Those from Reference Studies

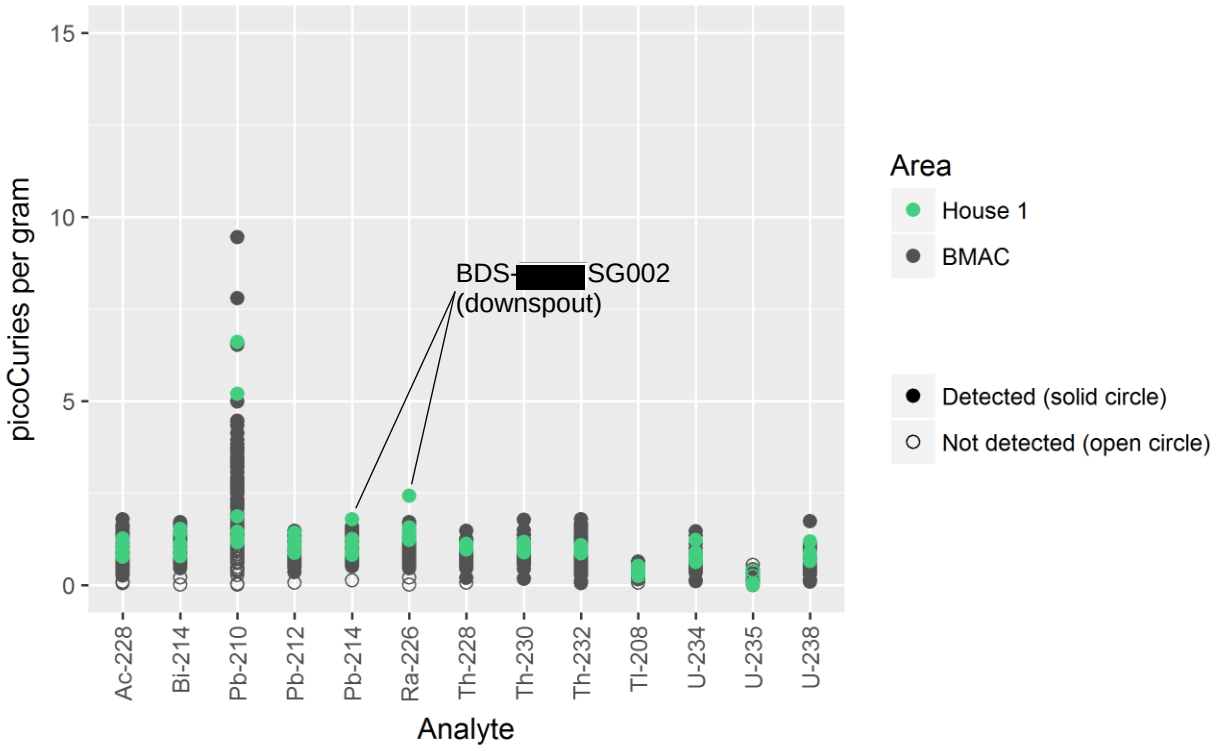
Soil sampling results were first compared to the BMAC Study dataset, followed by further comparisons to select radionuclide concentration ranges provided by the ORNL study and identified lead-210 sedimentation studies. The following presents comparisons of House 1 and House 2 soil sampling results to those from the reference studies:

House 1

For comparison to the BMAC Study dataset, Exhibit 5 is a plot of individual sample results from both House 1 soil samples and BMAC study soil samples.

EXHIBIT 5

SOIL SAMPLING RESULTS COMPARED TO BMAC STUDY RESULTS – HOUSE 1



As depicted on Exhibit 5, lead-214 and radium-226 concentrations in sample BDS-[redacted]SG002 (a grab sample collected beneath a downspout) exceed respective maximum concentrations detected in BMAC study samples; all other uranium, thorium, and progeny radionuclide concentrations in BDS property samples are less than respective maximum corresponding concentrations in BMAC study samples. Radium-226 and lead-214 concentrations detected in the BDS-[redacted]SG002 sample are listed in Table 11 along with reference concentrations of radium-226 and lead-214.

TABLE 11

SAMPLE BDS-[redacted]SG002 COMPARED TO BACKGROUND STUDIES
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Study Area	Ra-226 (pCi/g)	Pb-214 (pCi/g)
BDS-[redacted]SG002	2.43 G	1.79 G,J
BMAC Study[1] (112 samples)	0.46 – 1.7	0.50 - 1.59
ORNL Study – Missouri soil[2] (10 samples)	0.31 – 1.4	NS
ORNL Study – United States[2] (327 samples)	0.23 – 4.2	NS

Notes:

[1] Data from Pre-CERCLIS Screening of Bridgeton Municipal Athletic Fields Complex (BMAC) (Tetra Tech 2014)

[2] Study completed by Myrick, Berven, and Haywood (1983)

BMAC Bridgeton Municipal Athletic Fields
G Laboratory flag indicating a significant difference between density of the sample and calibration standard; the result may be biased high
J Laboratory flag indicating concentration is estimated
NS Not studied
ORNL Oak Ridge National Laboratory
Pb Lead
pCi/g picoCuries per gram
Ra Radium

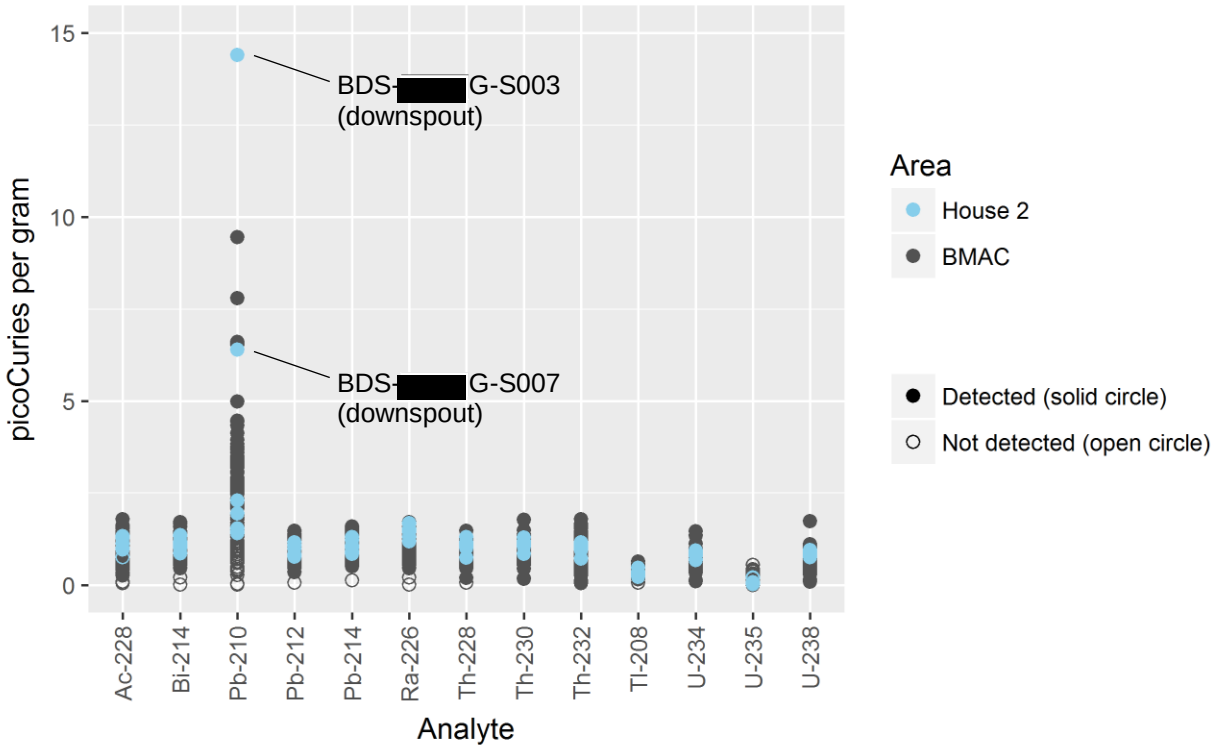
As indicated in Table 11, the BDS-[redacted]SG002 radium-226 result of 2.43 pCi/g is outside the range of the ORNL study of Missouri soil samples (10 samples), but within the range of ORNL study nationwide samples (327 samples) (Myrick, Berven, and Haywood 1983). The radionuclide lead-214 was not included in the ORNL study. As described in Section 5.0, radium-226 and lead-214 results are flagged "G" indicating that sample density is less than 85 percent of density of the calibration standard, and that the result may be biased high.

House 2

Exhibit 6 is a plot of House 2 soil sampling results against BMAC study soil sampling results.

EXHIBIT 6

SOIL SAMPLING RESULTS COMPARED TO BMAC STUDY RESULTS – HOUSE 2



As depicted on Exhibit 6, except for a lead-210 concentration of 14.4 pCi/g detected in sample BDS-[redacted]G-S003 (a grab sample from beneath a downspout), no uranium, thorium, or progeny radionuclide concentration exceeds a respective maximum concentration detected in the BMAC study. Lead-210 concentration in sample BDS-[redacted]G-S003 is comparable to lead-210 concentrations found by others in soils of drainage channels, drainage sediments, and lake sediments (in these aforementioned studies, lead-210 concentrations up to 27 pCi/g were reported). Also notable is that the second-highest lead-210 concentration detected in soil samples (6.4 pCi/g in BDS-[redacted]G-S007) was also in a sample collected beneath a downspout. Lead-210 concentrations in the other samples ranged from 1.41 to 2.30 pCi/g.

6.2 INDOOR WIPE SAMPLES

Indoor wipe samples were analyzed for uranium and thorium isotopes via alpha spectroscopy, and for radium-226 via radon emanation. Wipe sample results were reported by the laboratory on a per sample basis (i.e., pCi per sample). These values were divided by the sampling area (200 cm^2) to yield a result on a per cm^2 basis (i.e., pCi/cm^2). This conversion and detailed analytical results are listed in Table K-2 of Appendix K.

As specified in the QAPP, wipe sampling results were compared to EPA BPRGs (see EPA 2016b) for surface dust for residential exposure scenarios that correspond to a 1 in 10,000 (1E-4) cancer risk. No detected concentration exceeded an EPA BPRG. Detection sensitivities achieved by the laboratory for radium-226, thorium-230, and uranium-238 (the radionuclides with project-specific quantitation goals specified in the QAPP) were sufficient to compare the results to EPA BPRGs (their MDCs were below respective EPA BPRGs). Wipe sampling results and EPA BPRGs are listed in Tables 12 and 13.

TABLE 12

ANALYTICAL RESULTS FROM WIPE SAMPLES – HOUSE 1
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample	Description	U-238	U-234	Th-230	Ra-226	Th-232	Th-228	U-235
BDS-[redacted]W001	Field blank	< 0.00027	< 0.00039	< 0.00145	< 0.00115	< 0.000355	< 0.0011	< 0.000315
BDS-[redacted]W002	[redacted], floor	< 0.00033	< 0.000405	< 0.00145	< 0.000875	< 0.000275	< 0.001	< 0.000265
BDS-[redacted]W006	[redacted], wall	0.0001	0.00084	< 0.00155	< 0.0012	< 0.000375	< 0.00115	< 0.00029
BDS-[redacted]W014	[redacted], wall	< 0.00041	0.000475	< 0.0014	< 0.00145	< 0.000275	< 0.00115	< 0.00037
BDS-[redacted]W019	[redacted], wall	< 0.000235	< 0.000345	< 0.00145	< 0.0016	< 0.00048	< 0.0012	< 0.0001
BDS-[redacted]W021	Field blank	< 0.00037	0.00031	< 0.00145	< 0.000885	< 0.00036	< 0.00115	< 0.00044
BDS-[redacted]W034	[redacted] wall	0.000245	< 0.000425	< 0.0014	< 0.00087	< 0.00039	< 0.00105	< 0.000445
BDS-[redacted]W036	[redacted] entrance, floor	< 0.000385	0.000645	< 0.00145	< 0.00115	< 0.00035	< 0.00105	0.000115
BDS-[redacted]W048	[redacted] entrance, floor	< 0.00038	< 0.00038	< 0.00135	< 0.00125	< 0.00037	< 0.000915	0.000295
BDS-[redacted]W049	[redacted] wall	< 0.0003	< 0.0003	< 0.0014	< 0.0015	< 0.000245	< 0.00088	0.000115
BDS-[redacted]W052	[redacted] wall	< 0.00032	0.00057	< 0.0014	< 0.0013	0.00022	< 0.001	< 0.00026
BDS-[redacted]W058	[redacted] wall	< 0.0005	0.000375	< 0.00135	< 0.00105	< 0.00026	< 0.0011	< 0.00013
BDS-[redacted]W061	[redacted], floor	< 0.00025	0.000545	< 0.0013	< 0.0013	0.000125	< 0.000765	< 0.00011
BDS-[redacted]W074	[redacted], floor, entrance	< 0.00029	0.000345	< 0.00145	< 0.0012	< 0.000455	< 0.00074	0.000145
Building Preliminary Remediation Goal (BPRG) Corresponding to a Cancer Risk of 1 in 10,000		0.158	0.211	0.188	0.0456	0.0144	1.21	0.202

Notes:

All concentrations in picoCuries per square centimeter (pCi/cm^2)

< Radionuclide not detected (minimum detectable concentration is shown)

Ra Radium
Th Thorium
U Uranium

TABLE 13

ANALYTICAL RESULTS FROM WIPE SAMPLES – HOUSE 2
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample	Description	U-238	U-234	Th-230	Ra-226	Th-232	Th-228	U-235
BDS-[redacted]W001	Field blank	< 0.000255	0.00038	< 0.0016	0.0014	< 0.00049	< 0.0012	< 0.00011
BDS-[redacted]W003	[redacted]	< 0.0003	0.00064	< 0.0014	< 0.000835	< 0.00027	< 0.0011	0.000115
BDS-[redacted]W004	[redacted]n entrance, floor	< 0.000325	0.000575	< 0.0013	< 0.00055	< 0.00034	< 0.0011	< 0.00026
BDS-[redacted]W005	[redacted] entrance, floor	< 0.00042	< 0.0003	< 0.00145	< 0.000825	< 0.00035	< 0.00105	< 0.00028
BDS-[redacted]W006	[redacted]entrance, floor	< 0.000375	0.000345	< 0.0015	< 0.00095	< 0.000285	< 0.00115	< 0.000345
BDS-[redacted]W007	[redacted]entrance, floor	< 0.000305	< 0.000305	< 0.00145	< 0.000765	< 0.00042	< 0.00095	< 0.000465
BDS-[redacted]W010	[redacted], floor	< 0.000425	0.00039	< 0.00145	0.00115	0.000155	< 0.00125	0.00015
BDS-[redacted]W016	[redacted] wall	< 0.00023	< 0.000415	< 0.0014	0.0011	< 0.000335	< 0.00105	< 0.000275
BDS-[redacted]W024	[redacted] floor	< 0.00032	< 0.000545	< 0.00145	< 0.000825	0.00045	< 0.00095	< 0.000375
BDS-[redacted]W034	[redacted], floor	< 0.000245	< 0.00036	< 0.00145	< 0.00075	< 0.000345	< 0.0011	< 0.000105
BDS-[redacted]W036	[redacted] [redacted] wall	< 0.00009	< 0.00025	< 0.0014	< 0.0009	< 0.000265	< 0.0011	< 0.00037
BDS-[redacted]W042	[redacted] wall	< 0.000315	< 0.00041	< 0.00145	< 0.000835	< 0.000465	< 0.00115	< 0.000295
BDS-[redacted]W055	[redacted], floor	< 0.00035	< 0.000305	< 0.0015	< 0.000855	< 0.00039	< 0.0012	< 0.000285
BDS-[redacted]W061	Field blank	< 0.000305	< 0.000435	< 0.0014	< 0.00041	< 0.00041	< 0.00105	< 0.00042
Building Preliminary Remediation Goal (BPRG) Corresponding to a Cancer Risk of 1 in 10,000		0.158	0.211	0.188	0.0456	0.0144	1.21	0.202

Notes:

All concentrations in picoCuries per square centimeter (pCi/cm^2)

< Radionuclide not detected (minimum detectable concentration is shown)

Ra Radium
Th Thorium
U Uranium

6.3 INDOOR BULK DUST SAMPLES

Indoor bulk dust samples were analyzed for uranium and thorium isotopes via alpha spectroscopy, and for radium-226 via detection of radon emanation; results were reported on a per mass basis (i.e., pCi/g) (see Table 14). Each analyzed isotope is naturally occurring, with presence expected in dust containing some amount of soil or earthen material. As indicated in Table 14, radium-226 was not detected, but uranium and thorium isotopes were detected in each bulk dust sample. The three highest activities reported—a thorium-232 activity of 9.9 pCi/g, a thorium-228 activity of 9.8 pCi/g, and a thorium-230 activity of 1.8 pCi/g—each was detected in sample BDS-[redacted]BD01 collected from the [redacted] of House 2. All other detected isotope concentrations ranged from non-detect to 0.4 pCi/g. Thus, among the three bulk dust samples, the thorium isotope concentrations of sample BDS-[redacted]BD01 appear to be unique, possibly indicating presence in the sample of a thorium-laden material unique to the sample. Such material could have derived from chemically separated thorium used in commercial products. Properties and occurrence of chemically separated thorium are discussed below.

In nature, almost all (greater than 99 percent) of thorium by mass is thorium-232, and (along with its daughter thorium-228, present with thorium-232 in equal amounts by activity) this is the isotope associated with thorium ore minerals. Thorium-230 also occurs in nature as the daughter of uranium-238 and is associated with uranium ore. Most thorium used commercially has been extracted from the mineral monazite (Hedrick 1991, as cited in NRC 2001), which variably contains some uranium, and thus some thorium-230. Monazite typically contains an activity of thorium-230 equal to 11% of the activity of thorium-232 (Albert, 1966, as cited in NRC 2001). Thus, a similar ratio of thorium-230 to thorium-232 can also be expected in chemically separated thorium used in consumer products. Examples of thorium containing products include incandescent gas mantles (e.g., mantles used in camping lanterns), welding rods, thoriated optical lenses, and various tungsten- or magnesium-thorium alloy parts or products (NRC 2001).

Examination of thorium activities in bulk dust sample BDS-[redacted]BD01 revealed virtually equal thorium-232 and thorium-228 activities, the expected secular equilibrium between parent isotope thorium-232 and its daughter thorium-228. Moreover, as indicated in Table 15, the activity ratio of thorium-230 to thorium-232 was 0.18 ± 0.05 (or 18% ± 5%)—near the literature value of 11% thorium-230 to thorium-232. Thus, thorium isotope concentrations in bulk dust sample BDS-[redacted]BD01 appear to resemble those of chemically separated thorium found in consumer products.

TABLE 14

BULK DUST SAMPLES
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample	Description	Uranium Series				Thorium Series		Actinium Series
			U-238	U-234	Th-230	Ra-226	Th-232	Th-228	U-235
House 1	BDS-[redacted]BD01	[redacted]	0.248 J	0.267 J	0.27	< 0.094	0.182	0.281	0.042
	BDS-[redacted]BD02	[redacted]	0.231 J	0.366 J	0.21	< 0.126	0.214	0.26	< 0.038
	BDS-[redacted]FB	Field blank	0.054	0.155 J	< 0.3	< 0.141	< 0.074	< 0.177	< 0.058
House 2	BDS-[redacted]BD01	[redacted]	0.127	0.147 J	1.8	< 0.128	9.9	9.8	0.017
	BDS-[redacted]FB	Field blank	< 0.052	0.085	< 0.28	< 0.121	< 0.077	< 0.19	< 0.077

Notes:

All results in picoCuries per gram.

< Radionuclide not detected (minimum detectable concentration is shown)
J Laboratory flag indicating concentration is estimated
Ra Radium
Th Thorium
U Uranium

TABLE 15

ISOTOPIC THORIUM COMPOSITIONS OF DUST SAMPLE BDS-[redacted]BD01 AND THORIUM DERIVED FROM MONAZITE BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample / Reference	Th-230 (pCi/g)	Th-232 (pCi/g)	Th-228 (pCi/g)	Activity Ratio of Th-230 to Th-232
BDS-[redacted]BD01	1.8 +/- 0.35	9.9 +/- 1.6	9.8 +/- 1.6	0.18 +/- 0.05
Thorium derived from monazite (most thorium used commercially has been extracted from monazite)[1]	-	-	-	0.11

Notes:

[1] Hedrick (1991) and Albert (1966), as cited in U.S. Nuclear Regulatory Commission 2001.

+/- Two sigma total propagated uncertainty
pCi/g picoCuries per gram
Th Thorium

6.4 PRE-CERCLA CONSIDERATIONS

Tetra Tech has assisted EPA with acquisition of field measurements and collection of samples for laboratory analysis to support a Pre-CERCLA screening at residential properties in the Spanish Village subdivision in Bridgeton, Missouri. In addition, EPA tasked Tetra Tech with preparation of this report documenting investigation activities and summarizing and evaluating field measurements and laboratory analytical data. EPA is completing the Pre-CERCLIS screening checklist that will include a summary of the results and an evaluation of whether further CERCLA assessment will be warranted.

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APPENDIX A

FIGURES

N

0 1,000 2,000

Feet

Source: USGS Creve Ceour, MO 7.5 Minute Topo Quad, 1993;
USGS St. Charles, MO 7.5 Minute Topo Quad, 1994

Bridgeton Dust Site
Bridgeton, Missouri

Figure 1
Site Location Map

TETRA TECH

Date: 3/17/2017 Drawn By: Clayton Hayes Project No: 103X9025.16.0104.003

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APPENDIX B

PHOTOGRAPHIC DOCUMENTATION

HOUSE 1 FIELD SHEETS

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: Concrete [redacted] **Property:** House 1

Surveyed by: Danny O'Connor James Christopher Date surveyed: 12/27/16 Time surveyed 1238

Surface Description/Location:

Surface Description: Concrete [redacted] slab and [redacted] concrete slab

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	5	48				
Measurement 2	3	45				
Measurement 3	5	43				
Measurement 4	5	47				
Measurement 5	4	39				
Measurement 6	5	44				
Measurement 7	7	42				
Measurement 8	4	44				
Measurement 9	4	51				
Measurement 10	4	52				

1st Quartile	4.0	42.8				
3rd Quartile	5.0	48.8				
3rd Quartile + 1.5 IQR	6.5	57.8				

Photographic Log:

Digital Photo Number	Description
100-0002	Concrete floor

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] concrete wall **Property:** House 1

Surveyed by: Jenna Pratt Megan Sawyer Date surveyed: 12/27/16 Time surveyed 1250

Surface Description/Location:

Surface Description: Concrete slab wall, painted and unpainted

Location: [redacted] (washer and dryer)

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	12	48				
Measurement 2	15	52				
Measurement 3	8	54				
Measurement 4	14	45				
Measurement 5	12	36				
Measurement 6	9	56				
Measurement 7	14	54				
Measurement 8	17	43				
Measurement 9	8	48				
Measurement 10	13	40				

1st Quartile	8.8	42.3				
3rd Quartile	14.3	54.0				
3rd Quartile + 1.5 IQR	22.5	71.6				

Photographic Log:

Digital Photo Number	Description
100-0007	video of concrete wall (meant to take photo)
100-0008	photo of concrete wall

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] Linoleum **Property:** House 1

Surveyed by: James Christopher (alpha) Danny O'Connor (beta) Date surveyed: 12/27/16 Time surveyed 1220

Surface Description/Location:

Surface Description: 12 inch linoleum tile in [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	6	40				
Measurement 2	6	33				
Measurement 3	8	35				
Measurement 4	2	35				
Measurement 5	6	37				
Measurement 6	7	48				
Measurement 7	1	38				
Measurement 8	8	52				
Measurement 9	2	43				
Measurement 10	5	41				

1st Quartile	2.0	35.0				
3rd Quartile	7.3	44.3				
3rd Quartile + 1.5 IQR	15.1	58.1				

Photographic Log:

Digital Photo Number	Description
100-0004	View of linoleum

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] **Property:** House I

Surveyed by: Jenna Pratt (alpha) Megan Sawyer (beta) Date surveyed: 12/27/16 Time surveyed 1220

Surface Description/Location:

Surface Description: [redacted] in fr area of [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	4	54				
Measurement 2	5	38				
Measurement 3	5	42				
Measurement 4	4	46				
Measurement 5	8	40				
Measurement 6	7	34				
Measurement 7	6	46				
Measurement 8	5	49				
Measurement 9	2	49				
Measurement 10	5	51				

1st Quartile	4.0	39.5				
3rd Quartile	6.3	49.5				
3rd Quartile + 1.5 IQR	9.6	64.5				

Photographic Log:

Digital Photo Number	Description
100-0003	View of [redacted]

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: Linoleum [redacted] **Property:** House 1

Surveyed by: Jenna Pratt Megan Sawyer Date surveyed: 12/27 Time surveyed 1238

Surface Description/Location:

Surface Description: 12 inch linoleum tile

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	8	48				
Measurement 2	5	48				
Measurement 3	6	44				
Measurement 4	5	60				
Measurement 5	4	47				
Measurement 6	3	47				
Measurement 7	6	47				
Measurement 8	8	37				
Measurement 9	7	46				
Measurement 10	8	43				

1st Quartile	4.8	43.8				
3rd Quartile	8.0	48.0				
3rd Quartile + 1.5 IQR	12.9	54.4				

Photographic Log:

Digital Photo Number	Description
100-0001	View of linoleum

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] wall **Property:** House 1

Surveyed by: James Christopher Danny O'Connor Date surveyed: 12/27 Time surveyed 1250

Surface Description/Location:

Surface Description: [redacted] wall, painted white or varnished

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	4	24				
Measurement 2	6	33				
Measurement 3	3	28				
Measurement 4	4	41				
Measurement 5	6	32				
Measurement 6	12	45				
Measurement 7	8	40				
Measurement 8	12	36				
Measurement 9	7	34				
Measurement 10	4	35				

1st Quartile	4.0	31.0				
3rd Quartile	9.0	40.3				
3rd Quartile + 1.5 IQR	16.5	54.1				

Photographic Log:

Digital Photo Number	Description
100-0005	painted [redacted]
100-0006	varnished

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] **Property:** House 7

Surveyed by: Jenna Pratt Megan Sawyer Date surveyed: 12/27/16 Time surveyed 1320

Surface Description/Location:

Surface Description: [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	6	40				
Measurement 2	2	33				
Measurement 3	10	51				
Measurement 4	2	42				
Measurement 5	10	31				
Measurement 6	6	27				
Measurement 7	10	43				
Measurement 8	4	49				
Measurement 9	7	50				
Measurement 10	8	42				

1st Quartile	3.5	32.5				
3rd Quartile	10.0	49.3				
3rd Quartile + 1.5 IQR	19.8	74.4				

Photographic Log:

Digital Photo Number	Description
100-0012	[redacted]

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] tile **Property:** House 1

Surveyed by: Jenna Pratt Megan Sawyer Date surveyed: 12/27/16 Time surveyed 1335

Surface Description/Location:

Surface Description: glazed ceramic tile, floor and walls

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number	PR310986	206141				
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	8	105				
Measurement 2	10	80				
Measurement 3	9	102				
Measurement 4	11	92				
Measurement 5	16	82				
Measurement 6	10	115				
Measurement 7	7	107				
Measurement 8	13	100				
Measurement 9	7	96				
Measurement 10	9	89				

1st Quartile	7.8	87.3				
3rd Quartile	11.5	105.5				
3rd Quartile + 1.5 IQR	17.1	132.9				

Photographic Log:

Digital Photo Number	Description
100-0015	floor tile
100-0016	wall tile

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name [redacted] tile **Property:** House 1

Surveyed by: James Christopher ~~A~~ Danny O'Connor Date surveyed: 12/27/16 Time surveyed 1330

Surface Description/Location:

Surface Description: glazed ceramic tile, floor and walls

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number	PR310989	164377				
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	7	96				
Measurement 2	5	80				
Measurement 3	13	67				
Measurement 4	4	75				
Measurement 5	5	72				
Measurement 6	8	104				
Measurement 7	7	75				
Measurement 8	7	74				
Measurement 9	9	83				
Measurement 10	8	85				

1st Quartile	4.8	73.5				
3rd Quartile	8.0	87.8				
3rd Quartile + 1.5 IQR	12.9	109.1				

Photographic Log:

Digital Photo Number	Description
100-0013	floor tile
100-0014	wall tile

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: Drywall **Property:** House 1

Surveyed by: James Christopher Danny O'Connor Date surveyed: 12/27/16 Time surveyed 1315

Surface Description/Location:

Surface Description: drywall, upstairs and downstairs, [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	5	35				
Measurement 2	8	34				
Measurement 3	4	33				
Measurement 4	8	29				
Measurement 5	8	28				
Measurement 6	6	34				
Measurement 7	6	33				
Measurement 8	8	50				
Measurement 9	8	38				
Measurement 10	3	37				

1st Quartile	4.8	32.0				
3rd Quartile	8.0	37.3				
3rd Quartile + 1.5 IQR	12.9	45.1				

Photographic Log:

Digital Photo Number	Description

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] **Property:** House 2

Surveyed by: Jenna Pratt Megan Sawyer Date surveyed: 12/27/16 Time surveyed 1307

Surface Description/Location:

Surface Description: [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	9	56				
Measurement 2	5	38				
Measurement 3	2	26				
Measurement 4	5	44				
Measurement 5	3	34				
Measurement 6	6	40				
Measurement 7	4	43				
Measurement 8	4	31				
Measurement 9	6	48				
Measurement 10	5	38				

1st Quartile	3.9	33.3				
3rd Quartile	6.0	45.0				
3rd Quartile + 1.5 IQR	9.4	62.6				

Photographic Log:

Digital Photo Number	Description
100-0009	[redacted]
100-0011	

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] tile **Property:** House 7

Surveyed by: James Christopher Danny O'Connor Date surveyed: 12/27/16 Time surveyed 1310

Surface Description/Location:

Surface Description: ceramic glazed tile, floor

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	15	89				
Measurement 2	14	87				
Measurement 3	19	75				
Measurement 4	10	97				
Measurement 5	13	79				
Measurement 6	12	87				
Measurement 7	17	105				
Measurement 8	14	81				
Measurement 9	14	79				
Measurement 10	9	94				

1st Quartile	11.5	79.0				
3rd Quartile	15.5	94.8				
3rd Quartile + 1.5 IQR	21.5	118.4				

Photographic Log:

Digital Photo Number	Description
100-0010	[redacted] tile

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-FB **Property:** Housel

Collected by: Danny O'Connor Date collected: 10/28/16 Time collected: 1200

Sample Type: [ ] wipe (200 cm^2) [ ] wipe (_____ cm^2) [✓] cartridge (ID #212681

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field Blank bulk dust

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-BD01 **Property:** House 1

Collected by: Rob Mommig, Tom Mahler, Danny O'Conner Date collected: 12-28-16 Time collected: 11:15

Sample Type: [ ] wipe (200 cm^2) [ ] wipe (_____ cm^2) [✓] cartridge (ID #212674, #212673, #212665

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: Dust was collected from several surfaces including floor, walls, [redacted] piping, and window sills

Surface Description (check all that apply): [redacted]

Other Description: Three bulk dust sample containers were utilized to collect this sample in order to collect as close to 3 grams of dust as possible.

Static Counting of Surface: Because the sample was collected over several surfaces inside the [redacted], a static count was not recorded associated with this sample; however, all of the bulk dust samples will be sent for laboratory analysis.

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - BD02 **Property:** House 1

Collected by: Tom Mahler + Danny O'Connor Date collected: 12-28-16 Time collected: 1600

Sample Type: [ ] wipe (200 cm^2) [ ] wipe (_____ cm^2) [✓] cartridge (ID #212669, #212676

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[✓] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: Two bulk dust sample containers used to collect a sample from dust covered surfaces within the [redacted] Two containers were used in an attempt to collect sufficient sample mass. Sampled surfaces included: [redacted] surfaces. Both sample containers will be sent for bulk dust laboratory analysis. No static count was recorded for these surfaces; however, all sample containers will be submitted for lab analysis

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-SG001 **Property:** House 1

Collected by: Randy Brown Date collected: 12-27-16 Time collected: 16:05

Sample Type: [ ] composite [✓] grab

Sampe Depth [✓] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] Longitude: [redacted]

Other Description: Down spout near [redacted]

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
100-0028	Down spout near [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-SG002 **Property:** House 2

Collected by: Charles Hoopen Date collected: 12-27-16 Time collected: 16:10

Sample Type: [ ] composite [✓] grab

Sampe Depth [✓] surface (0-2 inches) [ ] other _____

Sample Location: [redacted]

Latitude: [redacted] Longitude: [redacted]

RLB 01/18/2017

Other Description: Downspout on [redacted]

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
100-0029	Downspout on [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-SG003 **Property:** House 7

Collected by: Randy Brown Date collected: 12-27-16 Time collected: 16:20

Sample Type: [ ] composite [✓] grab

Sampe Depth [✓] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] Longitude: [redacted]

RIB 01/18/2017

Other Description: Low area just [redacted]

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
100-0030	Low area just [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-SG004 **Property:** House 7

Collected by: Tom Mahlar Date collected: 12-27-16 Time collected: 16:27

Sample Type: [ ] composite [✓] grab

Sampe Depth [✓] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] ongitude: [redacted]

RLB 07/18/2017

Other Description: [redacted]

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
100-0032	[redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-SG005 **Property:** House 1

Collected by: Randy Brown Date collected: 12-27-16 Time collected: 16:32

Sample Type: [ ] composite [✓] grab

Sampe Depth [✓] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] Longitude: [redacted]

Other Description: Next to [redacted] back yard.

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
100-0031	Next to [redacted] backyard

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - SC-006 **Property:** House 1

Collected by: R. Brown Date collected: 12/27/2016 Time collected: 1726

Sample Type: [X] composite [ ] grab

Sampe Depth [X] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: _____ Longitude: _____

Other Description: _____

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - SC-007 **Property:** House 1

Collected by: R. Brown Date collected: 12/27/16 Time collected: 1532

Sample Type: [X] composite [ ] grab

Sampe Depth [X] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: _____ Longitude: _____

Other Description: _____

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W001 **Property:** House 7

Collected by: R. Moaning Date collected: 12/27/16 Time collected: 1535

Sample Type: [ ] wipe (200 cm^2) [X] wipe (—— cm^2) [ ] cartridge (ID _____
Field blank

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	06:49	3030	1043	60	0	28	CPM	C. Hooper
1/5/17	1212	3030	1043	300	3	50	Scalar	R. Moaning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: 305-3551-W002 **Property:** House 7

Collected by: R. Monnig Date collected: 12/27/16 Time collected: 1537

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	14	J. Pratt
44-9	164377	60	33	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	06:58	~~643~~ 3030	643	60	0	30	CPM	C. Hooper
1/4/16	1544	3030	643	300	5	59	Scaler	R. Monnig

Photo 100-0017

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W003 **Property:** House 1

Collected by: ~~M. Sawyer~~ R. Monnig **Date collected:** 12/27/16 **Time collected:** 1548

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[X] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[X] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[X] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	J. Christopher
44-9	164377	60	28	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:01	3030	643	60	0	24	CPM	C. Hooper
1/4/17	1549	3030	643	300	3	58	Scalar	R. Monnig

Photo 100-0018

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W004 **Property:** House 1

Collected by: M. Sawyer Date collected: 12/27/16 Time collected: 1559

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	J. Christopher
44-9	164377	60	32	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:03	3030	643	60	0	25	CPM	C. Hooper
1/4/17	1555	3030	643	300	1	65	scalar	R. Munnig

Photo 100-0019

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W005 **Property:** House 7

Collected by: R. Monning Date collected: 12/27/16 Time collected: 1605

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: some dust at location

Surface Description (check all that apply): [redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	J. Christopher
44-9	164377	60	29	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:05	3030	643	60	0	39	CPM	C. Hooper
1/4/17	1600	3030	643	300	2	75	Scalar	R. Monning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W006 **Property:** House 1

Collected by: R. Monnig Date collected: 12/27/16 Time collected: 1612

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: [redacted]

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	J. Christopher
44-9	164377	60	27	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:06	3030	1048	60	0	45	CPM	C. Hooper
1/4/17	1600	3030	643	300	6	48	scaler	R. Monnig
					~~2~~	~~59~~ Rm		

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W007 **Property:** House 1

Collected by: R. Monnig Date collected: 12/27/16 Time collected: 1618

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR 310989	60	3	J. Christopher
44-9	164377	60	31	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:08	3030	648	60	0	34	CPM	C. Hooper
~~1/4/17~~	~~1607~~	~~3030~~	~~643~~	~~300~~	~~6~~	~~48~~	~~scalar~~	~~R. Monnig~~
1/4/17	1613	3030	643	300	2	59	scalar	R. Monnig

RM

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W008 **Property:** House 7

Collected by: C. Hooper Date collected: 12/27/16 Time collected: 1629

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	11	J. Pratt
44-9	206141	60	55	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:10	3030	646	60	0	31	CPM	C Hooper
1/5/16	1033	3030	643	300	0	63	scalar	R. Monnig

Photo 100-0020

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted] W009 **Property:** House 1

Collected by: C. Hooper Date collected: 12/27/16 Time collected: 1634

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	21	J. Pratt
44-9	206141	60	82	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:12	3030	648	60	0	24	CPM	C. Hooper
1/5/17	1040	3030	643	300	3	56	Scaler	R. Manning

Photo 100-0021

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W016 **Property:** House 1

Collected by: C. Hooper Date collected: 12/27/16 Time collected: 1639

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	8	J. Pratt
44-9	206141	60	45	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:14	3030	648	60	0	33	CPM	C. Hooper
1/5/17	1047	3030	643	300	0	47	Scalar	R. Manning

Photo 100-0022

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W011 **Property:** House 1

Collected by: R. Manning Date collected: 12/27/16 Time collected: 1640

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____
field blank

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:15	3030	~~648~~ 643	60	0	36	CPM	C. Hooker
1/5/17	1052	3030	643	300	2	75	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W012 **Property:** House 1

Collected by: R Monnig Date collected: 12/27/16 Time collected: 1643

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	9	J. Pratt
44-9	206141	60	64	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:17	3030	648	60	0	Ct30	CPM	C. Hooper
1/5/17	1058	3030	643	300	0	55	scalar	R. Monnig

Photo 100-0023

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W013 **Property:** House 7

Collected by: C. Hooper Date collected: 12/27/16 Time collected: ~~12/27~~ 1650 Rm

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	2	J. Christopher
44-9	164377	60	49	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:20	3030	~~648~~ 643 Rm	60	0	27	CPM	C. Hooper
1/5/17	1103	3030	643	300	2	67	Scalar	R. Monnig

Photo 100-0024

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W014 **Property:** House 1

Collected by: C. Hooper Date collected: 12/27/16 Time collected: 1656

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]
Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	13	J. Pratt
44-9	206141	60	96	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:21	3030	~~648~~ 643	60	0	30	CPM	C. Hooper
1/5/17	1108	3030	643	300	4	69	Scalar	R. Manning

Photo 100-0025

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W015 **Property:** House 1

Collected by: C. Hooper Date collected: 12/27/16 Time collected: 1705

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR 310986	60	14	J. Pratt
44-9	206141	60	39	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:24	3030	648	60	0	27	CPM	C. Hooper
1/5/17	1114	3030	643	300	5	76	scalar	R. Mannion

100-0026 [redacted] Floor

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W016 **Property:** House 7

Collected by: C. Hooper Date collected: 12/27/16 Time collected: 1769

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	7	J. Christopher
44-9	206141	60	33	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:33	3030	648	60	0	31	cpm	C. Hooper
1/5/17	1120	3030	643	300	2	65	scalar	R. Mennig

Photo 100-0027

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W017 **Property:** House 1

Collected by: ~~R. A~~ O. O'Connor **Date collected:** 12/27/16 **Time collected:** ~~12/27/16~~ 1717 Rm

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	J. Christopher
44-9	164377	100	37	O. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:35	3030	648	60	0	33	CPM	C. Hooper
1/5/17	1125	3030	643	300	5	59	Scaler	R. Monnig

Photo 100-0033

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W018 **Property:** House 1

Collected by: D O'Connor Date collected: 12/27/16 Time collected: 1725

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	J. Christopher
44-9	164377	60	27	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:37	3030	648	60	0	27	CPM	C. Hooper
1/5/17	1131	3030	643	300	2	64	scalar	R. Menning

Photo 100-0034

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W019 **Property:** House 1

Collected by: D. O'Connor Date collected: 12/27/16 Time collected: 1728

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	5	J. Christopher
44-9	164377	60	38	M. Sawyer

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:40	3030	648	60	0	27	CPM	C. Hoge
1/5/17	1136	3030	643	300	4	54	Scalar	R. Mennig

Photo 100-0035

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W020 **Property:** House 1

Collected by: D. O'Connor Date collected: 12/27/16 Time collected: 1733

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	J. Christopher
44-9	164377	60	40	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:43	3030	648	60	0	30	CPM	C. Harper
1/5/17	1142	3030	643	300	1	54	Scaler	R. Manning

Photo ~~100-0035~~ RM
100-0036

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W021 **Property:** House 1

Collected by: R. Manning Date collected: 12/27/16 Time collected: 1738

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____
Field blank

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:45	3030	648	60	0	37	CPM	C. Hooper
1/5/17	1149	3030	643	300	4	64	scalar	R. Manning

~~Photo 100-0036~~ RM

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W022 **Property:** House 1

Collected by: D. O'Connor Date collected: 12/27/16 Time collected: 1740

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	1	J. Christopher
44-9	164377	60	35	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:46	3030	648	60	0	27	CPM	C. Hooper
1/5/17	1155	3030	643	300	0	65	scalar	R. Manning

Photo 100-0037

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W023 **Property:** House 1

Collected by: D O'Connor Date collected: 12/27/16 Time collected: 1747

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	J. Christopher
44-9	164377	60	41	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	07:48	3030	648	60	0	27	CPM	C. Hope
1/5/17	1200	3030	643	300	3	47	scalar	R. Manning

Photo 100-0038

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W024 **Property:** House 1

Collected by: D. O'Connor Date collected: 12/27/16 Time collected: 1748

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR 310989	60	4	J. Christopher
44-9	164377	60	41	D. O'Connor

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	08:09	3030	648	60	0	40	CPM	C. Hooper
1/5/17	1206	3030	643	300	1	49	scalar	R. Manning

Photo 100-0039

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W025 **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1100

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	1	MBS
44-9	PR206141	60	43	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:07	3030	643	60	0	36	CPM	C. Hooper
1/4/17	0934	3030	643	300	1	62	Scaler	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W026 **Property:** HOUSE 1

Collected by: CWP Date collected: 12/28/16 Time collected: 1053

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR 310989	60	1	MBS
44-9	PR 206141	60	29	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:09	3030	643	60	0	33	cpm	C. Hooper
1/4/17	0943	3030	643	300	0	67	scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W027 **Property:** HOUSE 2

Collected by: JWP Date collected: 12/28/16 Time collected: 1048

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: CERAMIC TILE

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	~~82~~ 5	MBS
44-9	PR20014	60	82	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:16	3030	643	60	0	30	CPM	C. HOOPER
1/4/17	0948	3030	643	300	5	57	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W028 **Property:** HOUSE 1

Collected by: UWP Date collected: 12/28/16 Time collected: 1043

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310984	60	2	MBS
44-9	PR206141	60	35	MBS

Drawer Counting (wipe only):

Date 29 (12)	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	10:15	3030	643	60	0	34	CPM	C. HOOPER
1/4/17	09:57	3030	643	300	4	61	Scalar	R. Mannig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W029 **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1032

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: HALL BATH; E. WALL

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR3ID989	60	5	MBS
44-9	PR206141	60	36	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:17	3030	643	60	0	34	CPM	C. Hooper
1/4/17	1002	3030	643	300	0	59	Scalar	R. Mennig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WCBD **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1035

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	0	MBS
44-9	PR206141	60	41	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:18	3030	643	60	0	39	cpm	C. Hopper
1/4/17	1007	3030	643	300	0	70	Scaler	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W31 **Property:** HOUSE 1

Collected by: Jenna Pratt Date collected: 12/28/16 Time collected: 0955

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	6	MS
44-9	~~195204~~ PR206141	60	45	MS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:20	3030	643	60	0	25	cpm	C. Hooper
1/4/17		3030	643	300	1	47	Jcalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W032 **Property:** House 1

Collected by: Jenna Pratt Date collected: 12/28/16 Time collected: 10:06

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR 310989	60	1	MBS
44-9	~~198204~~ PR206141	60	38	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:22	3030	643	60	0	34	cpm	C. Hooper
1/4/16	1019	3030	643	300	2	66	Scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WOB 3 **Property:** HOUSE 2

Collected by: Jenna Pratt Date collected: 12/28/16 Time collected: 10:12

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR 310980	60	3	MBS
44-9	~~198201~~ PR206141	60	45	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:24	3030	643	60	0	36	cpm	C. Hooper
1/4/17	1024	3030	643	300	2	54	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W034 **Property:** HOUSE 1

Collected by: Jenna Pratt Date collected: 12/28/16 Time collected: 10:25

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR31980	60	2	MBS
44-9	~~198207~~ PR206141	60	38	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:26	3030	643	60	0	30	cpm	C. Hooper
1/4/17	1031	3030	643	300	3	57	scalar	R. Mannig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS- [redacted] -W035 **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1027

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply): [redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	1	MBS
44-9	~~195201~~ PR2016141	60	63	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:28	3030	643	60	0	30	cpm	C. Hooper
1/4/16	1036	3030	643	300	0	50	Scaler	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- W036 **Property:** House 2

Collected by: DO Date collected: 12-28-16 Time collected: 1112

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Kitchen entrance

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	~~72~~ 73	DO
44-9	114377	60	97	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1030	3030	643	60	0	30	cpm	C. Hooper
1/4/17	1041	3030	643	300	1	55	scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W037 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1057

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: [redacted] wall

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR3109880	60	7	RM
44-9	114377	60	33	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10~~32~~ 32	3030	643	60	0	~~32~~ 34	cpm	C. Hooper
1/4/16	1047	3030	643	300	3	63	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W038 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1100

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310980	60	3	RM
44-9	114377	60	37	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1034	3030	643	60	0	33	cpm	C. Hooper
1/4/17	1052	3030	643	300	2	54	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS- [redacted] - W39 **Property:** HOUSE 1

Collected by: MBS Date collected: 12/28/16 Time collected: 1125

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply)

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	2	MBS
44-9	PR206141	60	33	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1035	3030	643	60	0	34	cpm	C. Hoagler
1/4/17	1059	3030	643	300	5	67	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W040 **Property:** House 1

Collected by: DA Date collected: 12-28-16 Time collected: 1028

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: Floor

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310580	60	10	RM
44-9	114377	60	56	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1437	3030	643	60	0	30	cpm	C. Hooper
1/4/17	1104	3030	643	300	2	57	scaler	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W041 **Property:** House I

Collected by: DQ Date collected: 12-28-16 Time collected: 1045

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[X] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: Floor

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR311986	60	8	RM
44-9	114377	60	83	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1039	3030	643	60	0	30	cpm	L. Hooper
1/4/17	1110	3030	643	300	4	54	scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W042 **Property:** House I

Collected by: DO Date collected: 12-28-16 Time collected: 1019

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	17	RM
44-9	114377	60	37	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:41	3030	643	60	0	39	cpm	C. Hooper
1/4/17	1116	3030	643	300	2	64	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W043 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/28/16 Time collected: 1132

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR231089	60	3	MBS
44-9	PR.20641	60	37	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:43	3030	643	60	0	39	cpm	C. Hooper
1/4/17	1121	3030	643	300	4	52	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W044 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1036

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	7	RM
44-9	114377	60	43	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:45	3030	643	60	0	42	cpm	C. Hooper
1/4/17	1208	3030	643	300	4	67	scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- W045 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1014

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	11	
44-9	114377	60	49	

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:47	3030	643	60	0	22	cpm	C. Hoover
1/4/17	1216	3030	643	300	1	48	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W046 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1042

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310980	60	8	JC
44-9	114377	60	37	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:49	3030	643	60	0	31	cpm	C. Hooper
1/4/17	1221	3030	643	300	5	59	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W047 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1033

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	8	RM
44-9	114377	60	37	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:51	3030	643	60	0	33	cpm	C. Hooper
1/4/16	1227	3030	643	300	3	60	Scaler	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted] W048 **Property:** House 7

Collected by: DO Date collected: 12-28-16 Time collected: 1117

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] door

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	8	DO
44-9	P14377	60	82	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:52	3030	643	60	0	30	cpm	C. Hooper
1/4/17	1232	3030	643	300	3	61	Scaler	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W049 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: ~~House 1~~ JC 1001

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	3	RM
44-9	114377	60	27	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:53	3030	643	60	0	31	cpm	C. Hooper
1/4/17	1251	3030	643	300	5	72	Scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W050 **Property:** House 2

Collected by: DD Date collected: 12-28-16 Time collected: 0957

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310980	60	15	RM
44-9	114377	60	42	RM

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:55	3030	643	60	0	21	cpm	C. Hooper
1/4/17	1257	3030	643	300	3	51	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD51 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/28/16 Time collected: 1245

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	MBS
44-9	PR20614	60	56	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:57	3030	643	60	0	30	cpm	C Hooper
1/4/17	1303	3030	643	300	5	55	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD52 **Property:** HOUSE 1

Collected by: MBS Date collected: 12/28/16 Time collected: 1238

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310580	60	11	MBS
44-9	PR206141	60	29	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:56	3030	643	60	0	36	cpm	C. Hooper
1/4/17	~~1/4~~ am 1309	3030	643	300	9	55	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W053 **Property:** HOUSE 1

Collected by: MBS Date collected: 12/28/16 Time collected: 1235

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply): [redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR31D989	60	6	MBS
44-9	PR206141	60	34	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	10:59	3030	643	60	0	42	cpm	C. Hooper
1/4/17	1317	3030	643	300	1	59	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W054 **Property:** HOUSE 1

Collected by: MBS Date collected: 12/28/16 Time collected: 1226

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR340989	60	4	MBS
44-9	PR206141	60	29	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1100	3030	643	60	4	27	cpm	C. Hooper
1/4/2017	1322	3030	643	300	3	57	Scalar	R. Munnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted] W055 **Property:** House 1

Collected by: MBS Date collected: 12/28/16 Time collected: 12:20

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	MBS
44-9	PR206141	60	54	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1102	3030	643	60	0	30	cpm	C. Hooper
1/4/17	1329	3030	643	300	5	57	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W056 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1244

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: Floor

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	8	JC
44-9	164377	60	49	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1101	3030	643	60	0	45	cpm	C. Hooper
1/4/17	1333	3030	643	300	2	63	Scalar	R. Mennig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W057 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1237

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	8	JC
44-9	164377	60	35	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1104	3030	643	60	0	33	cpm	L. Hooper
1/4/17	1339	3030	643	300	2	54	Scaler	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W058 **Property:** House 2

Collected by: DO Date collected: 12-28-16 Time collected: 1234

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	10	JC
44-9	164377	60	33	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1105	3030	643	60	0	37	cpm	L. Hooper
1/4/17	1344	3030	643	300	4	54	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- W059 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1227

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	319986	60	7	JC
44-9	164377	60	27	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1107	3030	643	60	0	27	cpm	C. Hooper
1/4/17	1350	3030	643	300	3	40	Scaler	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- W060 **Property:** House I

Collected by: DO Date collected: 12-28-16 Time collected: 1248

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	10	JC
44-9	164377	60	26	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1108	3030	643	60	0	24	cpm	L Hooper
1/4/17	1357	3030	643	300	4	42	Scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W061 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1222

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	7	JC
44-9	164377	60	62	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	1109	3930	64	60	0	39	cpm	C. Hooper
1/4/17	1410	3030	1643	300	6	72	Scalar	R. Menzig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W062 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 12/6

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	12	JC
44-9	164377	60	34	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:11	3030	643	60	0	30	cpm	C. Hooper
1/4/17	14/16	3030	643	360	2	54	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W063 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1211

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PB10986	60	11	JC
44-9	164377	60	29	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12-29-16	11:13	3030	643	60	0	18	cpm	C. Hooper
1/4/17	1421	3030	643	300	1	62	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W064 **Property:** House I

Collected by: DO Date collected: 12-28-16 Time collected: _____

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR1D986	60	3	JC
44-9	164377	60	41	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:14	3030	643	60	0	30	cpm	C. Hooper
1/4/17	1426	3030	643	300	2	52	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W065 **Property:** House 2

Collected by: DO Date collected: 12-28-16 Time collected: 1158

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR30986	60	11	JC
44-9	164377	60	45	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:15	3030	643	60	0	39	cpm	C. Hopper
1/4/17	1435	3030	643	300	1	44	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W066 **Property:** House 1

Collected by: JWP Date collected: 12/28/16 Time collected: ~~11~~ 1430

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: [redacted]

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	9	JWP
44-9	184377	60	43	JWP

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:16	3030	643	60	0	37	cpm	C. Hooper
1/4/17	1439	3030	643	360	3	55	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: WBDS-[redacted]-WD07 **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1425

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR3109866	60	8	MBS
44-9	114377	60	55	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:17	3030	643	60	0	27	cpm	CHOOper
1/4/17	1444	3030	643	300	6	59	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W068 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1432

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Utility room

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[redacted]

Other Description: [redacted]

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	10	JC
44-9	184377	60	52	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:19	3030	643	60	0	36	cpm	C. Hooper
1/4/17	1450	3030	643	300	5	75	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W069 **Property:** House 1

Collected by: DO Date collected: 12-28-16 Time collected: 1425

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):
[redacted]

Other Description: [redacted]

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90		60	6	JC
44-9		60	43	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/21/16	11:20	3030	643	60	0	28	cpm	C. Hooper
1/4/17	1456	3030	643	300	4	55	scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W070 **Property:** HOUSE 1

Collected by: MBS Date collected: 12/28/16 Time collected: ~~1305~~ 1315

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):
[redacted]

Other Description: [redacted] DOOR

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	4	TWP
44-9	114377	60	40	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:21	3030	643	60	0	30	cpm	C. Hooper
1/4/17	1506	3030	643	300	1	47	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W071 **Property:** House 1

Collected by: DO Date collected: 12/28/16 Time collected: 1457

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply)

[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	7	JC
44-9	114377	60	45	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:23	3070	643	60	0	33	cpm	C. Hooper
1/4/17	1511	3030	643	300	4	60	Scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W072 **Property:** HOUSE 2

Collected by: JWP Date collected: 12/28/16 Time collected: 1500

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	6	JC
44-9	114377	60	35	JC

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:24	3030	643	60	0	316	cpm	G. Hooper
1/4/17	1517	3030	643	300	4	48	scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- WD73 **Property:** House 1

Collected by: MBS Date collected: 12/28/16 Time collected: 1510

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):
[redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	3	JWP
44-9	114377	60	44	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	11:25	3030	643	60	0	43	cpm	C. Hooper
1/4/17	1526	3030	643	300	4	61	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W074 **Property:** House 1

Collected by: MBS Date collected: 12/28/16 Time collected: 1505

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply): [redacted]

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310256	60	3	JWP
44-9	114377	60	40	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:26	3030	643	60	0	39	cpm	C. Hooper
1/4/17	1538	3030	643	300	1	69	scalar	R. Monig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W075 **Property:** House 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1530

Sample Type: [ ] wipe (200 cm^2) [✓] wipe (— cm^2) [ ] cartridge (ID _____
FIELD BLANK

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:32	3030	643	60	0	36	cpm	C. Horger

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W076 **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1532

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: FIELD BANK

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	11:31	3030	643	60	0	39	cpm	C. Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W077 **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1534

Sample Type: [ ] wipe (200 cm^2) [X] wipe (____ cm^2) [ ] cartridge (ID _____

FIELD BLANK

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W078 **Property:** House 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1536

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____

FIELD BLANK

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD79 **Property:** HOUSE 1

Collected by: JWP Date collected: 12/28/16 Time collected: 1538

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____

FIELD BLANK

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

HOUSE 2 FIELD SHEETS

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] **Property:** Howie 2

Surveyed by: JP, ~~SW~~ JC MS Date surveyed: 12-24-16 Time surveyed 1732

Surface Description/Location:

Surface Description: [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number	310989	206141				
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	11	104				
Measurement 2	10	96				
Measurement 3	14	115				
Measurement 4	11	83				
Measurement 5	8	94				
Measurement 6	17	83				
Measurement 7	9	117				
Measurement 8	10	112				
Measurement 9	10	118				
Measurement 10	10	124				

1st Quartile	9.8	91.3				
3rd Quartile	11.8	117.3				
3rd Quartile + 1.5 IQR	14.8	156.3				

Photographic Log:

Digital Photo Number	Description
109-0088	[redacted]

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: Concrete **Property:** House 2

Surveyed by: JP, MS Date surveyed: 12-28-16 Time surveyed 1745

Surface Description/Location:

Surface Description: [redacted] Floors + walls

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number						
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	6	60				
Measurement 2	5	53				
Measurement 3	7	63				
Measurement 4	6	120				
Measurement 5	11	55				
Measurement 6	8	106				
Measurement 7	6	47				
Measurement 8	9	62				
Measurement 9	6	53				
Measurement 10	12	57				

1st Quartile	6.0	52.5				
3rd Quartile	9.5	73.8				
3rd Quartile + 1.5 IQR	14.8	105.6				

Photographic Log:

Digital Photo Number	Description
100-0086	[redacted] concrete Floor + walls

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: [redacted] Floors **Property:** House 2

Surveyed by: JP, MS Date surveyed: 12-28-16 Time surveyed 1440

Surface Description/Location:

Surface Description: [redacted] Floors throughout [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number	PR310389	PR206141				
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	2	51				
Measurement 2	9	55				
Measurement 3	4	63				
Measurement 4	5	55				
Measurement 5	3	48				
Measurement 6	2	37				
Measurement 7	4	30				
Measurement 8	7	43				
Measurement 9	7	37				
Measurement 10	4	45				

1st Quartile	2.8	37.0				
3rd Quartile	7.0	55.0				
3rd Quartile + 1.5 IQR	13.4	82.0				

Photographic Log:

Digital Photo Number	Description	
100-0078	[redacted]	
100-0079		
100-0080		
100-0081		
100-0082		

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: Drywall **Property:** House 2

Surveyed by: JP, MS Date surveyed: 12-28-16 Time surveyed 1719

Surface Description/Location:

Surface Description: Drywall/sheetrock

Location: [redacted] walls

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number	310789	296141				
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	10	50				
Measurement 2	10	59				
Measurement 3	8	48				
Measurement 4	5	57				
Measurement 5	8	42				
Measurement 6	8	36				
Measurement 7	11	47				
Measurement 8	9	40				
Measurement 9	10	51				
Measurement 10	14	46				

1st Quartile	8.0	41.5				
3rd Quartile	10.3	50.3				
3rd Quartile + 1.5 IQR	13.6	63.4				

Photographic Log:

Digital Photo Number	Description
100-0083	[redacted] drywall

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: Tile **Property:** House 2

Surveyed by: JP, MS Date surveyed: 12-28-16 Time surveyed 1700

Surface Description/Location:

Surface Description: Floor + wall tile

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number	310989	206141				
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	9	86				
Measurement 2	11	82				
Measurement 3	7	91				
Measurement 4	8	~~80~~ 76				
Measurement 5	10	97				
Measurement 6	17	96				
Measurement 7	17	87				
Measurement 8	23	80				
Measurement 9	13	84				
Measurement 10	17	111				

1st Quartile	8.8	81.5				
3rd Quartile	17.0	96.3				
3rd Quartile + 1.5 IQR	29.4	118.4				

Photographic Log:

Digital Photo Number	Description
100-0085	[redacted]
100-0084	

Surface Survey
Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Surface Name: Brick **Property:** House 2

Surveyed by: DO Date surveyed: 12-28-16 Time surveyed 1706

Surface Description/Location:

Surface Description: [redacted]

Location: [redacted]

Static Counting of Surface:

Parameter	Alpha Count	Beta Count	Alpha Count	Beta Count	Alpha Count	Beta Count
Detector Model	43-90	44-9	43-90	44-9	43-90	44-9
Detector Serial Number	310986	164377				
Counting time	60 sec	60 sec	60 sec	60 sec	60 sec	60 sec
Measurement 1	4	74				
Measurement 2	6	87				
Measurement 3	1	66				
Measurement 4	7	66				
Measurement 5	7	77				
Measurement 6	4	83				
Measurement 7	7	89				
Measurement 8	7	86				
Measurement 9	3	83				
Measurement 10	6	90				

1st Quartile	3.8	72.0				
3rd Quartile	7.0	87.5				
3rd Quartile + 1.5 IQR	11.9	110.8				

Photographic Log:

Digital Photo Number	Description
100-0087	[redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-C-S001 **Property:** House 2

Collected by: Randy Brown Date collected: 12/28/16 Time collected: 15:20

Sample Type: [✓] composite [ ] grab

Sampe Depth [✓] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: _____ Longitude: _____

Other Description: [redacted] 5-aliquot composite

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
1634	[redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-C-S002 **Property:** House 2

Collected by: Randy Brown Date collected: 12/28/2016 Time collected: 1540

Sample Type: [✓] composite [ ] grab

Sampe Depth [✓] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: _____ Longitude: _____

Other Description: [redacted] composite 5-aliquot composite

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
1628	Composite Area [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-G-5003 **Property:** House 2

Collected by: Randy Brown **Date collected:** 12/28/2016 **Time collected:** 1542

Sample Type: [ ] composite [X] grab

Sampe Depth [X] surface (0-2 inches) [ ] other _____

Sample Location:
QLB 01/18/17 [redacted]

Latitude: [redacted] Longitude [redacted]

Other Description: Downspout N/T [redacted]

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
1630	Sample Location [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-6-50004 **Property:** House 2

Collected by: Randy Brown **Date collected:** 12/28/16 **Time collected:** 1543

Sample Type: [ ] composite [X] grab

Sampe Depth [X] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] Longitude: [redacted]

RLB 01/18/2017

Other Description: Soil [redacted]

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
1632	Sample Location [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-G-S00J **Property:** House 2

Collected by: Randy Brown Date collected: 12/28/16 Time collected: 1545

Sample Type: [ ] composite [X] grab

Sampe Depth [X] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] ongitude: [redacted]

RLG 01/18/17

Other Description [redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
1631	Sample location [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-6-5006 **Property:** House 2

Collected by: Randy Brown Date collected: 12/28/16 Time collected: 1547

Sample Type: [ ] composite [X] grab

Sampe Depth [X] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] Longitude: [redacted]

Other Description: Near [redacted]

[redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
1629	Sample Location [redacted]

Soil Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-G-5007 **Property:** House 2

Collected by: Randy Brown Date collected: 12/28/16 Time collected: 15:52

Sample Type: [ ] composite [X] grab

Sampe Depth [X] surface (0-2 inches) [ ] other _____

Sample Location:

Latitude: [redacted] Longitude: [redacted]

RLB 01/18/17

Other Description: Downspout at [redacted]

Site Scetch

Photographic Log:

Digital Photo Number	Description
1633	Sample location viewing [redacted]

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-BD01 **Property:** House #2

Collected by: Danny O'Connor Date collected: 11/29/16 Time collected: 1115

Sample Type: [ ] wipe (200 cm^2) [ ] wipe (_____ cm^2) [✓] cartridge (ID # 212672, # 212666

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Other Description: _____

Surface Description (check all that apply):
[redacted]

Other Description: Bulk dust sample (two containers) collected from surfaces in [redacted] Surfaces included: [redacted] Both sample containers will be sent for laboratory analysis. No static counts were recorded for these surfaces; however, all samples will be submitted for lab analysis.

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-FB **Property:** House 2

Collected by: Danny O'Connor Date collected: ~~11/29/16~~ 12/29/16 RO Time collected: 1200

Sample Type: [ ] wipe (200 cm^2) [ ] wipe (_____ cm^2) [✓] cartridge (ID # 212685

Sample Location (check all that apply): Room name: _____

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field Blank bulk dust

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W001 **Property:** House 2

Collected by: JC Date collected: 12/29/16 Time collected: 0924

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Field Blank

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	13:00	3030	643	60	0	31	cpm	C Hooper
1/5/17	1217	3030	642	300	3	118	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: 13DS-[redacted]-W002 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 0926

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: [redacted]

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	8	DO
44-9	164372	60	11	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:58	3030	643	60	0	36	CPM	C Hooper
1/4/17	11:11	3030	642	300	1	99	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- W093 **Property:** House 2

Collected by: DG Date collected: 12/29/16 Time collected: 0937

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: [redacted]

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	13	DG
44-9	164377	60	122	DG

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:57	3030	643	60	0	28	cpm	C Stoney
1/4/17	11:16	3030	642	300	5	94	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W004 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 0948

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[X] high occupancy
[ ] low occupancy
[X] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] entrance

Surface Description (check all that apply):

[X] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[X] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	9	DO
44-9	164377	60	38	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:56	3030	643	60	0	25	CPM	C Hooper
1/4/17	12:10	3030	642	300	2	109	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W005 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 0951

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[✓] high occupancy
[ ] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] entrance

Surface Description (check all that apply):

[✓] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[✓] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	5	DO
44-9	164377	60	44	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:57	3030	643	60	0	31	CPM	CHarper
1/4/17	11:21	3030	642	300	2	115	Counts	CHarper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS- [redacted] - W006 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 09:50

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] Entrance; Floor

[ ] high occupancy
[ ] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[✓] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310959	60	4	MBS
44-9	PR206144	60	39	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:51	3030	643	60	0	45	CPM	C Hooper
1/4/17	12:00	3030	642	300	13	121	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W007 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 09:45

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] entrance ; Floor

[ ] high occupancy
[ ] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[✓] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR51098	60	4	MBS
44-9	PR206141	60	47	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:49	3030	643	60	0	40	cpm	C Hooper
1/4/17	12:05	3030	642	300	2	103	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS- [redacted] - W008 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1001

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: [redacted]

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	12	DO
44-9	164377	60	88	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:48	3030	643	60	0	24	CPM	C Hooper
1/4/17	10:54	3030	642	300	3	115	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W009 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1005

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: [redacted] wall

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	7	DO
44-9	164377	60	76	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:47	3030	643	60	0	39	CPM	C Hooper
1/4/17	10:47	3030	642	300	5	92	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD10 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 0955

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[✓] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	MBS
44-9	PR2016141	60	43	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:45	3030	643	60	0	30	CPM	C Hooper
1/4/17	10:42	3030	642	300	8	127	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- W011 **Property:** House 2

Collected by: JC Date collected: 12/29/16 Time collected: 1014

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Field Blank

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field Blank

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:44	3030	643	60	0	39	CPM	CHooper
1/5/17	1226	3030	642	300	4	114	scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W012 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 10:10

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	DR310989	60	6	MBS
44-9	DR206141	60	25	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:43	3030	643	60	0	40	CPM	CHoper
1/4/17	10:58	3030	642	300	4	110	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W013 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1913

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[✓] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[✓] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	6	DO
44-9	164377	60	38	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:41	3030	643	60	0	34	CPM	C Hooper
1/4/17	12:16	3030	642	300	5	117	Counts	C. Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W014 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1015

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR290789	60	2	MBS
44-9	PR206141	60	35	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:40	3030	643	60	0	51	CPM	C Hooper
1/4/17	11:03	3030	642	300	3	123	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS- [redacted] - W015 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1030

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	MBS
44-9	PR206141	60	47	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:38	3030	643	60	0	45	cpm	CHooper
1/4/17	12:43	3030	642	300	4	96	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD16 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1025

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	MBS
44-9	PR206141	60	23	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:37	3030	643	60	0	30	CPM	CHooper
1/4/17	12:37	3030	642	300	7	98	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD17 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1020

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

~~Sketch - Floor View~~ WALL VIEW Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	11	MBS
44-9	PR206141	60	41	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:35	3030	643	60	0	33	CPM	CHooper
1/4/17	12:22	3030	642	300	2	109	Counts	C.Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W018 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1039

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[X] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[X] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	314986	60	9	DO
44-9	164377	60	90	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:33	3030	643	60	0	27	CPM	CHooper
1/4/17	12:55	3030	642	300	6	89	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WO 19 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1045

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	5	DO
44-9	164377	60	28	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:31	3030	643	60	0	33	cpm	CHooper
1/4/17	13:00	3030	642	300	5	122	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W020 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1051

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	6	DO
44-9	164377	60	35	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:30	3030	643	60	0	39	cpm	CHooper
1/4/17	13:06	3030	642	300	6	124	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W021 **Property:** House 2

Collected by: JC Date collected: 12/29/16 Time collected: 1106

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____)

Sample Location (check all that apply): Room name: Field blank

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field blank

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:29	3030	643	60	0	24	CPM	C Hooper
1/5/17	1227	3030	642	60	1	28	CPM	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W022 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1056

Sample Type: [x] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[x] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[x] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[x] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[x] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	9	DO
44-9	164377	60	40	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:27	3030	643	60	0	31	cpm	C Hooper
1/4/17	12:48	3030	642	300	2	105	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W023 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1105

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[X] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: Floor

Surface Description (check all that apply):

[X] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[X] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	310986	60	5	DO
44-9	164377	60	30	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:26	3030	643	60	0	30	CPM	CHooper
1/4/17	13:12	3030	642	300	7	131	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W024 **Property:** House 2

Collected by: DO Date collected: 12/29/16 Time collected: 1111

Sample Type: [X] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted]

[ ] high occupancy
[X] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[X] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[X] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	319986	60	5	DO
44-9	164377	60	34	DO

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:25	3030	643	60	0	39	CPM	CHooper
1/4/17	13:17	3030	642	300	8	119	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W025 **Property:** Hose 2

Collected by: JWP Date collected: 12/29/16 Time collected: 1035

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted]

Surface Description (check all that apply):

[✓] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	JWP
44-9	PR206141	60	37	JWP

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:23	3030	643	60	0	25	cpm	C Hogan
1/4/17	13:52	3030	642	300	3	133	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W026 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1045

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	5	MBS
44-9	PR206141	60	28	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:22	3030	1643	60	0	37	cpm	C Hooper
1/4/17	13:45	3030	1642	300	2	109	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDC-[redacted]-W027 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1045

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name [redacted] WALL

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	MBS
44-9	PR206141	60	35	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:21	3030	643	60	0	34	CPM	CHooper
1/4/17	13:40	3030	642	300	3	104	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD28 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1040

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	5	MBS
44-9	PR200441	60	24	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:19	3030	643	60	0	28	CPM	CHooper
1/4/17	13:34	3030	642	300	5	95	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD29 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1100

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	6	MBS
44-9	PR206141	60	35	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:18	3030	643	60	0	24	CPM	CHoper
1/4/17	15:09	3030	642	300	6	104	Counts	CHoper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD30 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1105

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	MBS
44-9	PR206141	60	46	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:16	3030	643	60	0	27	cpm	CHooper
1/4/17	15:04	3030	642	300	5	130	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W031 **Property:** House 2

Collected by: JC Date collected: 12/29/16 Time collected: 1137

Sample Type: [ ] wipe (200 cm^2) [✓] wipe (— cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Field blank

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field blank

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:15	3030	643	60	0	25	cpm	CHoover
1/5/17	1228	3030	642	60	0	16	cpm	R. Mannig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W032 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1104

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	MBS
44-9	PR206141	60	28	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:13	3030	643	60	0	31	CPM	CHooper
1/4/17	15:15	3030	642	300	2	108	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W033 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1102

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310959	60	1	MBS
44-9	PR200141	60	46	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:12	3030	643	60	0	24	cpm	C Hooper
1/4/17	15:20	3030	642	300	3	113	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted] - WD34 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1055

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: Floor

Surface Description (check all that apply):

[✓] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310287	60	4	MBS
44-9	PR206141	60	55	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:11	3030	643	60	0	33	CPM	CHooper
1/4/17	15:26	3030	642	300	7	121	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W035 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1107

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Bedroom 2, E WALL

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	7	MBS
44-9	PR820614	60	32	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:10	3030	643	60	0	39	CPM	CHooper
1/4/17	15:53	3030	642	300	3	122	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W036 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 11:10

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] wall

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	3	MBS
44-9	PR206141	60	41	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:08	3030	643	60	0	42	cpm	C Hooper
1/4/17	15:58	3030	642	300	6	105	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BSD-[redacted]-W037 **Property:** House 2

Collected by: JWP Date collected: 12/29/16 Time collected: 1115

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] wall

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	JWP
44-9	PR206141	60	46	JWP

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	12:06	3030	643	60	0	45	CPM	C Hooper
1/4/17	16:04	3030	642	300	3	106	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD38 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: ~~11:13~~ 11:17 (JP)

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID ~~1113~~ (JP))

Sample Location (check all that apply): Room name: [redacted] wall

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	MBS
44-9	PR206141	60	39	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/28/16	12:05	3030	643	60	0	28	CPM	C. Hooper
1/4/17	16:09	3030	642	300	5	104	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W039 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1120

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: Floor

Surface Description (check all that apply):

[✓] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood MBS	[ ] plastic
[ ] tile	[ ] carpet	[✓] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310959	60	3	MBS
44-9	PR206141	60	52	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
12/29/16	12:03	3030	643	60	0	37	CPM	C. Harper
1/5/17	1203	3030	642	300	2	103	Scalar	R. Manning

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD40 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1134

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] Wall

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	~~[ ] wood~~ (IP)	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR10989	60	5	MBS
44-9	PR206141	60	48	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:36	3030	642	300	2	96	Counts	CHopper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS- [redacted] - W041 **Property:** House 2

Collected by: JC Date collected: 12/29/16 Time collected: 1238

Sample Type: [ ] wipe (200 cm^2) [X] wipe (— cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Field blank

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field blank

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/5/17	1232	3030	6042	60	1	18	cpm	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W042 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1132

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] Wall

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch ~~- Floor View~~ WALL VIEW (VP) Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	1	MBS
44-9	PR206141	60	34	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:58	3030	642	300	5	124	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD43 **Property:** House 2

Collected by: JWP Date collected: 12/29/16 Time collected: 1130

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[✓] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	5	MBS
44-9	PR206141	60	47	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:52	3030	642	300	5	112	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W044 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1136

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Bedroom 2; S Wall (UP)

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR30989	60	5	MBS
44-9	PR206141	60	27	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:47	3030	642	300	4	112	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W045 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1138

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] Wall

[✓] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	2	MBS
44-9	PR206141	60	41	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:41	3030	642	300	1	91	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W046 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1145

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] Floor

Surface Description (check all that apply):

[✓] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[✓] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	MBS
44-9	PR206141	60	41	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:31	3030	642	300	2	111	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W047 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1147

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] wall

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall [redacted]

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310987	60	4	MBS
44-9	PR206141	60	38	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:25	3030	642	300	1	107	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W048 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1148

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] Floor

Surface Description (check all that apply):

[✓] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[✓] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: Ceramic

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR910989	60	14	MBS
44-9	PR280141	60	142	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	15:42	3030	642	300	4	108	Counts	C Hoper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BOS-[redacted]-W049 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1152

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] hall

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	1	MBS
44-9	PR206141	60	46	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	15:36	3030	642	300	3	95	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]- WD50 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1150

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] wall

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	2	MBS
44-9	PR206141	60	40	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	15:31	3030	642	300	3	42	Counts	CHaper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W051 **Property:** House 2

Collected by: JC Date collected: 12/29/16 Time collected: 1307

Sample Type: [ ] wipe (200 cm^2) [X] wipe (—— cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Field blank

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field blank

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/5/17	1212	3030	642	300	1	102	scalar	R. Monnig

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W052 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1155

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] hall

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[✓] drywall	[ ] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	1	MBS
44-9	PR206141	60	42	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	15:47	3030	~~3030~~ CP 642	300	2	85	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD53 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1230

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] Wall

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	6	MBS
44-9	P2206141	60	58	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm) scaler	Counted By
1/4/17	13:22	3030	642	300	7	101	Counts	CHoger

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD54 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1304

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[✓] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	11	MBS
44-9	1164377	60	40	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or scaln dpm)	Counted By
1/4/17	10:36	3030	642	300	7	114	Counts	C Hoppen

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD55 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: ~~1106~~ JP 1306

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[ ] high occupancy
[✓] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] Floor

Surface Description (check all that apply):

[✓] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	~~[✓] painted~~ JP	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	3	MBS
44-9	164377	60	59	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm) scaler	Counted By
1/4/17	10:31	3030	642	300	1	131	Counts	C Hoppe

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WU56 **Property:** House 2

Collected by: MBS Date collected: 12/29/14 Time collected: ~~1200~~ (HP) 1308

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WA2L

[ ] high occupancy
[✓] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] Wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310950	60	9	MBS
44-9	164377	60	37	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm) scaler	Counted By
1/4/17	10:25	3030	642	300	5	101	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W057 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1300

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] WALL

[ ] high occupancy
[✓] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	10	MBS
44-9	164377	60	33	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm) scaler	Counted By
1/4/17	10:19	3030	642	300	1	119	Counts	C. Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W058 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1309

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room nam[redacted] WALL

[ ] high occupancy
[✓] low occupancy
[✓] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[✓] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: [redacted] DOOR

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310986	60	9	MBS
44-9	164377	60	30	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units scaler (cpm or dpm)	Counted By
1/4/17	10:13	~~642~~ 3030	642	300	3	105	Counts	C Hope

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WO~~54~~ JC 59 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1226

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] FLOOR

[ ] high occupancy
[ ] low occupancy
[ ] entrance

[redacted]

[redacted]

Sketch - Floor View Sketch - ~~Wall View~~ UP Floor view

Other Description: [redacted] Floor

Surface Description (check all that apply):

[✓] **floor**	[ ] **wall**	[ ] **furniture**	[ ] **applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	6	MBS
44-9	PR206141	60	51	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	13:29	3030	642	300	3	114	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W060 **Property:** HOUSE 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1220

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name [redacted] Floor

[ ] high occupancy
[ ] low occupancy
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: _____

Surface Description (check all that apply):

[✓] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	9	MBS
44-9	PR206141	600	52	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	13:58	3030	642	300	2	104	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS - [redacted] - W061 **Property:** House 2

Collected by: JC Date collected: 12/29/16 Time collected: 1441

Sample Type: [ ] wipe (200 cm^2) [✓] wipe (— cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: Field blank

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[ ] bedroom
[ ] kitchen
[ ] living area
[ ] laundry
[ ] basement
[ ] closet

Sketch - Floor View

Sketch - Wall View

Other Description: Field blank

Surface Description (check all that apply):

[ ] floor	**[ ] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[ ] concrete	[ ] wood	[✓] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[ ] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90				
44-9				

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/5/17	1230	3030	642	60	0	23	CPM	R. Monroe

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD62 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 1215

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] Wall

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR3109589	60	5	MBS
44-9	PR2061411	60	69	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	CH 14:20	3030	642	300	1	100	Counts	CHooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD63 **Property:** House 3

Collected by: MBS Date collected: 12/29/16 Time collected: ~~1222~~ 1214

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] wall [redacted]

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	7	MBS
44-9	PR20014	60	53	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:14	3030	642	300	0	83	Counts	C Hooper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-WD64 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 12 12

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] wall

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	2	MBS
44-9		60	45	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:09	3030	642	300	4	114	Counts	CHaper

Wipe/Bulk Dust Sample Collection Field Sheet
US EPA Region 7 - Bridgeton Dust Site

Sample Name: BDS-[redacted]-W065 **Property:** House 2

Collected by: MBS Date collected: 12/29/16 Time collected: 12:10

Sample Type: [✓] wipe (200 cm^2) [ ] wipe (_____ cm^2) [ ] cartridge (ID _____

Sample Location (check all that apply): Room name: [redacted] Wall

[ ] high occupancy
[ ] low occupancy
[ ] entrance
[redacted]

[redacted]

Sketch - Floor View Sketch - Wall View

Other Description: [redacted] wall

Surface Description (check all that apply):

[ ] floor	**[✓] wall**	**[ ] furniture**	**[ ] applicance**	
[ ] vinyl	[ ] drywall	[✓] concrete	[ ] wood	[ ] plastic
[ ] tile	[ ] carpet	[ ] hardwood	[✓] painted	[ ] metal

Other Description: _____

Static Counting of Surface:

Detector Model	Detector Serial Number	Counting Time (seconds)	Counts	Counted By
43-90	PR310989	60	4	MBS
44-9	PR206141	60	52	MBS

Drawer Counting (wipe only):

Date	Time	Detector Model	Detector Serial Number	Counting Time (seconds)	Alpha Counts	Beta Counts	Units (cpm or dpm)	Counted By
1/4/17	14:03	3030	642	300	0	118	Counts	C Hooper

APPENDIX C

LOG BOOK AND FIELD SHEETS

KS1521

Rite in the Rain®
ALL-WEATHER
LEVEL
№ 311FX

Bridgeton
Dust
Site

12/27/16 Bridgeton Dust Site

1030 EPA and START have arrived at [redacted] residence.

Onsite are:

Name	Number	Organization
Tom Mahler	816-604-0546	EPA
Chuck Hooper	[redacted]	EPA
Doug Ferguson	913-551-7221	EPA
Ben Washburn	913-551-7364	EPA
Danny O'Connor	913-551-7868	EPA
Rob Monnig	[redacted]	START
James Christopher	[redacted]	START
Megan Sawyer	[redacted]	START
Jenna Pratt	[redacted]	START
Dave Kappelman	[redacted]	EPA
Rita Alexander	[redacted]	MDNR

1120 Conduct initial walk through with NaI probe ERT-726.

[redacted] 5-6 μR/hr
5-7 μR/hr
5-6 μR/hr
5-6 μR/hr
5-6 μR/hr
5-6 μR/hr
5-6 μR/hr

12/27/16 Bridgeton Dust Site

[redacted] 5-6 μR/hr
6-7 μR/hr
6-7 μR/hr
6-7 μR/hr
5-6 μR/hr
5-6 μR/hr
6-7 μR/hr

1130 Finish indoor walk through

1200 Dave Kappleman is setting up PICs.

1202 PIC in [redacted]:
Model # S131-110-ER2500
Serial # 11J0150W
PIC in [redacted] (basement [redacted])

1206 Model # S131-110-ER2500
Serial # 11L01AOY

1210 Begin baseline survey of surfaces. Readings have been recorded onto field sheets.

1350 Complete surface survey.

1400 Break for lunch

1500 Return from lunch. Begin scanning and collecting wipe samples from interior. Wipe sample info. EPA begins to do gamma scan and exterior soil sampling.

12/27/16 Bridgeton Dust Site

1800 Finish for the day. Head back to hotel.

12/27/16

12/28/16 Bridgeton Dust Site

0930 EPA + START arrive at [redacted] residence

On site are:

Name	Number	Org.
James Christopher	[redacted]	START
Tom Mehler	816-604-0546	EPA
Bob Freeman		
Danny Donner		
Rita Alexander		
Ben Washburn		
Rob Mannig		
Megan Sawyer		
Jenna Pratt		
Dave Kappelman		
Randy Brown	[redacted]	EPA

0950 Begin wipe sampling in two teams

Team 1:

Danny O'Donner

James Christopher

α probe: PR 310986

β probe: 164377

Team 2:

Jenna Pratt + Megan Sawyer

α probe: PR 310989

β probe: PR 206141

12-28-16 Bridgeton Dust Site

1040 No [redacted] wall [redacted] collected due to [redacted]

1145 Start basement scan
ETA doing Follow up gamma scan in yard

1300 Lunch

1400 End lunch

1411 ~~Begin~~ JC Cont. collecting wipes in basement at [redacted] residence

1440 Complete wipe sampling basement —
Begin scanning [redacted] w/ α + β probes

1515 Complete [redacted] wipe sampling

1525 START on hold until homeowner from [redacted] arrives

1636 Begin Surface Survey at [redacted] residence

1705 PIC in [redacted]
SN: 1LJ015DW
Model: S131-110-ER2500
Pic in basement (E side):
SN: 11L01ADY
Model #: S131-110-ER2500

12-28-16 Bridgeton Dust Site

1714 ~~RAD 7~~ JC RAD7
SN: 576

1804 Complete Surface Survey of House 2 ([redacted])
Return to hotel

1930 Complete filling in info on Dust wipe field sheets

1942 Depart hotel

12/28/16

12-29-16 Bridgeton Dust Site

0810 Arrive at hotel [redacted]

0900 Arrive at [redacted] residence (House 2)

0910 Begin ratemeter check

0919 Begin scanning residence + wipe samples

1118 EPA OSC D. O'Connor starts bulk dust collection

1206 Conduct initial walkthrough w/ NaI probe ERT-726

[redacted] 9-10 uR/hr
14 uR/hr
15 uR/hr
10-11 uR/hr
8-9 uR/hr
8-9 uR/hr
9-10 uR/hr
8-9 uR/hr
8-9 uR/hr
9-10 uR/hr
10-11 uR/hr
10-11 uR/hr
10-11 uR/hr
10-11 uR/hr
9-10 uR/hr

12-29-16 Bridgeton Dust Site

Basement [redacted] 9-10 uR/hr

Basement drain/pipes 9-10 uR/hr

1222 Complete indoor walkthrough

1248 START wipe sampling the [redacted] - last room to sample

1315 START + EPA demob from [redacted] residence

1330 Lunch

1405 End lunch - at hotel

1418 START begins completion of wipe sample field sheet documentation

1632 Complete field sheet documentation

1647 Depart hotel

12-29-16

APPENDIX D

INSTRUMENT CALIBRATION AND DAILY RESPONSE CHECK FORMS

Designer and Manufacturer of Scientific and Industrial Instruments

642

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER U. S. EPA REGION 7 WAREHOUSE ORDER NO. 20302756/444200

Mfg. Ludlum Measurements, Inc. Model 3030 Serial No. 191249

Cal. Date 28-Dec-16 Cal Due Date 28-Dec-17 Cal. Interval 1 Year

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 38 % Alt 705.0 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Window Operation

☑ Audio ck.

Alpha Sensitivity 120 mV Beta Sensitivity 4 mV Beta Window 50 mV

☑ Calibrated in accordance with LMI SOP 14.8

Instrument Volt Set 525 V High Voltage set with detector connected.

☑ HV Readout (2 points) Ref./Inst. 500 / 502 V Ref./Inst. 1200 / 1199 V

Instrument in DPM mode.

QC mode turned ☑ OFF ☐ ON

Firmware version: 39013N41

Overload set at 1/4 turn past OFF.

Battery voltage measured at 13.15 Vdc.

C-14 Efficiency ~ 8.1 %(4 pi) Net

(EEPROM Settings)

(PC) Count Time: 1.0

Alpha Alarm: 999999 cpm

Beta Alarm: 999999 cpm

Alpha/Beta Alarm: 999999 cpm

Calibration Due Date: 12/28/2017

LOC (Loss of Count) time = 30 minutes (default)

Alpha Channel Digital Readout	REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400K cpm	400120 (0)	400120 (0)
	40K cpm	40010	40010
	4K cpm	4001	4001
	400 cpm	400	400
	40 cpm	40	40

Beta/Gamma Channel Digital Readout	REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400K cpm	399877 (0)	399877 (0)
	40K cpm	39981	39981
	4K cpm	3999	3999
	400 cpm	400	400
	40 cpm	40	40

*Uncertainty within ± 10% C.F. within ± 20%

(0) indicates 0.1 minute count

COMMENTS:

Ran data with customer sources Th230 #0768-5023 and SrY-90 #770-3427.

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

☑ Alpha S/N Pu239 #2928 ☑ Beta S/N Tc99 #7065 ☑ Other C14 #1867

☑ m 500 S/N 285610 ☐ Oscilloscope S/N ☑ Multimeter S/N 80040300

Calibrator David Anderson Title Technician Date 28-December-2016

QC'd By [illegible] Title Service Dept. QC Date 29 Dec 16

AC Inst. Only ☑ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed:

Ludlum Measurements, Inc.
Model 3030 Parameters

LMI sources Pu239 and Tc99

12/28/2016
9:22:27 AM

Header 1: CERETS #642
Header 2: SN 191249
Header 3: ASSET ID B01544
Header 4: More Comments?
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 12/28/2017

Model 3030 Date: 12/28/2016
Model 3030 Time: 9:11:11 AM

Count Time Switch (min): 1.0
User PC Time (min): 1.0

Alpha Alarm: 999999
Beta Alarm: 999999
Alpha + Beta Alarm: 999999

High Voltage (VDC): 525

Loss of Count Time (min): 15.0

Count Mode: CPM

Alpha Efficiency %: 39.2
Beta Efficiency %: 30.7

Background Subtract: ON
Alpha Background: 0.0
Beta Background: 48.0

Crosstalk Correction: ON
Alpha to Beta Crosstalk %: 1.7
Beta to Alpha Crosstalk %: 0.0

Show Parameters during startup: Disabled

Daily QC Check: OFF
Update Efficiency/Background Subtract from QC: ON
Override QC Count Time: ON

Last Alpha Efficiency %: 39.2
Last Beta Efficiency %: 30.7

Standard Alpha Efficiency %: 37
Standard Beta Efficiency %: 27

Allowable Alpha QC Efficiency ± %: 20
Allowable Beta QC Efficiency ± %: 20

Alpha Source Size (dpm): 25075
Alpha Source Size (Bq): 417.92
Alpha Source Size (µCi): 0.01129504505

Beta Source Size (dpm): 20595
Beta Source Size (Bq): 343.25
Beta Source Size (µCi): 0.00927702703

Alpha QC Count Time (min): 1.0
Beta QC Count Time (min): 1.0
Background QC Count Time (min): 1.0

Last Alpha QC Background: 0.0
Last Beta QC Background: 48.0

Alpha Background Upper Limit (cpm): 3.0
Alpha Background Lower Limit (cpm): 0.0
Beta Background Upper Limit (cpm): 50.0
Beta Background Lower Limit (cpm): 0.0

Next Sample Number: 0050
User-defined Comment:
Logging Mode: Log All
Recycle Mode: OFF
Printer Mode: OFF

Ludlum Measurements,Inc.
Model 3030 MDA Calculation Data

12/28/2016
9:21:05 AM

Alpha Background(cpm): 0.0
Beta Background(cpm): 48.0

Alpha Efficiency %: 39.2
Beta Efficiency %: 30.7

Background Count Time: 1.0 minute(s)
Confidence Level: 95% (3.290)

Count Time	Alpha MDA(dpm)	Beta MDA(dpm)
0.1	69.1	334.5
0.5	13.8	146.3
1.0	6.9	113.8
2.0	3.5	95.3
5.0	1.4	83.1
10.0	0.7	78.8
60.0	0.1	75.0
PC (1.0)	6.9	113.8

Ludlum Measurements, Inc.
Model 3030 Plateau Data

12/28/2016
9:09:24 AM

Header 1: CERETS #642
Header 2: SN 191249
Header 3: ASSET ID B01544
Header 4: More Comments?
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 12/6/2016

Model 3030 Date: 1/23/2001
Model 3030 Time: 8:32:01 AM

User PC Time: 1.0

Alpha Isotope: Pu239
Alpha Source Size (dpm): 25075
Alpha Source Size (Bq): 417.92
Alpha Source Size (µCi): 0.011295045

Beta Isotope: Tc99
Beta Source Size (dpm): 20595
Beta Source Size (Bq): 343.25
Beta Source Size (µCi): 0.009277027

Starting High Voltage: 400
Starting High Voltage: 600
High Voltage Increment: 25

Plateau Count Mode: SCALER
Source Count Time (min): 1.0
Background Count Time (min): 1.0

	ALPHA				BETA			
HV	Source (Beta)	Background	Eff	CrossTalk	Source (Alpha)	Background	Eff	Crosstalk
400	7661 (574)	0	30.6%	7.4%	546 (0)	5	2.6%	0.0%
425	8783 (394)	0	35.0%	4.4%	1853 (1)	8	9.0%	0.1%
450	9316 (263)	0	37.2%	2.7%	3258 (0)	16	15.7%	0.0%
475	9406 (245)	1	37.5%	2.3%	4254 (0)	25	20.5%	0.0%
500	9625 (250)	1	38.4%	2.2%	5421 (1)	40	26.1%	0.0%
525	9800 (215)	0	39.1%	1.7%	6474 (0)	46	31.2%	0.0%
550	9575 (202)	1	38.2%	1.5%	7223 (0)	54	34.8%	0.0%
575	9664 (183)	3	38.5%	1.2%	7256 (1)	63	34.9%	0.0%
600	9751 (185)	1	38.9%	1.3%	6930 (4)	60	33.4%	0.0%

Ludlum Measurements, Inc.
Model 3030 Parameters LMI sources Th230 and Sr Y-90

12/27/2016
3:04:12 PM

Header 1: CERETS #642
Header 2: SN 191249
Header 3: ASSET ID B01544
Header 4: More Comments?
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 12/6/2016

Model 3030 Date: 12/27/2016
Model 3030 Time: 2:07:58 PM

Count Time Switch (min): 1.0
User PC Time (min): 1.0

Alpha Alarm: 999999
Beta Alarm: 999999
Alpha + Beta Alarm: 999999

High Voltage (VDC): 500

Loss of Count Time (min): 15.0

Count Mode: CPM

Alpha Efficiency %: 27.3
Beta Efficiency %: 38.6

Background Subtract: ON
Alpha Background: 0.0
Beta Background: 38.0

Crosstalk Correction: ON
Alpha to Beta Crosstalk %: 12.3
Beta to Alpha Crosstalk %: 0.0

Show Parameters during startup: Disabled

Daily QC Check: OFF
Update Efficiency/Background Subtract from QC: ON
Override QC Count Time: ON

Last Alpha Efficiency %: 27.3
Last Beta Efficiency %: 38.6

Standard Alpha Efficiency %: 26
Standard Beta Efficiency %: 26

Allowable Alpha QC Efficiency ± %: 20
Allowable Beta QC Efficiency ± %: 20

Alpha Source Size (dpm): 3220
Alpha Source Size (Bq): 53.67
Alpha Source Size (µCi): 0.00145045045

Beta Source Size (dpm): 31657
Beta Source Size (Bq): 527.62
Beta Source Size (µCi): 0.01425990991

Alpha QC Count Time (min): 1.0
Beta QC Count Time (min): 1.0
Background QC Count Time (min): 1.0

Last Alpha QC Background: 0.0
Last Beta QC Background: 38.0

Alpha Background Upper Limit (cpm): 3.0
Alpha Background Lower Limit (cpm): 0.0
Beta Background Upper Limit (cpm): 50.0
Beta Background Lower Limit (cpm): 0.0

Next Sample Number: 0002
User-defined Comment:
Logging Mode: Log All
Recycle Mode: OFF
Printer Mode: OFF

Ludlum Measurements,Inc.
Model 3030 Plateau Data

12/27/2016
1:32:59 PM

Header 1: CERETS #642
Header 2: SN 191249
Header 3: ASSET ID B01544
Header 4: More Comments?
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 12/6/2016

Model 3030 Date: 12/27/2016
Model 3030 Time: 9:32:58 AM

User PC Time: 1.0

Alpha Isotope: Th230
Alpha Source Size (dpm): 3220
Alpha Source Size (Bq): 53.67
Alpha Source Size (µCi): 0.00145045

Beta Isotope: SrY-90
Beta Source Size (dpm): 31657
Beta Source Size (Bq): 527.62
Beta Source Size (µCi): 0.01425991

Starting High Voltage: 400
Starting High Voltage: 600
High Voltage Increment: 25

Plateau Count Mode: SCALER
Source Count Time (min): 1.0
Background Count Time (min): 1.0

	ALPHA				BETA			
HV	Source (Beta)	Background	Eff	CrossTalk	Source (Alpha)	Background	Eff	Crosstalk
400	695 (80)	0	21.6%	10.6%	3649 (3)	6	11.5%	0.1%
425	697 (75)	1	21.6%	9.6%	6796 (2)	8	21.4%	0.0%
450	783 (92)	0	24.3%	8.9%	9904 (2)	22	31.2%	0.0%
475	868 (82)	0	27.0%	4.7%	11800 (1)	41	37.1%	0.0%
500	849 (151)	1	26.3%	12.3%	12627 (3)	47	39.7%	0.0%
525	849 (178)	0	26.4%	15.2%	12159 (12)	49	38.3%	0.1%
550	894 (241)	0	27.8%	21.9%	11190 (71)	45	35.2%	0.6%
575	862 (252)	1	26.7%	20.8%	9851 (322)	73	30.9%	3.3%
600	864 (263)	0	26.8%	23.1%	8217 (928)	63	25.8%	11.4%

Ludlum Measurements, Inc.
Model 3030 Parameters Customer sources Th230 and Sr/Y-90

12/27/2016
2:52:14 PM

Header 1: CERETS #642
Header 2: SN 191249
Header 3: ASSET ID B01544
Header 4: More Comments?
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 12/6/2016

Model 3030 Date: 12/27/2016
Model 3030 Time: 2:07:58 PM

Count Time Switch (min): 1.0
User PC Time (min): 1.0

Alpha Alarm: 999999
Beta Alarm: 999999
Alpha + Beta Alarm: 999999

High Voltage (VDC): 500

Loss of Count Time (min): 15.0

Count Mode: CPM

Alpha Efficiency %: 14.5
Beta Efficiency %: 23.7

Background Subtract: ON
Alpha Background: 0.0
Beta Background: 36.0

Crosstalk Correction: ON
Alpha to Beta Crosstalk %: 7.2
Beta to Alpha Crosstalk %: 8.7

Show Parameters during startup: Disabled

Daily QC Check: OFF
Update Efficiency/Background Subtract from QC: ON
Override QC Count Time: ON

Last Alpha Efficiency %: 14.5
Last Beta Efficiency %: 23.7

Standard Alpha Efficiency %: 26
Standard Beta Efficiency %: 26

Allowable Alpha QC Efficiency ± %: 20
Allowable Beta QC Efficiency ± %: 20

Alpha Source Size (dpm): 19100
Alpha Source Size (Bq): 318.33
Alpha Source Size (µCi): 0.0086036036

Beta Source Size (dpm): 4421
Beta Source Size (Bq): 73.68
Beta Source Size (µCi): 0.00199144144

Alpha QC Count Time (min): 1.0
Beta QC Count Time (min): 1.0
Background QC Count Time (min): 1.0

Last Alpha QC Background: 0.0
Last Beta QC Background: 36.0

Alpha Background Upper Limit (cpm): 3.0
Alpha Background Lower Limit (cpm): 0.0
Beta Background Upper Limit (cpm): 50.0
Beta Background Lower Limit (cpm): 0.0

Next Sample Number: 0002
User-defined Comment:
Logging Mode: Log All
Recycle Mode: OFF
Printer Mode: OFF

Ludlum Measurements, Inc.
Model 3030 Plateau Data

12/27/2016
11:51:29 AM

Header 1: CERETS #642
Header 2: SN 191249
Header 3: ASSET ID B01544
Header 4: More Comments?
Header 5: More Comments?
Header 6: More Comments?

Calibration Due Date: 12/6/2016

Model 3030 Date: 12/27/2016
Model 3030 Time: 9:32:58 AM

User PC Time: 1.0

Alpha Isotope: Th230
Alpha Source Size (dpm): 19100
Alpha Source Size (Bq): 318.33
Alpha Source Size (µCi): 0.008603604

Beta Isotope: SrY-90
Beta Source Size (dpm): 5510
Beta Source Size (Bq): 91.83
Beta Source Size (µCi): 0.002481982

Starting High Voltage: 400
Starting High Voltage: 600
High Voltage Increment: 25

Plateau Count Mode: SCALER
Source Count Time (min): 1.0
Background Count Time (min): 1.0

	ALPHA					BETA				
HV	Source	(Beta)	Background	Eff	CrossTalk	Source	(Alpha)	Background	Eff	Crosstalk
400	2128	(221)	0	11.1%	10.2%	284	(55)	5	5.1%	19.7%
425	2419	(149)	1	12.7%	5.9%	538	(68)	6	9.7%	12.6%
450	2630	(155)	0	13.8%	4.9%	754	(69)	26	13.2%	9.5%
475	2813	(151)	0	14.7%	4.0%	1050	(89)	38	18.4%	8.8%
500	2797	(245)	0	14.6%	7.2%	1096	(91)	44	19.1%	8.7%
525	2794	(343)	0	14.6%	11.0%	1160	(97)	37	20.4%	8.6%
550	2848	(359)	2	14.9%	10.7%	1096	(96)	55	18.9%	9.0%
575	2932	(457)	0	15.4%	13.4%	995	(111)	63	16.9%	11.9%
600	2814	(518)	1	14.7%	16.1%	901	(167)	65	15.2%	19.9%

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER U.S. EPA REGION 7 WAREHOUSE ORDER NO. 20300678/442891

Mfg. Ludlum Measurements, Inc. Model 3030 Serial No. 298904

Cal. Date 18-Nov-16 Cal Due Date 18-Nov-17 Cal. Interval 1 Year

Check mark ✓ applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 48 % Alt 698.0 mm Hg

☐ New Instrument Instrument Received ✓ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

✓ Mechanical ck. ✓ Window Operation

✓ Audio ck.

Alpha Sensitivity 120 mV Beta Sensitivity 4 mV Beta Window 50 mV

✓ Calibrated in accordance with LMI SOP 14.8

Instrument Volt Set 525 V High Voltage set with detector connected.

✓ HV Readout (2 points) Ref./Inst. 500 / 501 V Ref./Inst. 1200 / 1198 V

Instrument in DPM mode.

QC mode turned ✓ OFF ☐ ON

Firmware version: 39013v16

Overload set at 1/4 turn past OFF.

Battery voltage measured at 12.6 Vdc.

C-14 Efficiency ~ 8 %(4 pi) Net

(EEPROM Settings)

(PC) Count Time: 21.0

Alpha Alarm: 999999 cpm

Beta Alarm: 999999 cpm

Alpha/Beta Alarm: 999999 cpm

Calibration Due Date: 11/18/2017

LOC (Loss of Count) time = 30 minutes (default)

Alpha Channel Digital Readout	REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400K cpm	40034(0)	40034(0)
	40K cpm	4004	4004
	4K cpm	400	400
	400 cpm	40	40
	40 cpm	4	4

Beta/Gamma Channel Digital Readout	REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400K cpm	40028(0)	40028(0)
	40K cpm	4003	4003
	4K cpm	400	400
	400 cpm	40	40
	40 cpm	4	4

*Uncertainty within ± 10% C.F. within ± 20%

(0) indicates 0.1 minute count

COMMENTS:

Cal'd with customers sources

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

✓ Alpha S/N Pu239 SN:7053 ✓ Beta S/N Tc99 SN:5280 ☐ Other

✓ m 500 S/N 190566 ☐ Oscilloscope S/N ✓ Multimeter S/N 86250390

Calibrator Jason Flan Title Calibrator Date 18-nov-16

QC'd By Mark H. Title Service Dept. QC Date 18 Nov 16

AC Inst. Only ✓ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed:

Ludlum Measurements,Inc.
Model 3030 Parameters

11/18/2016
2:24:37 PM

Header 1: CERETS #643
Header 2: SN #: 298904
Header 3: Asset ID B01545
Header 4: More Comments?
Header 5: Mor Comments?
Header 6: More Comments?

Calibration Due Date: 11/18/2017

Model 3030 Date: 11/18/2016
Model 3030 Time: 1:45:35 PM

Count Time Switch (min): 1.0
User PC Time (min): 21.0

Alpha Alarm: 999999
Beta Alarm: 999999
Alpha + Beta Alarm: 999999

High Voltage (VDC): 525

Loss of Count Time (min): 1666.7

Count Mode: SCALER

Alpha Efficiency %: 27.2
Beta Efficiency %: 28.0

Background Subtract: OFF
Alpha Background: 0.0
Beta Background: 50.0

Crosstalk Correction: OFF
Alpha to Beta Crosstalk %: 12.0
Beta to Alpha Crosstalk %: 1.2

Show Parameters during startup: Disabled

Daily QC Check: OFF

Last Alpha Efficiency %: 26.0
Last Beta Efficiency %: 29.0

Standard Alpha Efficiency %: 27
Standard Beta Efficiency %: 28

Allowable Alpha QC Efficiency ± %: 15
Allowable Beta QC Efficiency ± %: 15

Alpha Source Size (dpm): 18500
Alpha Source Size (Bq): 308.33
Alpha Source Size (µCi): 0.00833333333

Beta Source Size (dpm): 2310
Beta Source Size (Bq): 38.5
Beta Source Size (µCi): 0.00104054054

Last Alpha QC Background: 0.0
Last Beta QC Background: 45.0

Alpha Background Upper Limit (cpm): 10
Alpha Background Lower Limit (cpm): 0
Beta Background Upper Limit (cpm): 999999
Beta Background Lower Limit (cpm): 0

Next Sample Number: 0001
User-defined Comment: TEST
Logging Mode: Log All
Recycle Mode: OFF
Printer Mode: ON

Ludlum Measurements,Inc.
Model 3030 Plateau Data

11/18/2016
1:51:35 PM

Header 1: CERETS #643
Header 2: SN #: 298904
Header 3: Asset ID B01545
Header 4: More Comments?
Header 5: Mor Comments?
Header 6: More Comments?

Calibration Due Date: 11/18/2017

Model 3030 Date: 11/18/2016
Model 3030 Time: 1:45:35 PM

User PC Time: 21.0

Alpha Isotope: Pu239
Alpha Source Size (dpm): 24900
Alpha Source Size (Bq): 415.0
Alpha Source Size (µCi): 0.011216216

Beta Isotope: Tc99
Beta Source Size (dpm): 93200
Beta Source Size (Bq): 1553.33
Beta Source Size (µCi): 0.041981982

Starting High Voltage: 475
Starting High Voltage: 575
High Voltage Increment: 25

Plateau Count Mode: SCALER
Source Count Time (min): 1.0
Background Count Time (min): 1.0

	ALPHA					BETA				
HV	Source (Beta)		Background	Eff	CrossTalk	Source (Alpha)		Background	Eff	Crosstalk
475	9882	(273)	0	39.7%	2.4%	19783	(30)	37	21.2%	0.2%
500	10024	(332)	1	40.3%	2.9%	24776	(32)	42	26.5%	0.1%
525	9875	(311)	0	39.7%	2.7%	29600	(40)	46	31.7%	0.1%
550	10017	(243)	0	40.2%	1.9%	33355	(37)	49	35.7%	0.1%
575	9965	(240)	0	40.0%	1.8%	35272	(50)	57	37.8%	0.1%

Ludlum Measurements, Inc.
Model 3030 Plateau Data

11/18/2016
2:18:24 PM

Header 1: CERETS #643
Header 2: SN #: 298904
Header 3: Asset ID B01545
Header 4: More Comments?
Header 5: Mor Comments?
Header 6: More Comments?

Calibration Due Date: 11/18/2017

Model 3030 Date: 11/18/2016
Model 3030 Time: 1:45:35 PM

User PC Time: 21.0

Alpha Isotope: th230
Alpha Source Size (dpm): 18500
Alpha Source Size (Bq): 308.33
Alpha Source Size (µCi): 0.008333333

Beta Isotope: SrY90
Beta Source Size (dpm): 2310
Beta Source Size (Bq): 38.5
Beta Source Size (µCi): 0.001040541

Starting High Voltage: 475
Starting High Voltage: 575
High Voltage Increment: 25

Plateau Count Mode: SCALER
Source Count Time (min): 1.0
Background Count Time (min): 1.0

	ALPHA				BETA			
HV	Source (Beta)	Background	Eff	CrossTalk	Source (Alpha)	Background	Eff	Crosstalk
475	4732 (340)	0	25.6%	6.3%	539 (5)	40	21.6%	1.0%
500	5031 (467)	0	27.2%	8.6%	645 (3)	35	26.4%	0.5%
525	5032 (654)	0	27.2%	12.0%	696 (8)	50	28.0%	1.2%
550	5011 (684)	0	27.1%	12.9%	696 (7)	37	28.5%	1.1%
575	5011 (723)	0	27.1%	13.3%	689 (13)	59	27.3%	2.1%

Ludlum Measurements, Inc.
Model 3030 MDA Calculation Data

11/18/2016
2:18:28 PM

Alpha Background(cpm): 0.0
Beta Background(cpm): 50.0

Alpha Efficiency %: 27.2
Beta Efficiency %: 28.0

Confidence Level: 95%

Count Time	Alpha MDA(dpm)	Beta MDA(dpm)
0.1	99.6	372.3
0.5	19.9	163.3
1.0	10.0	127.2
2.0	5.0	106.6
5.0	2.0	93.0
10.0	1.0	88.1
60.0	0.2	83.9
PC (21.0)	0.5	85.5

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Knoxville, TN 37932, U.S.A.

Bench Test Data For Alpha Detector

Detector 43-90 Serial No. PR310956

Customer TETRA TECH EMI Order #. 20293219/437915

Counter 2241-2 Serial No. 198265 Counter Input Sensitivity 35 mV

Count Time 1min. Distance Source to Detector Surface

Isotope Th230 SN:E121495 19800dpm Other

43-4/43-44 HV Adjust for Altitude

Altitude	High Voltage
Sea Level	2050 V
1000 foot	2025 V
2000 foot	2000 V
3000 foot	1975 V
4000 foot	1950 V
5000 foot	1925 V
6000 foot	1900 V
7000 foot	1875 V

Alpha Scintillation Detector

HV Plateau	Background	Source Count
600	1	3088
650	2	3789
700	2	3812
750	3	3845
800	7	3970

Operating Voltage Set at 700 V

Air Proportional	43-5	43-65	43-90	Background	Meter Reading	Range/Scale
Toe	Toe	L/S*	Toe	2	3892	1min
Center	Center	Center	Center	2	3812	
Heel	Heel	Other**	Heel	2	3948	

☐ Uniformity (± 10%) Average Efficiency 19.60 %(4pi)

* Least Sensitive Position (Heel of Detector)
** Opposite Least Sensitive Position (Top of Detector)

Signature [signature] Date 26-July-16

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Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer TETRA TECH EMI Date 26-Jul-16 Order #. 20293219/437915

Model 2241-2 Serial No. 198265 Detector Model 44-9 Serial No. PR325857

Source Cs 137, 54mCi 4mCi High Voltage 900 V

Input Sensitivity 35 mV

Reference Point	"As Found" Readings (CPM): Meter Reading	Range/Scale	After Adjustment Readings (CPM): Meter Reading	Range/Scale
150 mR/hr	315 K	Digital	315 K	Digital
50 mR/hr	138		138	
15 mR/hr	48.8		48.8	
5 mR/hr	16.5		16.5	
1.5 mR/hr	4.92		4.92	
1.0 mR/hr	3.30		3.30	

COPY

Signature: [signature] Date 26-July-16

Attachment for Efficiencies

(All Efficiencies taken with 2241-2 SN:198265)

43-90 SN: PR310986

Th230 SN: E121495, Size: 19800dpm, Background: 2cpm, Counts: 3812cpm, 4pi Eff:19.24%
Th230 SN: E121495, Size: 10100cpm, Background: 2cpm, Counts: 3812cpm, 2pi Eff:37.72%
Pu239 SN: 7053, Size: 24900dpm, Background: 2cpm, Counts: 5709cpm, 4pi Eff:22.91%
Pu239 SN: 7053, Size: 12600cpm, Background: 2cpm, Counts: 5709cpm, 2pi Eff:45.29%

44-9 SN: PR325857

Tc99 SN: 5280, Size: 93200dpm, Background: 47cpm, Counts: 20923cpm, 4pi Eff: 22.39%
SrY90 SN: 5281, Size: 89386dpm, Background: 47cpm, Counts: 33883cpm, 4pi Eff: 37.85%
Cl36 SN: 1075-78-1, Size:22028dpm, Background: 47cpm, Counts: 8160cpm, 4pi Eff: 36.83%
C14 SN: 1476, Size: 229767dpm, Background: 47cpm, Counts: 9191cpm, 4pi Eff: 3.97%
Cs137 SN: 1075-78-2, Size:16892dpm, Background:47cpm,Counts:4804cpm, 4pi Eff: 28.16%

(Tc99 SN:4186 is larger than active area of 44-9 per customer request)
Tc99 SN: 4186, Size: 7492dpm, Background: 47cpm, Counts: 209cpm, 2pi Eff:2.16%

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street, 325-235-5494, Sweetwater, TX 79556, U.S.A.
☐ 10744 Dutchtown Road, 865-392-4601, Knoxville, TN 37932, U.S.A.

CUSTOMER: TETRA TECH EMI — ORDER NO. 20293219/437915

Mfg. Ludlum Measurements, Inc. Model 2241-2 Serial No. 198265

Mfg. Ludlum Measurements, Inc. Model 44-9 Serial No. PR 325857

Cal. Date 26-Jul-16 Cal Due Date 26-Jul-17 Cal. Interval 1 Year Meterface digital

Check mark ✓ applies to applicable instr. and/or detector IAW mfg. spec. T 73 °F RH 48 % Alt 692.0 mm Hg

☐ New Instrument Instrument Received ✓ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

✓ Mechanical ck. ☐ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
✓ F/S Resp. ck ☐ Reset ck. ☐ Window Operation
✓ Audio ck. ✓ Alarm Setting ck. ✓ Batt. ck. (Min. Volt) 2.2 VDC
✓ Calibrated in accordance with LMI SOP 14.8 ☐ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold Dial Ratio = mV

COMMENTS:

	Det.1(cpm)	Det.2(cpm)
Deadtime:	0uSec	0µSec
Cal Cons:	100e-2	100e-2
Alarm:	500kcpm	500kcpm
Alert:	200kcpm	200kcpm
HV:	900v	700v
Sens:	35mv	35mv
Probe:	44-9	43.90

Firmware: P-06-13
OL checked but not set
'Ratemete calibration' achieved with no deadtime.

See attachment for efficiencies

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
Dig.rate			
Dig.rate			

COPY

*Uncertainty within ± 10% C.F. within ± 20%

Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Ratemeter Readout	800K cpm	799 Kcpm	799 Kcpm
	200K cpm	199	199
	80K cpm	79	79
	20K cpm	19.9	19.9
	8K cpm	7.9	7.9
	2K cpm	1.99	1.99
	800 cpm	800 cpm	800 cpm
	200 cpm	200	200

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Scaler Readout	800K cpm	79944 (0)	79944 (0)
	200K cpm	19952	19952
	80K cpm	7994	7994
	20K cpm	1995	1995
	8K cpm	799	799
	2K cpm	199	199
	800 cpm	80	80
	200 cpm	20	20

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 2324/2521 ☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982

✓ Alpha S/N Th230 SN:E121495 ☐ Beta S/N ☐ Other

✓ m 500 S/N 190566 ☐ Oscilloscope S/N ✓ Multimeter S/N 86250390

Calibrator [signature] Title CALIBRATOR Date 26-July-16

QC'd By [signature] Title QC Date 27 Jul 16

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Todays Date	170105	**Cal Date**	160726	**Cal Due**	170726	**Shelf Loc**	ERL 201-A
Temp F	69.6	**Pressure "**	29.06	**Humidity%**	21	**Th Chk Src**	☑ Yes ☐ No
Case No.	117	**CERETS**	ERT-007	**2241-2 SN**	198265	**Test Loc**	Warehouse
44-9 SN	PR325857	**43-90 SN**	PR310986	**L180-2**	**CERETS** ERT-626		**SN** 238158

Required: Battery tester, standard screwdriver, small standard screwdriver, Ludlum Mod 500-2 or 2200
Jigs: CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wear gloves, do not touch active source area with hands
NOTE: Other sources may be used, but the activities in dpm will need to be input in Step 9 where indicated.
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-2 or the **calibration is invalidated**

☑ **Step 1.** Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker on the side of the Ludlum 2241-2.
☑ **Step 2.** Verify Document Packet includes instrument manuals and calibration certificates
☑ **Step 3.** Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
☑ **Step 4.** Remove 2241-2 from case and inspect for any visible damage or unusual conditions. Install D cells.

☑ **Step 5.** Verify that Detector 1 integrate time is 30 seconds and Detector 2 is 60 seconds. To reset the integrate time, select Detector 1 setting and remove the electronics package from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to Scaler Count Time screen ("s" for seconds will be displayed on the screen). Adjust using LEFT and UP buttons to 30 seconds. ENTER. Reset rotary switch to zero. Turn unit OFF. Select Detector 2 by lifting and switching from Detector 1 on the instrument front panel. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to the Scaler Count Time screen. Adjust using LEFT and UP buttons to 60 seconds. ENTER. Reset 16 position rotary switch to zero. Turn unit OFF. Reconnect speaker and serial cables. Reinstall electronics package.

☑ **Step 6.** Connect 2241-2 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Record HV reading for Det 1 and Det 2. Verify High Voltage set at voltage stated on the Calibration Certificate Conversion Chart ±3v for Det 1 (44-9 probe, usually 900 volts) and Det 2 HV for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the appropriate HV POT. CHECK CAREFULLY- Only adjust HV! Note in Comments if adjustment is needed.

Det 1 Volts 903 Det 2 Volts 700

☑ **Step 7.** Check audio using the toggle switch. Audio ☑ Yes ☐ No
Check the light using red button. Light ☑ Yes ☐ No

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 1

☑ **Step 8.** Select Det 1 position setting. Attach GM pancake probe (44-9) to cable. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	33.7	Source cpm	8750	Bkg Scaler	19	Source Scaler	4321

☑ **Step 9.** Place the plated Th-230 QC Source on Shelf 1 of the L180-2 jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN 5301-04		18200 dpm		Tc-99 SN 5678-06		8400 dpm	
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading	467	461	472	447.7	566	560	530	533.0
Efficiency	0.025	0.024	0.025	0.025	0.130	0.129	0.122	0.127

☑ In Ratemeter mode, read the Tc-99 source on Shelf position 2. Repeat for the next three shelf positions.

Reading	Shelf 2	830	Shelf 3	583	Shelf 4	322	Shelf 5	162
Effic (c/d)		0.097		0.067		0.036		0.017

Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 2

☑ **Step 10.** Select Det 2. Attach 43-90 alpha probe. Turn instrument ON. Take background rate reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and source scaler readings.

Bkg cpm	1.64	Source cpm	728	Bkg Scaler	3	Source Scaler	655

☑ **Step 11.** Place plated Th-230 source in top slot of 43-90 jig and take three scaler readings. Move source to middle slot and take three scaler readings. Move source to bottom slot and take three scaler readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	**Trial 1**	**Trial 2**	**Trial 3**	**Average**	**43-90 Probe Summary**		
Top	2855	2845	2861	2852.7			
Middle	2950	2774	2747	2822.7			
Bottom	2943	2883	2937	2920.0	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	2913.0	2831.0	2845.3	2863.1	2576.8	2863.1	3149.4
Efficiency	0.160	0.156	0.156	0.157	0.142	0.157	0.173
					Instrument/ probe	☑ Pass	☐ Fail

☑ Unit is ready for field operation. Connect appropriate probe, detector setting and operation mode

☑ When finished, remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

- The L-180-2 used for this test not normally assigned to this case.

Name: D.Draper Date: 1/5/2017 Reviewer: _____ Date: _____

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Todays Date	170104	Cal Date	160726	Cal Due	170726	Shelf Loc	ERL 201-A
Temp F	69.8	Pressure "	29.07	Humidity%	30	Th Chk Src	☑ Yes ☐ No
Case No.	117	CERETS	ERT-007	2241-2 SN	198265	Test Loc	Warehouse
44-9 SN	PR325857	43-90 SN	PR310986	L180-2	CERETS ERT-626		SN 238158

Required: Battery tester, standard screwdriver, small standard screwdriver, Ludlum Mod 500-2 or 2200
Jigs: CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wear gloves, do not touch active source area with hands
NOTE: Other sources may be used, but the activities in dpm will need to be input in Step 9 where indicated.
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-2 or the **calibration is invalidated**

☑ **Step 1.** Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker on the side of the Ludlum 2241-2.
☑ **Step 2.** Verify Document Packet includes instrument manuals and calibration certificates
☑ **Step 3.** Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
☑ **Step 4.** Remove 2241-2 from case and inspect for any visible damage or unusual conditions. Install D cells.

☑ **Step 5.** Verify that Detector 1 integrate time is 30 seconds and Detector 2 is 60 seconds. To reset the integrate time, select Detector 1 setting and remove the electronics package from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to Scaler Count Time screen ("s" for seconds will be displayed on the screen). Adjust using LEFT and UP buttons to 30 seconds. ENTER. Reset rotary switch to zero. Turn unit OFF. Select Detector 2 by lifting and switching from Detector 1 on the instrument front panel. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to the Scaler Count Time screen. Adjust using LEFT and UP buttons to 60 seconds. ENTER. Reset 16 position rotary switch to zero. Turn unit OFF. Reconnect speaker and serial cables. Reinstall electronics package.

☑ **Step 6.** Connect 2241-2 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Record HV reading for Det 1 and Det 2. Verify High Voltage set at voltage stated on the Calibration Certificate Conversion Chart ±3v for Det 1 (44-9 probe, usually 900 volts) and Det 2 HV for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the appropriate HV POT. CHECK CAREFULLY- Only adjust HV! Note in Comments if adjustment is needed.

Det 1 Volts 903 Det 2 Volts 700

☑ **Step 7.** Check audio using the toggle switch. Audio ☑ Yes ☐ No
Check the light using red button. Light ☑ Yes ☐ No

COPY

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 1

☑ **Step 8.** Select Det 1 position setting. Attach GM pancake probe (44-9) to cable. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	88	Source cpm	8020	Bkg Scaler	51	Source Scaler	4092

☑ **Step 9.** Place the plated Th-230 QC Source on Shelf 1 of the L180-2 jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN 5301-04		18200 dpm		Tc-99 SN 5678-06		8400 dpm	
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading	441	428	417	377.7	549	550	518	488.0
Efficiency	0.021	0.021	0.020	0.021	0.119	0.119	0.111	0.116

☑ In Ratemeter mode, read the Tc-99 source on Shelf position 2. Repeat for the next three shelf positions.

Reading	Shelf 2	796	Shelf 3	564	Shelf 4	368	Shelf 5	137
Effic (c/d)		0.089		0.061		0.038		0.010

Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 2

☑ **Step 10.** Select Det 2. Attach 43-90 alpha probe. Turn instrument ON. Take background rate reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and source scaler readings.

Bkg cpm 0.93 Source cpm 582 Bkg Scaler 1 Source Scaler 693

☐ **Step 11.** Place plated Th-230 source in top slot of 43-90 jig and take three scaler readings. Move source to middle slot and take three scaler readings. Move source to bottom slot and take three scaler readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	**Trial 1**	**Trial 2**	**Trial 3**	**Average**	**43-90 Probe Summary**		
Top	2888	2861	2886	2878.0			
Middle	2781	2829	2825	2811.3			
Bottom	2890	2943	2899	2910.3	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	2852.0	2876.7	2869.0	2865.9	2579.3	2865.9	3152.5
Efficiency	0.157	0.158	0.158	0.157	0.142	0.157	0.173
					Instrument/ probe	☑ Pass	☐ Fail

☑ Unit is ready for field operation. Connect appropriate probe, detector setting and operation mode

☑ When finished, remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

- Check boxes in Step 11 not marked on original sheet, but a check of the form shows steps were completed
- The L-180-2 used for this test not normally assigned to this case.

Name: Keith Payne Date: 1/4/2017 Reviewer: D.Draper Date: 170105

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

1/7PM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	29DEC16	**Cal Date**	26JUL16	**Cal Due**	26JUL17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #		**2241-2 SN**	198265	**CERETS**	ERT- 037	**Th Src?**	Yes
44-9 SN		**43-90 SN**	PR 310986	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				8.93
Src Reading Rate				6665
Net Reading Rate	0	0		0
SCA Background				2
SCA Reading (counts)				757
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

NOT USED

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DK 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Name	29 DEC 16 Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

1/7Am

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	29DEC16	**Cal Date**	26JUL16	**Cal Due**	26JUL17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #		**2241-2 SN**	198265	**CERETS**	ERT-007	**Th Src?**	Yes
44-9 SN		**43-90 SN**	PR310986	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0
Src Reading Rate				862
Net Reading Rate	0	0		0
SCA Background				0
SCA Reading (counts)				695
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

NOT USED

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart~~ DK 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

DJKopek	29DEC 16		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

117 P3

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	28 DEC 16	**Cal Date**	26 JUL 16	**Cal Due**	26 JUL 17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #	117	**2241-2 SN**	198265	**CERETS**	ERT- 007	**Th Src?**	Yes
44-9 SN		**43-90 SN**	PR 310986	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				1.1
Src Reading Rate				461
Net Reading Rate	0	0		0
SCA Background				1
SCA Reading (counts)				386
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

Not Used

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DK 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

[illegible]	28 DEC 16		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

117AM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date 28 Dec 16	**Cal Date** 26 Mar 16	**Cal Due** 26 Mar 17		**DQL**	1, 2, 3
Temp F	**Pressure "**	**Humidity %**		**Shelf**	201-A
Case #	**2241-2 SN** 198245	**CERETS** ERT-067		**Th Src?**	Yes
44-9 SN	**43-90 SN** PR310986	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0
Src Reading Rate				505
Net Reading Rate	0	0		0
SCA Background				0
SCA Reading (counts)				485
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DJK 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

DJKingsbury	28 Dec 16		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☑ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

117 PM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	12/27/16	**Cal Date**	26-July-16	**Cal Due**	26 July 17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #	117	**2241-2 SN**	198265	**CERETS**	ERT-007	**Th Src?**	Yes
44-9 SN		**43-90 SN**	310936	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0
Src Reading Rate				396
Net Reading Rate	0	0		0
SCA Background				1
SCA Reading (counts)				435
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

Not used

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DJK 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

DJ Kuyper	27 DEC 2016		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

117 AM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date 12/27/16	**Cal Date**	**Cal Due**		**DQL**	1, 2, 3
Temp F	**Pressure "**	**Humidity %**		**Shelf**	201-A
Case # 117	**2241-2 SN** 198265	**CERETS**	ERT-007	**Th Src?**	Yes
44-9 SN	**43-90 SN** 310956	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0.7
Src Reading Rate				556
Net Reading Rate	0	0		0
SCA Background				3
SCA Reading (counts)				637
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

Not used

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DK 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

[illegible]	27 Dec 16		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	16-12-21	**Cal Date**	16-7-26	**Cal Due**	17-7-26	**DQL**	1, 2, 3
Temp F	69.8	**Pressure "**	29.28	**Humidity %**	19	**Shelf**	201-A
Case #	117	**2241-2 SN**	198265	**CERETS**	ERT-007	**Th Src?**	Yes
44-9 SN	PR325857	**43-90 SN**	PR310986	**180-2 SN**		**180-2 CERETS**	

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate	36.0	18.2		3.51
Src Reading Rate	256	7850		1080
Net Reading Rate	0	0		0
SCA Background	14	30		1
SCA Reading (counts)	~~243~~ 139	472	3844	902
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Keith Payne	16-12-21		
Name (Keith Payne)	Date	Verified by (D.Draper)	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

COPY

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	2016/11/20	Cal Date	2016/07/26	Cal Due	2017/07/26	DQL	1, 2, 3
Temp F	69.6	Pressure "	29.62	Humidity %	24	Shelf	201-A
Case #	117	2241-2 SN	198265	CERETS	ERT-007	Th Src?	Yes
44-9 SN	PR325857	43-90 SN	PR310986	180-2 SN		180-2 CERETS	

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings				
	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate	55.7	29.7		0.0
Src Reading Rate	303	7100		1180
Net Reading Rate	247.3	7070.3		1180
SCA Background	15	23		1
SCA Reading (counts)	145	4049		1040
SCA Net Reading (cpm)	260	8052		1039
SCA Time (seconds)	30	30		60

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

	20-Nov-16		2-Dec-2016
Name (Keith Payne)	Date	Verified by (D.Draper)	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date 16-10-17	Cal Date 16-7-26	Cal Due 17-7-26	DQL 1, 2, 3
Temp F 73.2	Pressure " 29.03	Humidity % 62	Shelf 201-A
2241-2 SN 198265	CERETS ERT-007	Case # 117	Th Src? Yes
44-9 SN 325857	43-90 SN 310986	180-2 SN —	180-2 CERETS ERT- —

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present.
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings				
	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate	44.5	41.7		~~325~~ 3.25
Src Reading Rate	297	8420		2060
Net Reading Rate	0	0		0
SCA Background	23	21		3
SCA Reading (counts)	148	4034		818
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Ken Payne	16-10-17	D Draper	27 Oct 2016
Name (Keith Payne)	Date	Verified by (D Draper)	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

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Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at ±10% and the other at ±20% of the average reading. The acceptability of the instrument/probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average consult with the Radiological POC.

If the last 6 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass

Comments: Problems noted

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Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street, 325-235-5494, Sweetwater, TX 79556, U.S.A.
10744 Dutchtown Road, 865-392-4601, Knoxville, TN 37932, U.S.A.

CUSTOMER TETRA TECH EMI — ORDER NO. 20293219/437915

Mfg. Ludlum Measurements, Inc. Model 2241-2 Serial No. 198271

Mfg Ludlum Measurements, Inc. Model 44-9 Serial No. PR325858

Cal. Date 26-Jul-16 Cal Due Date 26-Jul-17 Cal. Interval 1 Year Meterface digital

Check mark ✓ applies to applicable instr. and/or detector IAW mfg. spec. T 73 °F RH 48 % Alt 692.0 mm Hg

☐ New Instrument ☐ Instrument Received ✓ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ✓ Requiring Repair ☐ Other-See comments

✓ Mechanical ck. ☐ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
✓ F/S Resp. ck ☐ Reset ck. ☐ Window Operation
✓ Audio ck. ✓ Alarm Setting ck. ✓ Batt. ck. (Min. Volt) 2.2 VDC
✓ Calibrated in accordance with LMI SOP 14.8 ☐ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. Comments mV Det. Oper. Comments V at Comments mV Threshold Dial Ratio = mV

COMMENTS:

	Det.1(cpm)	Det.2(cpm)
Deadtime:	0uSec	0µSec
Cal Cons:	100e-2	100e-2
Alarm:	500kcpm	500kcpm
Alert:	200kcpm	200kcpm
HV:	900v	800v
Sens:	35mv	35mv
Probe:	44-9	43.90

Firmware: P-06-13
OL checked but not set
'Ratemete calibration' achieved with no deadtime.

See attachment for efficiencies

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
Dig.rate			
Dig.rate			

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*Uncertainty within ± 10% C.F. within ± 20%

Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Ratemeter Readout	800K cpm	799 Kcpm	799 Kcpm	Scaler Readout	800K cpm	79962(0)	79962(0)
	200K cpm	199	199		200K cpm	19954	19954
	80K cpm	79	79		80K cpm	7996	7996
	20K cpm	19.9	19.9		20K cpm	1996	1996
	8K cpm	7.9	7.9		8K cpm	799	799
	2K cpm	1.99	1.99		2K cpm	199	199
	800 cpm	800 cpm	800 cpm		800 cpm	80	80
	200 cpm	200	200		200 cpm	20	20

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 2324/2521
☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☐ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982

✓ Alpha S/N Th230 SN:E121495 ☐ Beta S/N ☐ Other

✓ m 500 S/N 190566 ☐ Oscilloscope S/N ✓ Multimeter S/N 86250390

Calibrator [signature] Title Calibrator Date 26-July-16

QC'd By [signature] Title QC Date 27 Jul 16

Attachment for Efficiencies

(All Efficiencies taken with 2241-2 SN:198271)

43-90 SN: PR310989

Th230 SN: E121495, Size: 19800dpm, Background: 1cpm, Counts: 4168cpm, 4pi Eff:21.04%
Th230 SN: E121495, Size: 10100cpm, Background: 1cpm, Counts: 4168cpm, 2pi Eff:41.25%
Pu239 SN: 7053, Size: 24900dpm, Background: 1cpm, Counts: 5525cpm, 4pi Eff:22.18%
Pu239 SN: 7053, Size: 12600cpm, Background: 1cpm, Counts: 5525cpm, 2pi Eff:43.84%

44-9 SN: PR325858

Tc99 SN: 5280, Size: 93200dpm, Background: 52cpm, Counts: 19327cpm, 4pi Eff: 20.68%
SrY90 SN: 5281, Size: 89386dpm, Background: 52cpm, Counts: 31619cpm, 4pi Eff: 35.31%
Cl36 SN: 1075-78-1, Size:22028dpm, Background: 52cpm, Counts: 7710cpm, 4pi Eff: 34.76%
C14 SN: 1476, Size: 229767dpm, Background: 52cpm, Counts: 8543cpm, 4pi Eff: 3.69%
Cs137 SN: 1075-78-2, Size:16892dpm, Background:52cpm,Counts:4464cpm, 4pi Eff: 26.11%

(Tc99 SN:4186 is larger than active area of 44-9 per customer request)
Tc99 SN: 4186, Size: 7492dpm, Background: 52cpm, Counts: 164cpm, 2pi Eff:1.49%

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer: TETRA TECH EMI Date: 26-Jul-16 Order #: 20293219/437915

Model: 2241-2 Serial No.: 198271 Detector Model: 44-9 Serial No.: PR325555

Source: Cs 137, 54mCi 4mCi High Voltage: 900 V

Input Sensitivity: 35 mV

Reference Point	"As Found" Readings (CPM): Meter Reading	Range/Scale	After Adjustment Readings (CPM): Meter Reading	Range/Scale
150 mR/hr	304K	Digital	304K	Digital
50 mR/hr	135		135	
15 mR/hr	48.8		48.8	
5 mR/hr	16.2		16.2	
1.5 mR/hr	4.86		4.86	
1.0 mR/hr	3.16		3.16	

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Signature: [signature] Date: 26-July-16

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

Bench Test Data For Alpha Detector

Detector 43-90 Serial No. PR310989

Customer TETRA TECH EMI Order #. 20293219/437915

Counter 2241-2 Serial No. 198271 Counter Input Sensitivity 35 mV

Count Time 1 min. Distance Source to Detector Surface

Isotope Th230 SN:E121495 19800dpm Other

43-4/43-44 HV Adjust for Altitude

Altitude	High Voltage
Sea Level	2050 V
1000 foot	2025 V
2000 foot	2000 V
3000 foot	1975 V
4000 foot	1950 V
5000 foot	1925 V
6000 foot	1900 V
7000 foot	1875 V

Alpha Scintillation Detector

HV Plateau	Background	Source Count
700	0	3652
750	1	4080
800	1	4168
850	3	4173
900	8	4212

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Operating Voltage Set at 800 V

Air Proportional	43-5	43-65	43-90	Background	Meter Reading	Range/Scale
Toe	Toe	L/S*	Toe	1	4007	1 min
Center	Center	Center	Center	1	4168	5
Heel	Heel	Other**	Heel	1	4048	

~~Uniformity~~ (± 10%) Average Efficiency 20.57 % (4π)

* Least Sensitive Position (Heel of Detector)
** Opposite Least Sensitive Position (Top of Detector)

Signature [signature] Date 26-July-10

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Todays Date	170105	**Cal Date**	160726	**Cal Due**	170726	**Shelf Loc**	ERL 201-A
Temp F		**Pressure "**		**Humidity%**		**Th Chk Src**	☑ Yes ☐ No
Case No.	118	**CERETS**	ERT-008	**2241-2 SN**	198271	**Test Loc**	Warehouse
44-9 SN	PR325858	**43-90 SN**	PR310989	**L180-2**	**CERETS** ERT-626		**SN** 238158

Required: Battery tester, standard screwdriver, small standard screwdriver, Ludlum Mod 500-2 or 2200
Jigs: CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wear gloves, do not touch active source area with hands
NOTE: Other sources may be used, but the activities in dpm will need to be input in Step 9 where indicated.
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-2 or the **calibration is invalidated**

☐ **Step 1.** Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker on the side of the Ludlum 2241-2.

☐ **Step 2.** Verify Document Packet includes instrument manuals and calibration certificates

☐ **Step 3.** Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present

☐ **Step 4.** Remove 2241-2 from case and inspect for any visible damage or unusual conditions. Install D cells.

☐ **Step 5.** Verify that Detector 1 integrate time is 30 seconds and Detector 2 is 60 seconds. To reset the integrate time, select Detector 1 setting and remove the electronics package from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to Scaler Count Time screen ("s" for seconds will be displayed on the screen). Adjust using LEFT and UP buttons to 30 seconds. ENTER. Reset rotary switch to zero. Turn unit OFF. Select Detector 2 by lifting and switching from Detector 1 on the instrument front panel. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to the Scaler Count Time screen. Adjust using LEFT and UP buttons to 60 seconds. ENTER. Reset 16 position rotary switch to zero. Turn unit OFF. Reconnect speaker and serial cables. Reinstall electronics package.

☐ **Step 6.** Connect 2241-2 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Record HV reading for Det 1 and Det 2. Verify High Voltage set at voltage stated on the Calibration Certificate Conversion Chart ±3v for Det 1 (44-9 probe, usually 900 volts) and Det 2 HV for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the appropriate HV POT. CHECK CAREFULLY- Only adjust HV! Note in Comments if adjustment is needed.

Det 1 Volts _____ Det 2 Volts _____

☐ **Step 7.** Check audio using the toggle switch. Audio ☐ Yes ☐ No
Check the light using red button. Light ☐ Yes ☐ No

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 1

☐ **Step 8.** Select Det 1 position setting. Attach GM pancake probe (44-9) to cable. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	Source cpm	Bkg Scaler	Source Scaler

☐ **Step 9.** Place the plated Th-230 QC Source on Shelf 1 of the L180-2 jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN 5301-04		18200 dpm		Tc-99 SN 5678-06		8400 dpm	
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading				0.0				0.0
Efficiency	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

☐ In Ratemeter mode, read the Tc-99 source on Shelf position 2. Repeat for the next three shelf positions.

Reading	Shelf 2		Shelf 3		Shelf 4		Shelf 5	
Effic (c/d)		0.000		0.000		0.000		0.000

Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 2

☑ **Step 10.** Select Det 2. Attach 43-90 alpha probe. Turn instrument ON. Take background rate reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and source scaler readings.

Bkg cpm _____ Source cpm _____ Bkg Scaler 0 Source Scaler _____

☑ **Step 11.** Place plated Th-230 source in top slot of 43-90 jig and take three scaler readings. Move source to middle slot and take three scaler readings. Move source to bottom slot and take three scaler readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	**Trial 1**	**Trial 2**	**Trial 3**	**Average**	**43-90 Probe Summary**		
Top	2126	2086	1999	2070.3			
Middle	2518	2479	2518	2505.0			
Bottom	2639	2565	2530	2578.0	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	2427.7	2376.7	2349.0	2384.4	2146.0	2384.4	2622.9
Efficiency	0.133	0.131	0.129	0.131	0.118	0.131	0.144
					Instrument/ probe	☐ Pass	☑ Fail

☐ Unit is ready for field operation. Connect appropriate probe, detector setting and operation mode

☐ When finished, remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

Note: The feet were replaced on the 43-90 probe and the efficiency rechecked. Time of test ~11:16.

- Alpha probe failed in top slot too low. One of the trials in Bot slot was too high although average passed.
- The L-180-2 used for this test not normally assigned to this case.

Name: D. Draper Date: 1/5/2017 Reviewer: _____ Date: _____

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Todays Date	170105	**Cal Date**	160726	**Cal Due**	170726	**Shelf Loc**	ERL 201-A
Temp F		**Pressure "**		**Humidity%**		**Th Chk Src**	☑ Yes ☐ No
Case No.	118	**CERETS**	ERT-008	**2241-2 SN**	198271	**Test Loc**	Warehouse
44-9 SN	PR325858	**43-90 SN**	PR310989	**L180-2**	**CERETS** ERT-626		**SN** 238158

Required: Battery tester, standard screwdriver, small standard screwdriver, Ludlum Mod 500-2 or 2200
Jigs: CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wear gloves, do not touch active source area with hands
NOTE: Other sources may be used, but the activities in dpm will need to be input in Step 9 where indicated.
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-2 or the **calibration is invalidated**

☐ **Step 1.** Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker on the side of the Ludlum 2241-2.

☐ **Step 2.** Verify Document Packet includes instrument manuals and calibration certificates

☐ **Step 3.** Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present

☐ **Step 4.** Remove 2241-2 from case and inspect for any visible damage or unusual conditions. Install D cells.

☐ **Step 5.** Verify that Detector 1 integrate time is 30 seconds and Detector 2 is 60 seconds. To reset the integrate time, select Detector 1 setting and remove the electronics package from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to Scaler Count Time screen ("s" for seconds will be displayed on the screen). Adjust using LEFT and UP buttons to 30 seconds. ENTER. Reset rotary switch to zero. Turn unit OFF. Select Detector 2 by lifting and switching from Detector 1 on the instrument front panel. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to the Scaler Count Time screen. Adjust using LEFT and UP buttons to 60 seconds. ENTER. Reset 16 position rotary switch to zero. Turn unit OFF. Reconnect speaker and serial cables. Reinstall electronics package.

☐ **Step 6.** Connect 2241-2 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Record HV reading for Det 1 and Det 2. Verify High Voltage set at voltage stated on the Calibration Certificate Conversion Chart ±3v for Det 1 (44-9 probe, usually 900 volts) and Det 2 HV for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the appropriate HV POT. CHECK CAREFULLY- Only adjust HV! Note in Comments if adjustment is needed.

Det 1 Volts _____ Det 2 Volts _____

☐ **Step 7.** Check audio using the toggle switch. Audio ☐ Yes ☐ No
Check the light using red button. Light ☐ Yes ☐ No

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 1

☐ **Step 8.** Select Det 1 position setting. Attach GM pancake probe (44-9) to cable. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	Source cpm	Bkg Scaler	Source Scaler

☐ **Step 9.** Place the plated Th-230 QC Source on Shelf 1 of the L180-2 jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN 5301-04		18200 dpm		Tc-99 SN 5678-06		8400 dpm	
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading				0.0				0.0
Efficiency	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

☐ In Ratemeter mode, read the Tc-99 source on Shelf position 2. Repeat for the next three shelf positions.

Reading	Shelf 2	Shelf 3	Shelf 4	Shelf 5
Effic (c/d)	0.000	0.000	0.000	0.000

Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 2

☑ **Step 10.** Select Det 2. Attach 43-90 alpha probe. Turn instrument ON. Take background rate reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and source scaler readings.

Bkg cpm _____ Source cpm _____ Bkg Scaler 0 Source Scaler _____

☑ **Step 11.** Place plated Th-230 source in top slot of 43-90 jig and take three scaler readings. Move source to middle slot and take three scaler readings. Move source to bottom slot and take three scaler readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	**Trial 1**	**Trial 2**	**Trial 3**	**Average**	**43-90 Probe Summary**		
Top	2669	2752	2677	2699.3			
Middle	3152	3130	3118	3133.3			
Bottom	3174	3308	3334	3272.0	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	2998.3	3063.3	3043.0	3034.9	2731.4	3034.9	3338.4
Efficiency	0.165	0.168	0.167	0.167	0.150	0.167	0.183
					Instrument/ probe ☐ Pass ☑ Fail		

☐ Unit is ready for field operation. Connect appropriate probe, detector setting and operation mode

☐ When finished, remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

Note: The feet were removed from the 43-90 probe and the efficiency rechecked. Time of test ~11:03.

- Alpha probe failed in top slot too low.
- The L-180-2 used for this test not normally assigned to this case.

Name: D. Draper Date: 1/5/2017 Reviewer: _____ Date: _____

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Todays Date	170105	**Cal Date**	160726	**Cal Due**	170726	**Shelf Loc**	ERL 201-A
Temp F	69.8	**Pressure "**	29.08	**Humidity%**	20	**Th Chk Src**	☑ Yes ☐ No
Case No.	118	**CERETS**	ERT-008	**2241-2 SN**	198271	**Test Loc**	Warehouse
44-9 SN	PR325858	**43-90 SN**	PR310989	**L180-2**	**CERETS** ERT-626		**SN** 238158

Required: Battery tester, standard screwdriver, small standard screwdriver, Ludlum Mod 500-2 or 2200
Jigs: CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wear gloves, do not touch active source area with hands
NOTE: Other sources may be used, but the activities in dpm will need to be input in Step 9 where indicated.
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-2 or the **calibration is invalidated**

☑ **Step 1.** Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker on the side of the Ludlum 2241-2.

☑ **Step 2.** Verify Document Packet includes instrument manuals and calibration certificates

☑ **Step 3.** Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present

☑ **Step 4.** Remove 2241-2 from case and inspect for any visible damage or unusual conditions. Install D cells.

☑ **Step 5.** Verify that Detector 1 integrate time is 30 seconds and Detector 2 is 60 seconds. To reset the integrate time, select Detector 1 setting and remove the electronics package from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to Scaler Count Time screen ("s" for seconds will be displayed on the screen). Adjust using LEFT and UP buttons to 30 seconds. ENTER. Reset rotary switch to zero. Turn unit OFF. Select Detector 2 by lifting and switching from Detector 1 on the instrument front panel. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to the Scaler Count Time screen. Adjust using LEFT and UP buttons to 60 seconds. ENTER. Reset 16 position rotary switch to zero. Turn unit OFF. Reconnect speaker and serial cables. Reinstall electronics package.

☑ **Step 6.** Connect 2241-2 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Record HV reading for Det 1 and Det 2. Verify High Voltage set at voltage stated on the Calibration Certificate Conversion Chart ±3v for Det 1 (44-9 probe, usually 900 volts) and Det 2 HV for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the appropriate HV POT. CHECK CAREFULLY- Only adjust HV! Note in Comments if adjustment is needed.

Det 1 Volts 901 Det 2 Volts 700

☑ **Step 7.** Check audio using the toggle switch. Audio ☑ Yes ☐ No
Check the light using red button. Light ☑ Yes ☐ No

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 1

☑ **Step 8.** Select Det 1 position setting. Attach GM pancake probe (44-9) to cable. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	30.4	Source cpm	7470	Bkg Scaler	20	Source Scaler	3672

☑ **Step 9.** Place the plated Th-230 QC Source on Shelf 1 of the L180-2 jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN 5301-04		18200	dpm	Tc-99 SN 5678-06		8400	dpm
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading	339	374	391	348.0	570	535	516	520.3
Efficiency	0.018	0.019	0.020	0.019	0.131	0.123	0.118	0.124

☑ In Ratemeter mode, read the Tc-99 source on Shelf position 2. Repeat for the next three shelf positions.

Reading	Shelf 2	950	Shelf 3	660	Shelf 4	301	Shelf 5	105
Effic (c/d)		0.111		0.076		0.033		0.010

Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 2

☑ **Step 10.** Select Det 2. Attach 43-90 alpha probe. Turn instrument ON. Take background rate reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and source scaler readings.

Bkg cpm	0	Source cpm	479	Bkg Scaler	1	Source Scaler	512

☑ **Step 11.** Place plated Th-230 source in top slot of 43-90 jig and take three scaler readings. Move source to middle slot and take three scaler readings. Move source to bottom slot and take three scaler readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	**Trial 1**	**Trial 2**	**Trial 3**	**Average**			
Top	2040	2045	1980	2021.3	**43-90 Probe Summary**		
Middle	2459	2535	2470	2487.7			
Bottom	2570	2685	2638	2630.7	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	2355.3	2420.7	2361.7	2379.2	2141.3	2379.2	2617.1
Efficiency	0.129	0.133	0.130	0.131	0.118	0.131	0.144
					Instrument/ probe ☐ Pass ☑ Fail		

☐ Unit is ready for field operation. Connect appropriate probe, detector setting and operation mode

☐ When finished, remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

Note: 43-90 probe was returned from the field with feet on probe that lifted the probe ~1/4 inch.

- Alpha probe failed in top slot too low and bottom slot too high. This is a recheck from 170104, still fails.
- The L-180-2 used for this test not normally assigned to this case.

The 43-90 test was performed ~09:55 hrs

Name: D.Draper Date: 1/5/2017 Reviewer: _____ Date: _____

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Todays Date	170104	**Cal Date**	160726	**Cal Due**	170726	**Shelf Loc**	ERL 201-A
Temp F	70	**Pressure "**	29.05	**Humidity%**	29	**Th Chk Src**	☑ Yes ☐ No
Case No.	118	**CERETS**	ERT-008	**2241-2 SN**	198271	**Test Loc**	Warehouse
44-9 SN	PR325858	**43-90 SN**	PR310989	**L180-2**	**CERETS** ERT-626		**SN** 238158

Required: Battery tester, standard screwdriver, small standard screwdriver, Ludlum Mod 500-2 or 2200
Jigs: CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wear gloves, do not touch active source area with hands
NOTE: Other sources may be used, but the activities in dpm will need to be input in Step 9 where indicated.
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-2 or the **calibration is invalidated**

☑ **Step 1.** Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker on the side of the Ludlum 2241-2.

☑ **Step 2.** Verify Document Packet includes instrument manuals and calibration certificates

☑ **Step 3.** Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present

☑ **Step 4.** Remove 2241-2 from case and inspect for any visible damage or unusual conditions. Install D cells.

☑ **Step 5.** Verify that Detector 1 integrate time is 30 seconds and Detector 2 is 60 seconds. To reset the integrate time, select Detector 1 setting and remove the electronics package from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to Scaler Count Time screen ("s" for seconds will be displayed on the screen). Adjust using LEFT and UP buttons to 30 seconds. ENTER. Reset rotary switch to zero. Turn unit OFF. Select Detector 2 by lifting and switching from Detector 1 on the instrument front panel. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn unit ON, press ENTER, then ENTER to the Scaler Count Time screen. Adjust using LEFT and UP buttons to 60 seconds. ENTER. Reset 16 position rotary switch to zero. Turn unit OFF. Reconnect speaker and serial cables. Reinstall electronics package.

☑ **Step 6.** Connect 2241-2 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Record HV reading for Det 1 and Det 2. Verify High Voltage set at voltage stated on the Calibration Certificate Conversion Chart ±3v for Det 1 (44-9 probe, usually 900 volts) and Det 2 HV for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the appropriate HV POT. CHECK CAREFULLY- Only adjust HV! Note in Comments if adjustment is needed.

Det 1 Volts 900 Det 2 Volts 701

☑ **Step 7.** Check audio using the toggle switch. Audio ☑ Yes ☐ No
Check the light using red button. Light ☑ Yes ☐ No

COPY

Cincinnati ERT Contamination Monitoring Kit Efficiency Check (Cases 111- 120)

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 1

☑ **Step 8.** Select Det 1 position setting. Attach GM pancake probe (44-9) to cable. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	32.5	Source cpm	7070	Bkg Scaler	16	Source Scaler	3730

☑ **Step 9.** Place the plated Th-230 QC Source on Shelf 1 of the L180-2 jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN 5301-04		18200 dpm		Tc-99 SN 5678-06		8400 dpm	
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading	385	376	353	355.3	531	517	524	508.0
Efficiency	0.020	0.020	0.019	0.020	0.123	0.119	0.121	0.121

☑ In Ratemeter mode, read the Tc-99 source on Shelf position 2. Repeat for the next three shelf positions.

Reading	Shelf 2	900	Shelf 3	610	Shelf 4	298	Shelf 5	143
Effic (c/d)		0.105		0.071		0.034		0.015

Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 2

☑ **Step 10.** Select Det 2. Attach 43-90 alpha probe. Turn instrument ON. Take background rate reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and source scaler readings.

Bkg cpm	0	Source cpm	578	Bkg Scaler	0	Source Scaler	459

☐ **Step 11.** Place plated Th-230 source in top slot of 43-90 jig and take three scaler readings. Move source to middle slot and take three scaler readings. Move source to bottom slot and take three scaler readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	Trial 1	Trial 2	Trial 3	Average	43-90 Probe Summary		
Top	2014	1997	2127	2046.0			
Middle	2495	2521	2481	2499.0			
Bottom	2699	2590	2631	2640.0	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	2402.7	2369.3	2413.0	2395.0	2155.5	2395.0	2634.5
Efficiency	0.132	0.130	0.133	0.132	0.118	0.132	0.145
					Instrument/ probe	☐ Pass	☑ Fail

☐ Unit is ready for field operation. Connect appropriate probe, detector setting and operation mode

☐ When finished, remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

- Check boxes in Step 11 not marked on original sheet, but a check of the case shows steps were completed
- Alpha probe failed in top slot too low and bottom slot too high. This indicates the alpha probe may not have been seated correctly on the source jig. Will recheck today.
- The L-180-2 used for this test not normally assigned to this case.

Name: Keith Payne Date: 1/4/2017 Reviewer: D.Draper Date: 170105

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

118 PM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	29DEC16	Cal Date	26JUL16	Cal Due	26JUL17	DQL	1, 2, 3
Temp F		Pressure "		Humidity %		Shelf	201-A
Case #	118	2241-2 SN	198271	CERETS	ERT- 008	Th Src?	Yes
44-9 SN		43-90 SN	PR36989	180-2 SN		180-2 CERETS	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				D
Src Reading Rate				359
Net Reading Rate	0	0		0
SCA Background				1
SCA Reading (counts)				387
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

NOT USED

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DK 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Name	29DEC2016 Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

118AM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	29DEC16	**Cal Date**	26JUL16	**Cal Due**	26JUL17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #	118	**2241-2 SN**	198271	**CERETS**	ERT-008	**Th Src?**	Yes
44-9 SN		**43-90 SN**	PR310989	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0
Src Reading Rate				505
Net Reading Rate	0	0		0
SCA Background				0
SCA Reading (counts)				617
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

NOT USED

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DJC 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

D Kapel	29 DEC 16		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

118PM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	28DEC16	**Cal Date**	26JUL16	**Cal Due**	26JUL17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #		**2241-2 SN**	148271	**CERETS**	ERT-008	**Th Src?**	Yes
44-9 SN		**43-90 SN**	PR310489	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0.93
Src Reading Rate				481
Net Reading Rate	0	0		0
SCA Background				
SCA Reading (counts)				563
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

NOT USED

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DJC 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Name	28DEC2016 Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

118 Am

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	28 DEC 16	**Cal Date**	26 JUL 16	**Cal Due**	26 JUL 17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #	118	**2241-2 SN**	198271	**CERETS**	ERT- 008	**Th Src?**	Yes
44-9 SN		**43-90 SN**	PR 310989	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings				
	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0
Src Reading Rate				3.75
Net Reading Rate	0	0		0
				0
SCA Background				0
SCA Reading (counts)				438
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

NOT USED

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart.~~ DJC 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

DJCrapo	28 DEC 16		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

118PM

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	27 DEC 16	**Cal Date**	26 JUL 16	**Cal Due**	26 JUL 17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #	118	**2241-2 SN**	198271	**CERETS**	ERT-008	**Th Src?**	Yes
44-9 SN		**43-90 SN**	310989	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0
Src Reading Rate				569
Net Reading Rate	0	0		0
SCA Background				0
SCA Reading (counts)				452
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

Not used

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart~~ 27 DEC 16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Name	27 Dec 16 Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

118 Ans

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	27DEC16	**Cal Date**	26JUL16	**Cal Due**	26JUL17	**DQL**	1, 2, 3
Temp F		**Pressure "**		**Humidity %**		**Shelf**	201-A
Case #	118	**2241-2 SN**	198271	**CERETS**	ERT- 008	**Th Src?**	Yes
44-9 SN		**43-90 SN**	310989	**180-2 SN**		**180-2 CERETS**	ERT-

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

DET 2

Table 1. Response Kit Instrument Readings				
	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate				0
Src Reading Rate				295
Net Reading Rate	0	0		0
SCA Background				0
SCA Reading (counts)				297
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

NOT USED

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. ~~Record Net Reading rate on the 43-90 Control Chart~~. DJC 12/29/16
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

D J Appel	27DEC2016		
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	12/21/2016	Cal Date	7/26/2016	Cal Due	7/26/2017	DQL	1, 2, 3
Temp F	69.8	Pressure "	29.28	Humidity %	19	Shelf	201-A
Case #	118	2241-2 SN	198271	CERETS	ERT-008	Th Src?	Yes
44-9 SN	PR325858	43-90 SN	PR310989	180-2 SN	NA	180-2 CERETS	NA

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate	25.7	35.1		0.0
Src Reading Rate	37	3610		592
Net Reading Rate	11.3	3574.9		592
SCA Background	23	18		0
SCA Reading (counts)	15	7790		684
SCA Net Reading	-16	15544		684
SCA Time (seconds)	30	30		60

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Name (Keith Payne)	21-Dec-16	Verified by (D.Draper)	5-Jan-2017
	Date		Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date	2016/11/20	Cal Date	2016/07/26	Cal Due	2017/07/26	DQL	1, 2, 3
Temp F	69.6	Pressure "	29.62	Humidity %	24	Shelf	201-A
Case #	118	2241-2 SN	198271	CERETS	ERT-008	Th Src?	Yes
44-9 SN	PR325858	43-90 SN	PR310989	180-2 SN	NA	180-2 CERETS	

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
5. Remove 2241-2 from the case and inspect for any visible damage or unusual conditions. Select Audio OFF and F/S to F. Attach Type C cable to 2241-2. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-9 (cpm)		43-90 (cpm)
	Cover On	Cover Off	Cover Off
Th Source Door	Closed	Open	Open
Background Rate	38.6	51.3	0.0
Src Reading Rate	235	6940	629
Net Reading Rate	196.4	6888.7	629
SCA Background	17	23	0
SCA Reading (counts)	137	3620	564
SCA Net Reading (cpm)	240	7194	564
SCA Time (seconds)	30	30	60

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm). Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Name (Keith Payne)	20-Nov-16	Verified by (D Draper)	2-Dec-2016
	Date		Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Date 16-10-17	Cal Date 16-7-26	Cal Due 17-7-26	DQL	1, 2, 3
Temp F 73.2	Pressure " 29.03	Humidity % 62	Shelf	201-A
2241-2 SN 198271	CERETS ERT-008	Case # 118	Th Src?	Yes
44-9 SN 325858	43-90 SN 310989	180-2 SN —	180-2 CERETS ERT- —	

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Tests can be omitted for probes that will not be used in the field.

Step Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section.

1. Open case and verify contents with serial numbers posted on the outside of the case and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
2. Verify Document Packet includes instrument manuals and calibration certificates.
3. Annotate if Control Charts (Ratemeter mode) are present for the 44-9 and 43-90 probes.
4. Verify that a type C (type C cable (serial cord), extra batteries and carrying strap are present.
5. Remove 2241-2 from the case and inspect for any outside damage or unusual conditions. Select Audio OFF and F S to F. Attach Type C cable to 2241-2. Move Selection to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings				
	44-9 (cpm)			43-90 (cpm)
	Cover On	Cover Off		Cover Off
Th Source Door	Closed	Open		Open
Background Rate	48.2	34.2		0.00
Src Reading Rate	238	17100		1030
Net Reading Rate	0	0		0
SCA Background	36	32		0
SCA Reading (counts)	274	7297		1023
SCA Net Reading	0	0		0
SCA Time (seconds)	30	30		60

6. Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3.
7. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3-4 cpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.
8. Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.
9. Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 2. After ~30 seconds record background reading (cpm in Table 1 should be ~0 cpm). Take reading on instrument check source (~ 800-600 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.
10. Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.
11. Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-2 in case.

Keith Payne	Keith P 16-10-17	DRAPER	27 Oct 2016
Name (Keith Payne)	Date	Verified by (D Draper)	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

COPY

Cincinnati ERT Contamination Monitoring Kit Pre-Operational Check (Cases 111-120)

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit probe combination does not pass the following criteria notify the Radiologic POD BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control values, one at +[illegible] and the other at -[illegible] of the average reading. The acceptability of the instrument probe performance is based on current probe performance compared to these control values.

If the readings are within the ±[illegible] control limits the probe is acceptable.

If the readings are between ±[illegible] and ±[illegible] standard deviations of the readings (these are ±[illegible] of the limits) the probe is still acceptable. If the reading is outside the ±[illegible] limits or between ±[illegible] and ±[illegible] consult with the Radiologic POD.

If a reading is more than ±[illegible] the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average consult with the Radiologic POD.

If the last 5 readings have been greater or less than the average the unit does not pass.

If the last 7 readings have been increasing or decreasing the unit does not pass.

The Unit and its counting probes PASS ☐ Yes ☐ No
Annotate in comments any probe combination that does NOT Pass

Comments: Problems noted

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Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street, 325-235-5494, Sweetwater, TX 79556, U.S.A.
☐ 10744 Dutchtown Road, 865-392-4601, Knoxville, TN 37932, U.S.A.

CUSTOMER TETRA TECH EMI — ORDER NO. 20291557/436839

Mfg. Ludlum Measurements, Inc. Model 2241-3 Serial No. 246576

Mfg. Ludlum Measurements, Inc. Model 44-10 Serial No. PR201042

Cal. Date 20-Jun-16 Cal Due Date 20-Jun-17 Cal. Interval 1 Year Meterface 44-10/44-1

Check mark ✓ applies to applicable instr. and/or detector IAW mfg. spec. T 73 °F RH 45 % Alt 710.0 mm Hg

☐ New Instrument Instrument Received ✓ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

✓ Mechanical ck. ☐ Meter Zeroed ☐ Background Subtract ✓ Input Sens. Linearity
✓ F/S Resp. ck ✓ Reset ck. ☐ Window Operation
✓ Audio ck. ✓ Alarm Setting ck. ✓ Batt. ck. (Min. Volt) 2.2 VDC
✓ Calibrated in accordance with LMI SOP 14.8 ✓ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. 35 mV Det. Oper. Comments V at 35 mV Threshold Dial Ratio = mV

COMMENTS:

	Det 1.	Det 2.	Det 3.	Det 4. Firmware: P 10 12
Deadtime:	9 µSec	95 µSec	67 µSec	0 µSec
Cal Constant:	554 08	720 05	100 -2	100 -2
Alarm:	50 µR/hr	5 mR/hr	50 kC/m	50 kC/m
Alert:	20 µR/hr	2 mR/hr	20 kC/m	20 kC/m
High Voltage:	1500 V	900 V	900 V	600 V
Detector:	44-10	44-6	44-9	43-90

Pulser calibration "RATEMETER READOUT" performed without dead time.
See attachment for Effs.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
Digital	2.0mR/hr	1.97 mR/hr	1.97 mR/hr
Digital	1.5mR/hr	1.48	1.48
	1.0mR/hr	1.00	1.00
	500µR/hr	508 µR/hr	508 µR/hr
	200µR/hr	208	208
	150µR/hr	151	151
	100µR/hr	104	104

CUT

*Uncertainty within ± 10% C.F. within ± 20%

Range(s) Calibrated Electronically

Ratemeter Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	800K cpm	800K cpm	800K cpm
	200K cpm	200	200
	80K cpm	80	80
	20K cpm	20	20
	8K cpm	8	8
	2K cpm	2	2
	800 cpm	800	800
	200 cpm	200	200

Scaler Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	800K cpm	79958 (10)	79958 (10)
	200K cpm	19984	19984
	80K cpm	7995	7995
	20K cpm	1995	1995
	8K cpm	800	800
	2K cpm	200	200
	800 cpm	80	80
	200 cpm	20	20

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 2324/2521 ☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ✓ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982

✓ Alpha S/N Th230:E121495>19,800dpm ☐ Beta S/N ☐ Other

✓ m 500 S/N 289158 ☐ Oscilloscope S/N ✓ Multimeter S/N 93870637

Calibrated By: Jeremy Thompson Date 20-Jun-16

Reviewed By: Ronald H. Date 21 Jun 16

Attachment for Efficiencies

(Efficiencies taken with 2241-3 SN:286586)

43-90 SN: PR238786

Th230 SN: E121495, Size: 19,800dpm, Background:3cpm, Counts:3977cpm, 4pi Eff:20.07%

Th230 SN: E121495, Size: 10,100cpm, Background:3cpm, Counts:3977cpm, 2pi Eff:40.00%

Pu239 is 100c/m squared center

Pu239 SN: 2125, Size: 270dpm, Background:3cpm, Counts:44cpm 4 pi Eff:15.18%

Pu239 SN: 2125, Size: 135cpm, Background:3cpm, Counts:44cpm 2 pi Eff:30.37%

44-9 SN: PR237606

Th230 SN: E121495, Size: 19,800dpm, Background:32cpm, Counts:2917cpm, 4pi Eff:15.00%

Tc99 SN: NI-EV, Size: 22,700dpm, Background:32cpm, Counts:5398cpm, 4pi Eff: 24.65%

SrY90 SN: 4016, Size: 32,062dpm, Background:32cpm, Counts:11901cpm, 4pi Eff: 37.02%

C14 SN: 1867, Size: 221,707dpm, Background:32cpm, Counts:11500cpm, 4pi Eff: 5.17%

Cl36 SN:1075-78-1, Size:22,028dpm, Background:32cpm, Counts:8694cpm 4 pi Eff.:39.32%

Cs137 SN:1075, Size:16,931dpm, Background:32cpm, Counts:5036cpm 4 pi Eff:30.00%

Tc99 source larger than active area of 44-9.

Tc99 SN:4186, Size:7,500dpm, Background:32cpm, Counts:162cpm 4 pi Eff:1.73%

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
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865-392-4601
Knoxville, TN 37932, U.S.A.

Bench Test Data For Detector

Detector 44-10 Serial No. PR201042

Customer TETRA TECH EMI Order #. 20291557/436839

Counter 2241-3 Serial No. 286586 Counter Input Sensitivity 35 mV

Count Time 6 Seconds Distance Source to Detector Surface

Other

High Voltage	Background	Isotope Am241 Size ≈0.77μCi	Isotope Size	Isotope Size	Isotope Size
1400	876	13774			
1450	820	13653			
*1500	790	13682			
1550	839	13511			
1600	855	13671			
1650	951	13471			
1700	1213	21213			

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Signature Jeremy Thompson Date 20.Jun.16

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Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer: TETRA TECH EMI Date: 20-Jun-16 Order #: 20291557/436839

Model: 2241-3 Serial No.: 276576 Detector Model: 44-6 Serial No.: PR207100

Source: Cs137:144nCi, Cs137a High Voltage: 900 V

Count time: Ratemeter Input Sensitivity: 35 mV

Reference Point	"As Found" Readings: with Deadtime	"As Found" Readings: w/o Deadtime	After Adjustment Readings: with Deadtime	After Adjustment Readings: w/o Deadtime
500 mR/hr	510 mR/hr	NA	510 mR/hr	NA
400	395		395	
200	192		192	
150	149		149	
100	99		99	
50	51		51	
20	20.7		20.7	
15	15.4		15.4	
8	8.38		8.37	
2	2.05		2.05	
1.5	1.53		1.53	
1.0	1.04		1.04	

Signature: Jeremy Thompson Date: 20-Jun-16

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10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CONVERSION CHART

Customer: TETRA TECH EMI Date: 20-Jun-16 Order #: 20291557/436839

Model: 2241-3 Serial No.: 246546 Detector Model: 44-9 Serial No.: PR214471

Source: Cs137 - 144.6mCi, Cs137 - 3mCi High Voltage: 900 V

Count time: Ratemeter Input Sensitivity: 35 mV

Reference Point	"As Found" Readings (CPM): with Deadtime		"As Found" Readings (CPM): w/o Deadtime	After Adjustment Readings (CPM): with Deadtime		After Adjustment Readings (CPM): w/o Deadtime
150 mR/hr	490	K	NA	490	K	NA
50 mR/hr	165			165		
15 mR/hr	46.2			46.2		
5 mR/hr	16.0			16.0		
1.5 mR/hr	5.17			5.17		
1.0 mR/hr	3.35			3.35		

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Signature: Jeremy Thompson Date: 20.Jun.16

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865-392-4601
Knoxville, TN 37932, U.S.A.

Bench Test Data For Alpha Detector

Detector 43-90 Serial No. PR237786

Customer TETRA TECH EMI Order #. 20291557/436839

Counter 2241-3 Serial No. 276516 Counter Input Sensitivity 35 mV

Count Time 1 minute Distance Source to Detector surface

Isotope Th230:E121495≈19,800dpm Other

43-4/43-44 HV Adjust for Altitude

Altitude	High Voltage
Sea Level	2050 V
1000 foot	2025 V
2000 foot	2000 V
3000 foot	1975 V
4000 foot	1950 V
5000 foot	1925 V
6000 foot	1900 V
7000 foot	1875 V

Alpha Scintillation Detector

HV Plateau	Background	Source Count
500	1	2013
550	3	3595
600	3	3977
650	3	4032
700	5	4171

Operating Voltage Set at 600 V

Air Proportional	43-5	43-65	43-90	Background	Meter Reading	Range/Scale
Toe	Toe	L/S*	Toe	3	3921	Digital
Center	Center	Center	Center	3	3977	
Heel	Heel	Other**	Heel	2	3908	

✓ Uniformity (± 10%) Average Efficiency 20 (4π) %

* Least Sensitive Position (Heel of Detector)
** Opposite Least Sensitive Position (Top of Detector)

Signature Jeremy Thompson Date 20 Jan 16

COPY

Cincinnati ERT Response Kit Pre-Operational Check (Cases 101-110)

Date	12/27/16	**Cal Date**	20 JUN 16	**Cal Due**	20 JUN 17	**DQL**	1, 2, 3
Temp		**Pressure**		**Humidity**		**Shelf**	201-A
Case #	101	**2241-3**	286586	**CERETS**	ERT-101	**Th Src?**	
44-10	PR201042	**44-6**	PR	**44-9**	PR	**43-90**	PR

Jigs: None required **Check source:** Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will not be used in the field.

- [x] Open case and verify contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
- [x] Verify Document Packet includes instrument manuals and cal certificates.
- [ ] Annotate if Control Charts (Ratemeter mode) are present for the 44-10, 44-6, 44-9 and 43-90 probes.
- [x] Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
- [x] Remove 2241-3 from case and inspect for any visible damage or unusual conditions. Select Audio OFF, F/S to F, attach Type C cable to 2241-3. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-10 (uR/hr)	44-6 (uR/hr)		44-9 (cpm)		43-90 (cpm)
		Win closed	Win open	Cover On	Cover Off	
Th Source Door	Closed	Closed	Open	Closed	Open	Open
Background Rate	6.0					
Src Reading Rate	39					
Net Reading Rate	0	0	0	0	0	0
SCA Background	1129					
SCA Reading (counts)	6464					
SCA Net Reading	0	0	0	0	0	0
SCA Net cpm	0	0	0	0	0	0
SCA Time (seconds)	10	10	10	30	30	30

- [x] **44-10** Attach cable from 2241-3 to 44-10 gamma probe. Turn instrument ON by selecting DET 1 Record the background reading (away from sources) after ~30 seconds (typically ~ 5 uR/hr).
- [x] Place Gamma probe, end first, against the source (Source holder cover CLOSED) and record the reading. (The reading should be approximately 20 uR/hr above background.) If the 44-10 Control Chart is present, record Net Reading count rate.
- [x] Switch from RATE to SCA. Push black button in handle; record background after the count is complete (COUNTING indicator goes out). Count and record Th source with end of probe against closed door.
- [x] Check audio using the toggle switch. Check light using red button. Turn 2241-3 to OFF.
- [ ] **44-6** Select RATE. Attach GM probe (44-6) to cable and turn instrument to Detector 2 position. Record background reading with window CLOSED after ~30 seconds; repeat window OPEN.
- [ ] Place GM probe (44-6) with window CLOSED next to instrument check source door CLOSED and note reading after about 30 seconds (Readings ~40 to 60 uR/hr).
- [ ] Test the probe and source again with the window OPEN and source door OPEN. Record readings in Table
- [ ] Switch from RATE to SCA. Push black button in handle and record background with window CLOSED.
- [ ] Repeat counting source. With window OPEN, push black button in handle and record background. Repeat counting check source. Turn instrument OFF, remove probe. Return to case.

Name	Date	Verified by	Date
D Myers	12/27/2016		

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Cincinnati ERT Response Kit Pre-Operational Check (Cases 101-110)

☐ **44-9** Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.

☐ Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.

☐ **43-90** Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 4. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm).

☐ Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.

☐ Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.

☐ Unit is ready to be placed into field use. Attach appropriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-3 in case.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ☐ 44-10 ☐ 44-6 ☐ 44-9 ☐ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Response Kit Pre-Operational Check (Cases 101-110)

Date	16-10-12	Cal Date	16-6-20	Cal Due	17-6-20	DQL	1, 2, 3
Temp	72.5	Pressure	29.23	Humidity	48	Shelf	201-A
2241-3	286586	CERETS	ERT-001	Case #	101	Th Src?	Yes

Jigs: None required
Check source: Thorium lantern mantle on side of 2241-3 (~0.03 uCi)
NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: Tests can be omitted for probes that will notbe used in the field.
Record readings in Table 1. Annotate unexpected or unusual conditions in Comments Section

- ✓ Open case and verify contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker.
- ✓ Verify Document Packet includes instrument manuals and cal certificates.
- ✓ Annotate if Control Charts (Ratemeter mode) are present for the 44-10, 44-6, 44-9 and 43-90 probes.
- ✓ Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present.
- ✓ Remove 2241-3 from case and inspect for any visible damage or unusual conditions. Select Audio OFF, F/S to F, attach Type C cable to 2241-3. Move Selector to RATE by lifting toggle.

Table 1. Response Kit Instrument Readings

	44-10 (uR/hr)	44-6 (uR/hr)		44-9 (cpm)		43-90 (cpm)
		Win closed	Win open	Cover On	Cover Off	
Th Source Door	Closed	Closed	Open	Closed	Open	Open
Background Rate	6.5	9	12	36.3	62	7.49
Src Reading Rate	42	106	1160	382	9810	603
Net Reading Rate	0	0	0	0	0	0
SCA Background	959	1	4	19	28	3
SCA Reading (counts)	6457	22	256	187	7443	357
SCA Time	10 sec	10 sec	10 sec	30 sec	30 sec	30 sec

- ✓ Attach cable from 2241-3 to 44-10 gamma probe. Turn instrument ON by selecting DET 1. Record the background reading (away from sources) after ~30 seconds (typically ~ 5 uR/hr).
- ✓ Place Gamma probe, end first, against the source (Source holder cover CLOSED) and record the reading. (The reading should be approximately 20 uR/hr above background.) If the 44-10 Control Chart is present, record Net Reading count rate.
- ✓ Switch from RATE to SCA. Push black button in handle and record background after the count is complete (COUNTING indicator goes out). Count and record Th source.
- ✓ Check audio using the toggle switch. Check light using red button. Turn 2241-3 to OFF.
- ✓ Select RATE. Attach GM probe (44-6) to cable and turn instrument to Detector 2 position. Record background reading with window CLOSED after ~30 seconds, repeat window OPEN, door OPEN
- ✓ Place GM probe (44-6) with window CLOSED next to instrument check source door CLOSED and note reading after about 30 seconds (Readings ~40 to 60 uR/hr)
- ✓ Test the probe and source again with the window OPEN. The reading should be ~2 times higher than with the window CLOSED reading. Record readings in Table 1. Record Net Reading rate on Control Chart.
- ✓ Switch from RATE to SCA. Push black button in handle and record background with window CLOSED and window OPEN. Repeat counting check source. Turn the instrument to OFF. Remove 44-6 probe, replace in case with window CLOSED.

Keith Payne	16-10-12	[signature]	27 Oct 2016
Name	Date	Verified by	Date

File original of this form in the Instrument File. Place a copy in the Instrument Case Document Package.

Cincinnati ERT Response Kit Pre-Operational Check (Cases 101-110)

✓ Select RATE. Attach the 44-9 pancake probe (44-9) with red cover still ON. Select Detector 3. Record background count rate after ~30 seconds. Take source reading (source holder cover OPEN). Readings should stabilize at approximately 3 kcpm. Take another background and source reading with the red cover OFF. With red cover OFF the readings should increase ~4 times. Record this reading in the Table and on the Control Chart, if present.

✓ Switch from RATE to SCA. Push black button in handle and record background with window OPEN and window CLOSED. Repeat counting Th source. Turn the instrument to OFF. Remove 44-9 probe from the cable, replace in case with red cap on 44-9 probe.

✓ Select RATE. Attach 43-90 alpha probe. Remove plastic probe cover. Turn instrument to Detector 4. After ~30 seconds record background reading in cpm in Table 1 (should be ~0 cpm).

✓ Take reading on instrument check source (~ 300- 500 cpm) with Source Holder door OPEN. Record data in table. Record Net Reading rate on the 43-90 Control Chart.

✓ Switch from RATE to SCA. Push black button in handle and record background. Repeat counting check source. Turn the instrument to OFF. Remove cable and 43-90 probe, replace probe in case with plastic cover in place. Switch from SCA to RATE.

✓ Unit is ready to be placed into field use. Attach apprpriate probe, select RATE or SCA. When finished, remove batteries. Replace all components and Model 2241-3 in case.

Use of Control Charts

Note: It is important that readings are taken in a low background area. Nearby sources or variable background will affect the interpretation of results.

Note: If a unit/ probe combination does not pass the following criteria, notify the Radiological POC BEFORE using the instrument.

Control Charts in this procedure use the Net Counting Rate. The Control Charts have two control levels, one at +10% and the other at +20% of the average reading. The acceptability of the instrument/ probe performance is based on current and historical performance compared to these control levels.

If the reading is within the ±10% control band of the historical average the unit is acceptable.

If the reading is between ±10% and ±20%, take two more readings. If these are both ±10% the unit is acceptable. If one reading is within ±10% and the other is between ±10% and ±20%, consult with the Radiological POC.

If a reading is more than ±20%, the unit does not pass.

If the last 3 readings on the Control Chart have been greater than or less than the average, consult with the Radiological POC.

If the last 5 readings have been greater or less than the average, the unit does not pass.

If the last 7 readings have been increasing or decreasing, the unit does not pass.

The Unit and following probes PASS ___ 44-10 ___ 44-6 ___ 44-9 ___ 43-90
Annotate in comments any probe combination that does NOT Pass.

Comments/ Problems noted:

Cincinnati ERT Response Kit Efficiency Check (Cases 101- 110)

Case No.	101	**CERETS**	ERT-726	**2241-3 SN**	286586	**Test Loc**	Warehouse
44-10 SN	PR201042	**44-6 SN**	PR207700	**44-9 SN**	PR214481	**43-90 SN**	PR239786
Todays Date	01/06/17	**Cal Date**	06/20/16	**Cal Due**	06/20/17	**Shelf Loc**	ERL 201-A
Temp F	69.6	**Pressure "**	29.25	**Humidity%**	15	**Th Chk Src**	☑ Yes ☐ No

Required: Battery tester, standard screwdriver, small standard screwdriver, Mod 550-2 or 2200
Jigs: C-ERT 001 44-7/44-10, CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wearing gloves, do not touch active source area with hands
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-3 or the **calibration is invalidated**

☐ Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker
☐ Verify Document Packet includes instrument manuals and cal certificates
☐ Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
☐ Remove 2241-3 from case and inspect for any visible damage or unusual conditions. Install 2 D cells.

☐ To reset the integrate time, select detector setting, remove the electronics from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn ON, press ENTER, then ENTER to Scaler Count Time screen. Adjust using LEFT and UP buttons. ENTER. Reset rotary switch to zero. Turn OFF. Reconnect speaker and serial cables. Reinstall electronics

☑ Connect 2241-3 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Verify Det 1 High Voltage set at voltage stated on the Calibration Certificate Conversion Chart for Det 1 (44-10 probe), Det 2 HV for 44-6, Det 3 for 44-9, and Det 4 for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the HV POT. CHECK CAREFULLY- Only adjust HV!
Det 1 Volts 1497 Det 2 Volts 898 Det 3 Volts 899 Det 4 Volts 602
☑ Check audio using the toggle switch. Check light using red button.

Ludlum 44-10 NaI (low level gamma- 0 to 4000 uR/hr) Probe Check, Detector 1
☑ Select Det 1 position setting. Attach 44-10 gamma probe. Turn instrument ON in Ratemeter mode. Record the background reading after ~1 minute (typically ~ 10 uR/hr). Place Gamma probe, end first, against the source (cover closed), record reading (should be approximately 13 uR/hr above background). Select SCALER mode. Take an integrated background and source reading. Record the readings. Turn instrument OFF.

Bkg uR/hr	8.0	Source uR/hr	44.0	Bkg Scaler	1258	Source Scaler	6948

☑ Place probe on 44-10 source jig. Take background ratemeter and scaler counts. Place Cs-137 source on the jig. Repeat background and source measurements in both modes. Update Control Charts

Bkg uR/hr	8.0	Source uR/hr	255	Bkg Scaler	1372	Source Scaler	37,041

Ludlum 44-6 GM (1 mR/hr- 50 mR/hr) Probe Check, Detector 2
☐ Select Det 2 position setting. Attach GM probe (44-6) to cable with window CLOSED. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-6) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg uR/hr	Source uR/hr	Bkg Scaler	Source Scaler

☐ With probe in the Ratemeter mode test the probe again with the window OPEN. The reading should be ~10% greater than the window CLOSED reading. Record readings. Repeat background and instrument check source measurements in SCALER mode.

Bkg uR/hr	Source uR/hr	Bkg Scaler	Source Scaler

Cincinnati ERT Response Kit Efficiency Check (Cases 101- 110)

☐ Place window CLOSED probe on 44-10 source jig. Take RATEMETER mode background and integrated counts. Place Cs-137 source on the jig. Repeat background and source measurements in SCALER mode.

Bkg uR/hr	Source uR/hr	Bkg Scaler	Source Scaler

☐ Place window OPENED probe on 44-10 source jig. Take RATEMETER mode background and integrated counts. Place Cs-137 source on the jig. Repeat background and source measurements in SCALER mode.

Bkg uR/hr	Source uR/hr	Bkg Scaler	Source Scaler

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 3

☐ Select Det 2 position setting. Attach GM pancake probe (44-9) to cable. Remove red detector cover. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	Source cpm	Bkg Scaler	Source Scaler

☐ Place the plated Th-230 QC Source on the jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN	5301-04	18200	dpm	Tc-99 SN	5678-06	8400	dpm
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading				0				0
Efficiency	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

☐ Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 4

☐ Select Det 4. Attach 43-90 alpha probe. Turn instrument ON. Take background reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and instrument check source readings.

Bkg cpm _____ Source cpm _____ Bkg Scaler _____ Source Scaler _____

☐ Place plated Th-230 source in the top slot of the 43-90 jig and take three readings. Move source to the middle slot and take three readings. Move source to bottom slot and take three readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	Trial 1	Trial 2	Trial 3	Average	43-90 Probe Summary		
Top				0			
Middle				0			
Bottom				0	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	0	0	0	0	0	0	0
Efficiency	0.000	0.000	0.000	0.000	0.000	0.000	0.000
					Instrument/ probe ☐ Pass ☐ Fail		

☑ Remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted: • Recheck of the inconsistent 44-10 readings between Dec16 and Jan17
NOTE: If different sources are used, indicate the serial number and activity in dpm in the 44-9 table
NOTE: Keep sources at a distance while taking all measurements.
• Cs137 source SN: 80 was replaced with Cs137 source SN: 7Cs-5-2 with the following results for Step 4:
Bkg 8 uR/hr Source 809 uR/hr Bkg 1291 counts Source 113,969 counts
From this I conclude that the incorrect Cs137 source was used in Dec16. Kpayne indicated this was possible.

Name D. Draper Date 01/06/17 Reviewer _____ Date _____

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

Cincinnati ERT Response Kit Efficiency Check (Cases 101- 110)

Case No.	101	**CERETS**	ERT-726	**2241-3 SN**	286586	**Test Loc**	Warehouse
44-10 SN	PR201042	**44-6 SN**	PR207700	**44-9 SN**	PR214481	**43-90 SN**	PR239786
Todays Date	01/04/17	**Cal Date**	06/20/16	**Cal Due**	06/20/17	**Shelf Loc**	ERL 201-A
Temp F	70.0	**Pressure "**	29.05	**Humidity%**	28	**Th Chk Src**	☑ Yes ☐ No

Required: Battery tester, standard screwdriver, small standard screwdriver, Mod 550-2 or 2200
Jigs: C-ERT 001 44-7/44-10, CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wearing gloves, do not touch active source area with hands
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-3 or the **calibration is invalidated**

☑ Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker
☑ Verify Document Packet includes instrument manuals and cal certificates
☑ Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
☑ Remove 2241-3 from case and inspect for any visible damage or unusual conditions. Install 2 D cells.

☑ To reset the integrate time, select detector setting, remove the electronics from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn ON, press ENTER, then ENTER to Scaler Count Time screen. Adjust using LEFT and UP buttons. ENTER. Reset rotary switch to zero. Turn OFF. Reconnect speaker and serial cables. Reinstall electronics

☑ Connect 2241-3 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Verify Det 1 High Voltage set at voltage stated on the Calibration Certificate Conversion Chart for Det 1 (44-10 probe), Det 2 HV for 44-6, Det 3 for 44-9, and Det 4 for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the HV POT. CHECK CAREFULLY- Only adjust HV!
Det 1 Volts 1499 Det 2 Volts 898 Det 3 Volts 898 Det 4 Volts 601
☑ Check audio using the toggle switch. Check light using red button.

Ludlum 44-10 NaI (low level gamma- 0 to 4000 uR/hr) Probe Check, Detector 1
☐ Select Det 1 position setting. Attach 44-10 gamma probe. Turn instrument ON in Ratemeter mode. Record the background reading after ~1 minute (typically ~ 10 uR/hr). Place Gamma probe, end first, against the source (cover closed), record reading (should be approximately 13 uR/hr above background). Select SCALER mode. Take an integrated background and source reading. Record the readings. Turn instrument OFF.

Bkg uR/hr	5.4	Source uR/hr	46.0	Bkg Scaler	860	Source Scaler	7159

☐ Place probe on 44-10 source jig. Take background ratemeter and scaler counts. Place Cs-137 source on the jig. Repeat background and source measurements in both modes. Update Control Charts

Bkg uR/hr	11.0	Source uR/hr	250	Bkg Scaler	1595	Source Scaler	37,269

Ludlum 44-6 GM (1 mR/hr- 50 mR/hr) Probe Check, Detector 2
☐ Select Det 2 position setting. Attach GM probe (44-6) to cable with window CLOSED. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-6) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg uR/hr	10.0	Source uR/hr	87.0	Bkg Scaler	2	Source Scaler	23

☐ With probe in the Ratemeter mode test the probe again with the window OPEN. The reading should be ~10% greater than the window CLOSED reading. Record readings. Repeat background and instrument check source measurements in SCALER mode.

Bkg uR/hr	17.0	Source uR/hr	1040.0	Bkg Scaler	3	Source Scaler	219

Cincinnati ERT Response Kit Efficiency Check (Cases 101- 110)

☐ Place window CLOSED probe on 44-10 source jig. Take RATEMETER mode background and integrated counts. Place Cs-137 source on the jig. Repeat background and source measurements in SCALER mode.

Bkg uR/hr	17.0	Source uR/hr	73.0	Bkg Scaler	4	Source Scaler	20

☐ Place window OPENED probe on 44-10 source jig. Take RATEMETER mode background and integrated counts. Place Cs-137 source on the jig. Repeat background and source measurements in SCALER mode.

Bkg uR/hr	16.0	Source uR/hr	97.0	Bkg Scaler	6	Source Scaler	28

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 3

☐ Select Det 2 position setting. Attach GM pancake probe (44-9) to cable. Remove red detector cover. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	31.8	Source cpm	9.9	Bkg Scaler	20	Source Scaler	5092

☐ Place the plated Th-230 QC Source on the jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN	5301-04	18200	dpm	Tc-99 SN	5678-06	8400	dpm
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading	928	878	909	885	606	674	683	634
Efficiency	0.050	0.047	0.049	0.049	0.070	0.078	0.079	0.076

☐ Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 4

☐ Select Det 4. Attach 43-90 alpha probe. Turn instrument ON. Take background reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and instrument check source readings.

Bkg cpm 2 Source cpm 409 Bkg Scaler 0 Source Scaler 261

☐ Place plated Th-230 source in the top slot of the 43-90 jig and take three readings. Move source to the middle slot and take three readings. Move source to bottom slot and take three readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	**Trial 1**	**Trial 2**	**Trial 3**	**Average**			
Top	1150	1148	1127	1142	**43-90 Probe Summary**		
Middle	1348	1277	1133	1253			
Bottom	1337	1318	1301	1319	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	1278	1248	1187	1238	1114	1238	1361
Efficiency	0.070	0.069	0.065	0.068	0.061	0.068	0.075
					Instrument/ probe ☑ Pass ☐ Fail		

☐ Remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

NOTE: If different sources are used, indicate the serial number and activity in dpm in the 44-9 table

NOTE: Keep sources at a distance while taking all measurements.

• The Cs-137 source readings with the 44-10 probe are inconsistent with Dec readings. Recheck.

Name Keith Payne Date 01/04/17 Reviewer D.Draper Date 01/05/17

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

Cincinnati ERT Response Kit Efficiency Check (Cases 101- 110)

Case No.	101	**CERETS**	ERT-726	**2241-3 SN**	286586	**Test Loc**	Warehouse
44-10 SN	PR201042	**44-6 SN**	PR207700	**44-9 SN**	PR214481	**43-90 SN**	PR239786
Todays Date	12/09/16	**Cal Date**	06/20/16	**Cal Due**	06/20/17	**Shelf Loc**	ERL 201-A
Temp F	69.1	**Pressure "**	29.56	**Humidity%**	14	**Th Chk Src**	☑ Yes ☐ No

Required: Battery tester, standard screwdriver, small standard screwdriver, Mod 550-2 or 2200
Jigs: C-ERT 001 44-7/44-10, CERT 44-9 001, CERT 43-90 001,
Sources: Lantern mantle (~0.03 uCi); Cs-137 1uci SN: 80, Plated sources Th-230 5301-04, Tc99 5678-06

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: Handle plated sources with plastic forceps or wearing gloves, do not touch active source area with hands
NOTE: A voltmeter or other instrument is necessary to test the batteries.
NOTE: Ratemeter readings are set to probe type, ie, uR/hr for the 44-10. All scaler readings are in COUNTS.
CAUTION: Adjust only the **HV potentiometers** on the 2241-3 or the **calibration is invalidated**

☑ Open case and verify serial numbers of contents with serial numbers posted on the outside of the box and with the inventory list. Verify that the calibration sticker is in place and the instrument is within calibration. Compare probe serial numbers to Calibration Sticker
☑ Verify Document Packet includes instrument manuals and cal certificates
☑ Verify that a type C / type C cable, serial cord, extra batteries and carrying strap are present
☑ Remove 2241-3 from case and inspect for any visible damage or unusual conditions. Install 2 D cells.

☑ To reset the integrate time, select detector setting, remove the electronics from the can. Carefully remove the speaker cable and serial cable. SELECT Position 8 (Scaler Alarm/ Count Time) on the 16 position rotary switch to get Alarm. Turn ON, press ENTER, then ENTER to Scaler Count Time screen. Adjust using LEFT and UP buttons. ENTER. Reset rotary switch to zero. Turn OFF. Reconnect speaker and serial cables. Reinstall electronics

☑ Connect 2241-3 to 500-2 with Type C cable. Set Pulse rate to ~200 cpm. Verify Det 1 High Voltage set at voltage stated on the Calibration Certificate Conversion Chart for Det 1 (44-10 probe), Det 2 HV for 44-6, Det 3 for 44-9, and Det 4 for 43-90. If Voltages are incorrect, set Amplitude on 500-2 to Input Sensitivity of detector on Cal Cert. Remove Cal plate on 2241-3 and adjust the HV POT. CHECK CAREFULLY- Only adjust HV!
Det 1 Volts 1498 Det 2 Volts 898 Det 3 Volts 898 Det 4 Volts 602
☑ Check audio using the toggle switch. Check light using red button.

Ludlum 44-10 NaI (low level gamma- 0 to 4000 uR/hr) Probe Check, Detector 1
☑ Select Det 1 position setting. Attach 44-10 gamma probe. Turn instrument ON in Ratemeter mode. Record the background reading after ~1 minute (typically ~ 10 uR/hr). Place Gamma probe, end first, against the source (cover closed), record reading (should be approximately 13 uR/hr above background). Select SCALER mode. Take an integrated background and source reading. Record the readings. Turn instrument OFF.

Bkg uR/hr	5.5	Source uR/hr	38.0	Bkg Scaler	930	Source Scaler	6630

☐ Place probe on 44-10 source jig. Take background ratemeter and scaler counts. Place Cs-137 source on the jig. Repeat background and source measurements in both modes. Update Control Charts

Bkg uR/hr	6.0	Source uR/hr	809	Bkg Scaler	898	Source Scaler	111,978

Ludlum 44-6 GM (1 mR/hr- 50 mR/hr) Probe Check, Detector 2
☐ Select Det 2 position setting. Attach GM probe (44-6) to cable with window CLOSED. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-6) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg uR/hr	8.0	Source uR/hr	107.0	Bkg Scaler	1	Source Scaler	18

☐ With probe in the Ratemeter mode test the probe again with the window OPEN. The reading should be ~10% greater than the window CLOSED reading. Record readings. Repeat background and instrument check source measurements in SCALER mode.

Bkg uR/hr	6.0	Source uR/hr	1320.0	Bkg Scaler	2	Source Scaler	255

Cincinnati ERT Response Kit Efficiency Check (Cases 101- 110)

☐ Place window CLOSED probe on 44-10 source jig. Take RATEMETER mode background and integrated counts. Place Cs-137 source on the jig. Repeat background and source measurements in SCALER mode.

Bkg uR/hr	10.0	Source uR/hr	326.0	Bkg Scaler	4	Source Scaler	57

☐ Place window OPENED probe on 44-10 source jig. Take RATEMETER mode background and integrated counts. Place Cs-137 source on the jig. Repeat background and source measurements in SCALER mode.

Bkg uR/hr	12.0	Source uR/hr	320.0	Bkg Scaler	58	Source Scaler	58

Ludlum 44-9 (GM) (pancake) Probe Check, Detector 3

☐ Select Det 2 position setting. Attach GM pancake probe (44-9) to cable. Remove red detector cover. Turn instrument ON, SLOW setting and record background Ratemeter reading. On FAST setting, Place GM probe (44-9) next to instrument check source door OPEN and note reading after about 30 seconds (Readings ~400 to 600 CPM). Repeat background and source measurements in SCALER mode.

Bkg cpm	31.6	Source cpm	9100	Bkg Scaler	19	Source Scaler	4770

☐ Place the plated Th-230 QC Source on the jig. Place pancake probe (44-9) on source jig. Take 3 scaler readings. Record average on Control Chart. Replace the Th-230 source with the Tc-99 QC Source. Take 3 scaler readings. Record averages on the L44-9 Control Charts for this kit.

	Th-230 SN	5301-04	18200	dpm	Tc-99 SN	5678-06	8400	dpm
	Trial 1	**Trial 2**	**Trial 3**	**Average**	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Reading	938	889	854	875	633	571	601	583
Efficiency	0.050	0.048	0.046	0.048	0.073	0.066	0.069	0.069

☐ Turn instrument OFF. Remove 44-9 probe from cable and replace in case.

Ludlum 43-90 Alpha Scintillation Probe Check, Detector 4

☐ Select Det 4. Attach 43-90 alpha probe. Turn instrument ON. Take background reading in cpm. Take reading on instrument check source (~ 300- 500 cpm). Switch to Scaler mode. Take background and instrument check source readings.

Bkg cpm 0 Source cpm 512 Bkg Scaler 0 Source Scaler 209

☐ Place plated Th-230 source in the top slot of the 43-90 jig and take three readings. Move source to the middle slot and take three readings. Move source to bottom slot and take three readings. Record data in table. Turn instrument OFF. Remove probe and cable. Update Control Chart for the 43-90 probe.

Reading	Trial 1	Trial 2	Trial 3	Average	43-90 Probe Summary		
Top	1089	1129	1208	1142			
Middle	1340	1279	1304	1308			
Bottom	1318	1326	1390	1345	**Avg -10%**	**Mean Avg**	**Avg +10%**
Mean	1249	1245	1301	1265	1138	1265	1391
Efficiency	0.069	0.068	0.071	0.069	0.063	0.069	0.076
					Instrument/ probe ☑ Pass ☐ Fail		

☐ Remove batteries from the 2241-3. Replace all components and 2241-3 in case.

Comments/ problems noted:

NOTE: If different sources are used, indicate the serial number and activity in dpm in the 44-9 table

NOTE: Keep sources at a distance while taking all measurements.

• 43-90 probe Top Reading low; 2 of the three readings were below Avg-10% although the average passed.

Name Keith Payne Date 12/09/16 Reviewer D.Draper Date 01/05/17

File original of this form in the Instrument File. Place a copy into the Instrument Case Document Package.

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit	11J015DW	Case #	172	CERETS #	ERT-737	Location:	Warehouse
Date	170104	Calibration Date	160623			Calib Due Date	170623
Bkg	3.8 uR/hr	Temp	69.8 F	Pressure	29.03 " Hg	Humidity%	32

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only.
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing.
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each. ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 3 Min: 33
Record Sensor Data: HPIC: .0080 Bty Volts: 6.686 BiasVolts: 406.9 Temp: 24.70

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 170104
Reviewed by: [signature] Date: 170105

COPY

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0080	6.688	408.4	24.20	
Cs-137	5 uCi	.0313	6.684	407.0	24.20	
Cs-137	1 uCi	.0119	6.682	407.1	24.20	
Co-60	1 uCi	.0123	6.692	405.7	24.20	
Eu-152	1 uCi	.0080	6.684	406.8	24.10	
Am-241	~0.1 uCi	.0094	6.600	407.7	24.20	
Th-232	~0.03 uCi	.0093	6.538	408.0	24.10	
Bkg	NA	.0088	6.534	406.9	24.20	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0084 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit. — Record the third reading 0.0312 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit. — Record the third reading 0.0124 mR/hr

4.4 Remove all sources. — Record the third reading 0.0084 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved.

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> OK

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE. At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention.

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments:

Test performed under line power

COPY

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 1150150W	Case # 172	CERETS # ERT-737		Location: Warehouse	
Date 161214	Calibration Date 160623			Calib Due Date 170623	
Bkg 3.8 uR/hr	Temp 68.9° F	Pressure 29.27 " Hg		Humidity% 20	

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only.
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing.
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each. ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 2 Min: 6
Record Sensor Data: HPIC: .0080 Bty Volts: 6.328 BiasVolts: 408.2 Temp: 22.90

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 161214
Reviewed by: [signature] Date: 170105

COPY

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0077	6.322	407.6	22.90	
Cs-137	5 uCi	.0313	6.234	406.6	22.90	
Cs-137	1 uCi	.0137	6.354	406.3	22.90	
Co-60	1 uCi	.0127	6.358	408.2	22.90	
Eu-152	1 uCi	.0074	6.222	407.2	23.00	
Am-241	~0.1 uCi	.0077	6.336	407.4	23.00	
Th-232	~0.03 uCi	.0096	6.348	408.6	23.00	
Bkg	NA	.0082	6.322	407.2	23.00	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0081 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit. — Record the third reading 0.0315 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit. — Record the third reading 0.0134 mR/hr

4.4 Remove all sources. — Record the third reading 0.0085 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved.

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> OK

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE. At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention.

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments:

Portal Monitor function check being performed in vicinity

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Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 115015DW	Case # 77	CERETS # ERT-377		Location: Warehouse	
Date 16 11 09	Calibration Date [illegible]			Calib Due Date 17 11 13	
Bkg 3.8 uR/hr	Temp 66.6 F		Pressure 29.24 " Hg		Humidity% 54

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: This instrument is valid for collecting Data Quality Level 1 data only
NOTE: Record changes and differences in Comments sections

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC. Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec. None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3. Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10 000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration Verify the following settings CLOSE window after checking each
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings CLOSE window after checking each. ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- **Day:** 0 **Hour:** 0 **Min:** 0
Record Sensor Data **HPIC:** .0078 **Bty Volts:** 6.165 **BiasVolts:** 403.3 **Temp:** 27.20

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by [illegible] Date: 16 11 09
Reviewed by [illegible] Date: 02 Dec 16

Table 1. Place a check source on the unit in the designated area approximately 60 seconds then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0077	6.174	403.3	22.20	
Cs-137	5 uCi	.0338	6.060	407.3	22.20	
Cs-137	1 uCi	.0126	6.184	403.4	22.20	
Co-60	1 uCi	.0114	6.100	406.9	22.20	
Eu-152	1 uCi	.0080	6.182	406.6	22.30	
Am-241	~0.1 uCi	.0079	6.172	403.2	22.20	
Th-232	~0.03 uCi	.0077	6.116	406.6	22.20	
Bkg	NA	.0083	6.176	406.4	22.30	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0082 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit — Record the third reading 0.0313 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit — Record the third reading 0.0131 mR/hr

4.4 Remove all sources. — Record the third reading 0.0081 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> **OK**

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE At prompt to download to RSS-131 YES

Continue collecting data. When data collection is finished download data using filename convention

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in Otherwise, unplug and disconnect the power supply and return them to the case

Comments:

HPIC [illegible] did not show [illegible] reading, rebooted
Restart config [illegible] same result

[illegible] unplugged shown
[illegible] prior current [illegible]

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 11501504	Case # 172	CERETS # ERT-137		Location: Warehouse	
Date 161012	Calibration Date 160623			Calib Due Date 170623	
Bkg 4.0 uR/hr	Temp 72.3° F		Pressure 29.22 "Hg		Humidity% 48

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only.
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing.
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 1 Min: 48
Record Sensor Data: HPIC: .0072 Bty Volts: 6.376 BiasVolts: 406.8 Temp: 25.40

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 161012
Reviewed by: [signature] Date: 27 Oct 2016

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0032	6.341	408.4	25.40	
Cs-137	5 uCi	.0308	6.336	406.9	25.40	
Cs-137	1 uCi	.0131	6.338	407.3	25.40	
Co-60	1 uCi	.0117	6.341	408.0	25.40	
Eu-152	1 uCi	.0081	6.340	407.3	25.40	
Am-241	~0.1 uCi	.0032	6.338	407.7	25.40	
Th-232	~0.03 uCi	.0087	6.336	406.7	25.40	
Bkg	NA	.0033	6.332	407.4	25.40	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0079 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit. — Record the third reading 0.0313 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit. — Record the third reading 0.0133 mR/hr

4.4 Remove all sources. — Record the third reading 0.0079 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> **OK**

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention.

☑ 6.3 Turn unit OFF Unplug cables and put them in the bag If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments:

Partial monitor check being done in view of
Test done on battery power

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Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 115015D	Case # 172	CERETS # ERT-737	Location: Warehouse
Date 160914	Calibration Date 160623		Calib Due Date 170623
Bkg 3.8 uR/hr	Temp 76.1° F	Pressure 29.20 "Hg	Humidity% 57

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002). CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3. Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- **Day:** 0 **Hour:** 2 **Min:** 17
Record Sensor Data: **HPIC:** .0031 **Bty Volts:** 6.352 **BiasVolts:** 400.0 **Temp:** 37.40

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 160914
Reviewed by: [signature] Date: 03 OCT 2016

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Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0075	6.340	407.0	27.40	
Cs-137	5 uCi	.0322	6.330	407.2	27.50	
Cs-137	1 uCi	.0131	6.022	405.5	27.40	
Co-60	1 uCi	.0123	6.194	407.3	27.40	
Eu-152	1 uCi	.0089	6.332	408.5	27.40	
Am-241	~0.1 uCi	.0081	6.336	406.6	27.40	
Th-232	~0.03 uCi	.0090	6.334	407.3	27.50	
Bkg	NA	.0081	6.328	407.5	27.40	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0083 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit — Record the third reading 0.0315 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit — Record the third reading 0.0129 mR/hr

4.4 Remove all sources. — Record the third reading 0.0081 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors. ☑ HPIC ☑ Bty Volt ☑ Bias Volt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> **OK**

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE At prompt to download to RSS-131. YES

Continue collecting data. When data collection is finished, download data using filename convention.

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case

Comments:

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 11JC15DW	Case # 172	CERETS # ERT-737		Location: Warehouse	
Date 160810	Calibration Date 160623			Calib Due Date 170623	
Bkg 4.0 uR/hr	Temp 78.8 F		Pressure 29.83 " Hg		Humidity% 68

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: This instrument is valid for collecting Data Quality Level 1 data only
NOTE: Record changes and differences in Comments sections

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen. Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- **Day:** 0 **Hour:** 5 **Min:** 1
Record Sensor Data: **HPIC:** .0075 **Bty Volts:** 6.910 **BiasVolts:** 10.75 **Temp:** 30.00

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 160810
Reviewed by: [signature] Date: 160901

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0081	6.358	407.0	30.00	
Cs-137	5 uCi	.0319	6.412	408.0	30.00	
Cs-137	1 uCi	.0135	6.416	407.4	30.00	
Co-60	1 uCi	.0114	6.412	406.7	30.00	
Eu-152	1 uCi	.0078	6.412	407.5	30.00	
Am-241	~0.1 uCi	.0082	6.414	407.4	30.00	
Th-232	~0.03 uCi	.0095	6.301	408.7	30.00	
Bkg	NA	.0077	6.396	407.7	30.00	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0080 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit — Record the third reading 0.0313 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit — Record the third reading 0.0135 mR/hr

4.4 Remove all sources. — Record the third reading 0.0072 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is today's date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> **OK**

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE. At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments:

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Certificate of Calibration

2016-6762-2

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name:	US EPA	Manufacturer:	GE Reuter-Stokes
Address:	4820 Olympic Blvd Erlanger, KY 41018	Model: RSS-131ER	SN: 11J01SDW
		Detector Manufacturer:	GE Reuter-Stokes
Customer PO#	Work Order: 2016-6762	Det. Model: Pressurized Ion Chamber	SN: n/a
Calibration Method:	Source	Procedure:	MCP-30

Instrument Received: ☑ Within Tolerance ☐ Out of Tolerance ☐ Repairs Required ☐ Other (See Comments)

☐ Geotropism ☐ Meter Zero ☑ Mech. Ck ☐ HV Readout ☑ Battery Check ☑ Reset

☐ Audio ☐ Window Status ☐ FS Response ☑ Linearity ☐ Alarm Set

Temperature: 71.1 F Humidity: 48.5% Pressure: 28.4 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
Dose Rate	0.4 mR/hr	0.407 mR/hr	0.407 mR/hr	0.36-0.44	Dose Rate	0.8 mR/hr	0.803 mR/hr	0.803 mR/hr	0.72-0.88
Dose Rate	4 mR/hr	4.02 mR/hr	4.02 mR/hr	3.6-4.4	Dose Rate	8 mR/hr	7.82 mR/hr	7.82 mR/hr	7.2-8.8
Dose Rate	40 mR/hr	39.4 mR/hr	39.4 mR/hr	36-44	Dose Rate	80 mR/hr	78.5 mR/hr	78.5 mR/hr	72-88
Dose Rate	400 mR/hr	394.5 mR/hr	394.5 mR/hr	360-440	Dose Rate	800 mR/hr	793.5 mR/hr	793.5 mR/hr	720-880

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance	Position
Cs137	7020CM	Cell 3 Gamma Irradiator	7.625 Ci					

Comments

```
As Found Sensitivity & Parameters:
Cs137 = 11.37 mV/uR/hr
Ra226 = 11.25 mV/uR/hr
PAC: 2.141e-8
PLN: 5.178e11
PMM: 2.214e9
PHM: 9.949e8

As Left Sensitivity & Parameters:
Cs137 = 11.37 mV/uR/hr
Ra226 = 11.25 mV/uR/hr
PAC: 2.141e-8
PLN: 5.178e11
PMM: 2.214e9
PHM: 9.949e8
```

Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument)

Calibration Technician: (AL)	QA Technician	Date 6/24/16
Calibration Date: 06/23/2016	Calibration Due 06/23/2017	39

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 1160ADY	Case # 175	CERETS # ERT-2410		Location: Warehouse	
Date 170104	Calibration Date 160113			Calib Due Date 170113	
Bkg 3.8 uR/hr	Temp 69.8 F		Pressure 29.03 " Hg		Humidity% 32

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only.
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing.
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each. ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 41 Min: 1
Record Sensor Data: HPIC: .0078 Bty Volts: 6.428 BiasVolts: 398.0 Temp: 24.40

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 170104
Reviewed by: [signature] Date: 170105

COPY

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0086	6.332	400.1	24.40	
Cs-137	5 uCi	.0311	6.360	400.8	24.40	
Cs-137	1 uCi	.0122	6.366	399.0	24.40	
Co-60	1 uCi	.0124	6.310	400.0	24.40	
Eu-152	1 uCi	.0078	6.282	401.2	24.40	
Am-241	~0.1 uCi	.0071	6.448	399.2	24.40	
Th-232	~0.03 uCi	.0101	6.466	400.3	24.40	
Bkg	NA	.0082	6.466	399.8	24.50	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0077 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit. — Record the third reading 0.0314 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit. — Record the third reading 0.0128 mR/hr

4.4 Remove all sources. — Record the third reading 0.0085 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved.

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> OK

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE. At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention.

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments:

Test performed under line power

COPY

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 11L01ADY	Case # 175	CERETS # ERT-940		Location: Warehouse	
Date 161214	Calibration Date 160113			Calib Due Date 170113	
Bkg 3.8 uR/hr	Temp 68.9° F	Pressure 29.27 " Hg		Humidity% 20	

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only.
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing.
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each. ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 8 Min: 21
Record Sensor Data: HPIC: .0086 Bty Volts: 6.052 BiasVolts: 400.9 Temp: 23.20

COPY

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 161214
Reviewed by: [signature] Date: 170105

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0078	6.088	399.5	23.20	
Cs-137	5 uCi	.0311	6.120	399.5	23.20	
Cs-137	1 uCi	.0130	6.054	399.2	23.20	
Co-60	1 uCi	.0116	6.088	400.8	23.20	
Eu-152	1 uCi	.0087	5.924	399.7	23.20	
Am-241	~0.1 uCi	.0087	5.956	400.9	23.20	
Th-232	~0.03 uCi	.0091	6.130	398.9	23.20	
Bkg	NA	.0086	6.116	399.8	23.20	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0080 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit. — Record the third reading 0.0318 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit. — Record the third reading 0.0126 mR/hr

4.4 Remove all sources. — Record the third reading 0.0084 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved.

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> OK

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE. At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention.

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments:

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 1142 ADV	Case # 1.5	CERETS # ERI-740		Location: Lighthouse	
Date 16 11 09	Calibration Date 16 11 13			Calib Due Date 17 11 13	
Bkg 3.8 uR/hr	Temp 66.6 F		Pressure 29.24 " Hg		Humidity% 54

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply
NOTE: This instrument is valid for collecting Data Quality Level 1 data only
NOTE: Record changes and differences in Comments sections

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3. Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 3 Min: 2
Record Sensor Data: HPIC: .0037 Bty Volts: 6.236 BiasVolts: 275.2 Temp: 22.10

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 16 11 09
Reviewed by: [signature] Date: 02 Dec 16

Table 1. Place a check source on the unit in the designated area approximately 60 seconds then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0079	6.244	399.5	23.10	
Cs-137	5 uCi	.0321	6.218	399.5	23.10	
Cs-137	1 uCi	.0135	6.226	398.3	23.10	
Co-60	1 uCi	.0115	6.218	400.6	23.10	
Eu-152	1 uCi	.0087	6.206	399.0	23.10	
Am-241	~0.1 uCi	.0088	6.232	399.4	23.20	
Th-232	~0.03 uCi	.0095	6.103	400.7	23.20	
Bkg	NA	.0076	6.090	399.2	23.10	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0050 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit — Record the third reading 0.0311 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit — Record the third reading 0.0127 mR/hr

4.4 Remove all sources — Record the third reading 0.0079 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors: ☑ HPIC ☑ Bty Volt ☑ Bias Volt ☑ Temp

☒ 6.1 Go to Online --> Clear Data Ques --> OK

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE At prompt to download to RSS-131 YES

Continue collecting data. When data collection is finished download data using filename convention

☑ 6.3 Turn unit OFF Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise unplug and disconnect the power supply and return them to the case.

Comments: HPIC upload did not show source irradiations. Rerun upload with AC power, did not change result. Transformer stayed green when battery was connected [illegible]

Rerun upload [illegible]

Then close [illegible]

C-ERT Form F-045 Rev 5 Feb 06, 2015

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 1120A3	Case # 175	CERETS # ERT-740	Location: Warehouse
Date 161012	Calibration Date 160113		Calib Due Date 170113
Bkg 4.0 uR/hr	Temp 72.3° F	Pressure 29.22 " Hg	Humidity% 48

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only.
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing.
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each. ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 3 Min: 37
Record Sensor Data: HPIC: .0077 Bty Volts: 5.715 BiasVolts: 1000.1 Temp: 25.90

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by: [signature] Date: 161012
Reviewed by: [signature] Date: 27 Oct 2016

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0080	5.974	401.0	25.80	
Cs-137	5 uCi	.0320	6.128	400.9	25.90	
Cs-137	1 uCi	.0130	6.138	399.8	25.90	
Co-60	1 uCi	.0124	6.140	399.3	25.90	
Eu-152	1 uCi	.0083	6.120	401.1	26.00	
Am-241	~0.1 uCi	.0076	6.100	400.9	26.00	
Th-232	~0.03 uCi	.0090	6.138	399.3	25.90	
Bkg	NA	.0072	5.954	400.2	25.90	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0081 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit. — Record the third reading 0.0316 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit. — Record the third reading 0.0128 mR/hr

4.4 Remove all sources. — Record the third reading 0.0074 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> **OK**

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE. At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention.

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments: Test done on battery power

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Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 1160191	Case # 175	CERETS # ERT-740		Location: Warehouse	
Date 160914	Calibration Date 160113			Calib Due Date 170113	
Bkg 3.8 uR/hr	Temp 76.1° F		Pressure 29.20 "Hg		Humidity% 57

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only
NOTE: Record changes and differences in Comments sections

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3. Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- Day: 0 Hour: 1 Min: 7
Record Sensor Data HPIC: .00794 Bty Volts: 6.338 BiasVolts: 400.8 Temp: 77.00

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by [signature] Date: 160914
Reviewed by [signature] Date: 03 Oct 2016

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0077	6.338	399.4	27.00	
Cs-137	5 uCi	.0312	6.266	401.1	27.00	
Cs-137	1 uCi	.0127	6.340	399.3	27.00	
Co-60	1 uCi	.0118	6.336	400.0	27.00	
Eu-152	1 uCi	.0058	6.324	399.6	27.00	
Am-241	~0.1 uCi	.0080	6.186	399.9	27.10	
Th-232	~0.03 uCi	.0099	6.338	399.9	27.00	
Bkg	NA	.0082	6.338	400.1	27.10	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0077 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit — Record the third reading 0.0311 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit — Record the third reading 0.0127 mR/hr

4.4 Remove all sources — Record the third reading 0.0075 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date, ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors: ☑ HPIC ☑ BtyVolt ☑ BiasVolt ☑ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> **OK**

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE. At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments:

Cincinnati ERT Reuter-Stokes RSS-131 Functional Test

SN Unit 1160ADY	Case # 175	CERETS # ERT-740		Location: Warehouse	
Date 160810	Calibration Date 160113			Calib Due Date 170113	
Bkg 4.0 uR/hr	Temp 78.8° F		Pressure 29.83 " Hg		Humidity% 68

Source Number	Isotope	Activity	Comments
119E11-2	Cs-137	5 uCi	
1442	Cs-137	1 uCi	
111E01-2	Co-60	1 uCi	
111E08-2	Eu-152	1 uCi	
No SN	Th-232	~0.03 uCi	
SD-1-03	Am-241	~1 uCi	

NOTE: The instrument is very sensitive to the cable shorting out. Do not bend cable sharply.
NOTE: This instrument is valid for collecting Data Quality Level 1 data only.
NOTE: Record changes and differences in Comments sections.

☑ 1.1 Verify that a charger, 2 serial cables with modified connectors, software CD and Data Packet are present. Verify that the RSS-131 Operations Manual, Calibration Certificate and forms are present.
☑ 1.2 Verify the S/N from the Calib Sheet and the top of the instrument are the same.
☑ 1.3 Connect special Reuter- Stokes cable from COM2 on the unit to serial port on Dell PC, Govt property # G003130 (ERT-371) or computer with current firmware and config utilities. It may be necessary to use the Serial-USB adaptor.
☑ 1.4 Plug charger in to 110 v outlet and connect to RSS-131.
☑ 1.5 Turn RSS-131 ON. Collect data for at least one hour before continuing.
☑ 1.6 Turn Dell PC ON. Open RSS-131 folder on desktop. Double click on RSS131 Config file.
☑ 1.7 Verify that the Firmware is Vers 5.7 and Config Utility is 4.4.
☑ 1.8 Verify the following appears at the bottom of the screen: Ready | COM1: 9600, N,8,1 | No Modem

☑ 2.1 Go to Configuration -→ General Verify these settings are selected and checked if applicable: mm/dd/yy, mR/hr, 100 msec, None; External comm port- None
☑ 2.2 Go to Configuration -→ Comm Verify COM2, BAUD: 9600, Parity: None, Handshaking: None; CLOSE
☑ 2.3 Go to Configuration -→ Electrometer Verify readings match Calibration certificate Page 3 (+ 0.002); CLOSE

Go to Configuration -→ Sensors -→ (see argument below) Change to values listed if necessary.

Argument	Interval	Buffer	AlarmLow	AlarmHigh	Comment
HPIC	60	10,000	5.00E-06	1.00E-04	Conversion Fctr- see Calib Sheet Pg 3, Unit Conv = 1
Wind Speed	3600	100	0	0	Conv Fctr = 0.219
Wind Direction	3600	100	0	0	
Pressure	60	1000	0	40	Range 800- 100 mbar
Bias volts	60	1000	250	500	
Battery volts	60	1000	5.5	8.5	
Rain	3600	100	0	500	Conversion Factor = 10.000
Temperature	60	1000	-25	50	
Aux A/D	3600	100	0	0	

☑ 3.1 Go to Configuration. Verify the following settings. CLOSE window after checking each.
Alarm Dial- blank Filter- 1 Backward compatability- blank
☑ 3.2 Go to Online. Verify the following settings. CLOSE window after checking each ☑ Version- SFTW-131-001-6.1ER
☑ Time- Set time to PC is checked Record Uptime- **Day:** 0 **Hour:** 4 **Min:** 54
Record Sensor Data **HPIC:** .0071 **Bty Volts:** 6.136 **BiasVolts:** 359.5 **Temp:** 29.90

C-ERT Form F-045
Rev 5 Feb 06, 2015

Performed by [signature] Date: 160810
Reviewed by [signature] Date: 160901

Table 1. Place a check source on the unit in the designated area approximately 60 seconds, then record the reading for each of the following parameters. Go to Online --> Sensor Data to obtain the readings.

Isotope	Activity	HPIC	Bty V	Bias V	Temp	Comments
Bkg	NA	.0073	6.102	400.6	29.90	
Cs-137	5 uCi	.0324	6.156	399.9	30.00	
Cs-137	1 uCi	.0117	6.104	400.0	29.90	
Co-60	1 uCi	.0112	6.152	400.3	30.00	
Eu-152	1 uCi	.0083	6.146	400.3	30.00	
Am-241	~0.1 uCi	.0073	6.112	399.9	30.00	
Th-232	~0.03 uCi	.0090	6.158	401.2	30.00	
Bkg	NA	.0078	6.146	401.3	30.00	

4.1 Go to Online --> Current Data --> HPIC --> Get Data — Record the third reading 0.0073 mR/hr

4.2 Place the 5 uCi Cs-137 source on the unit — Record the third reading 0.0313 mR/hr

4.3 Remove source. Place the 1 uCi Cs-137 source on the unit — Record the third reading 0.0124 mR/hr

4.4 Remove all sources — Record the third reading 0.0078 mR/hr

5.1 Record data from the unit for each of the parameters through the following steps

Upload Data --> Select sensor (leave Start Date and End Date blank) --> OK

Name each file ***yymmdd-x-sensor*** where ***yymmdd*** is todays date ***x*** is the iteration of data saved on this date and ***sensor*** is the specific sensor being saved

Sensors: ☑ HPIC ☑ Bty Volt ☑ Bias Volt ☐ Temp

☑ 6.1 Go to Online --> Clear Data Ques --> **OK**

☑ 6.2 Go to File --> Save As --> ***yymmdd-x*** SAVE At prompt to download to RSS-131, YES

Continue collecting data. When data collection is finished, download data using filename convention

☑ 6.3 Turn unit OFF. Unplug cables and put them in the bag. If unit is to be used in the next 24 hours, leave it plugged in. Otherwise, unplug and disconnect the power supply and return them to the case.

Comments: HPIC interval was found at 1 second. Reset to 60 seconds and queues were cleared after Google data were downloaded.

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique*, and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

Sensor Type: 100 R/Hr

Serial Number: 11L01ADY

Calibration Date: 1/13/2016

Sensitivity: 9.74 mV/µR/h

Authorized Signature

*Calibration Procedure: RS-SOP 238.1

Calibration Data

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique* and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

*Calibration Procedure: RS-SOP 238.1

Sensor Type:	100 R/Hr	Source (CS-137):	BB-400
Serial Number:	11L01ADY	Date of Certification:	12/1/1994
Sensitivity (Ra-226):	9.74 mV/μR/h	Exposure Rate at 1 meter:	4.226 mR/h

Customer Name: TETRA TECH

Distance		Exposure Rate	P+S+A	S+A	P	k(CS-137)
Feet	cm	μR/h	V	V	V	mV/μR/h
12	366	190.411	2.364	0.482	1.882	9.88
14	427	139.315	1.791	0.427	1.364	9.79
16	488	106.222	1.424	0.375	1.049	9.87
18	549	83.581	1.167	0.343	0.824	9.85

k(CS-137) = 9.85 mv/μR/h

k(Ra-226) = 0.9892 k(CS-137)

k(Ra-226) = 9.74 mv/μR/h

$\bar{k}$ = 9.85 mv/μR/h

σ = .04 mv/μR/h

$V = \frac{\sigma}{k} =$ 0.404%

Wm Radwanski

Date: 1/22/16

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RSS-131 FIRMWARE PARAMETERS

S/N 11L01ADY

RAC	2.168E-08
ZLN	0.000E+00
ZMN	4.880E-01
ZHN	2.000E-03
ZLD	0.000E+00
ZMD	-6.718E-04
ZHD	2.291E-05
RLN	4.492E+11
RMN	2.215E+09
RHN	9.960E+06
RLV	-1.675E+08
RMV	-7.067E+04
RHV	-1.948E+02

By: Wm Radwanski
Level 2 Nuclear / Electrical Inspector

Date: 1/22/16

Reviewed By: [illegible]
Product Engineer

Durridge Company Inc.
524 Boston Road, Billerica, MA 01821
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www.durridge.com

Tuesday, February 16, 2016

Calibration of RAD7 0516 for Radon-220

This memo is to confirm that I have calibrated the RAD7 unit 0516 for thoron gas (radon-220) using non-certified calibration materials. The following conditions were maintained during the calibration:

Temperature: 22.8 degrees C
Flow rate: 0.716 L/min
Small drying tube: (W.A. Hammond Drierite #26930)
Tubing: 3/16 inch I.D. vinyl, 3 ft length
Inlet filter: SRI 44525-NN, 25mm 0.45μm Nylon
RAD7 Protocol: Thoron
Equilibration period: 5 minutes

Under these conditions I found the thoron sensitivity to be 0.107 cpm/(pCi/L), and I adjusted the unit's thoron factor accordingly. I estimate the overall calibration error to be within +/- 25%.

COPY

Please note that thoron's short half-life (55.6 sec) means that deviation from these conditions of configuration and flow rate can cause significant change in thoron recovery. For example, if the large drying column is to be used instead of the small drying tube, you can expect the instrument to under-report inlet thoron gas concentration by approximately 50%. Furthermore, if the cycle time were also increased above five minutes, and the pump allowed to operate in AUTO mode, pumping for only one minute in every five, the air sample in the measurement chamber could be as much as 5 - 10 minutes old, and the instrument thoron reading could be just 1%, or less, of the inlet thoron gas concentration. Please call if you have questions.

Signature

Kathleen Fletcher
Radon Measurement Specialist

Durridge Company
524 Boston Road, Billerica, MA 01821
Tel: (978) 667-9556, Fax: (978) 667-9557
www.durridge.com

Certificate of Calibration

RAD7 PROFESSIONAL RADON DETECTOR (NRSB Device Code - 31810 CR)

Calibration Date:	February 15, 2016	*Date of Previous Calibration:*	*January 9, 2015*
Serial Number:	0516	*Previous Sensitivity, Normal mode:*	*0.377*
Model Number:	RAD7-711	*Previous Sensitivity, Sniff mode:*	*0.182*
Firmware Version:	3.1a 151208	*Previous Spill Factor:*	*0.017*
RADLINK Version:	0311		
Dates of Calibration Run:	February 12, 2016 to February 15, 2016		
Reference Unit Number(s):	504, 887, 961, 1277		
Mean Temperature:	20.4 °C		
Mean Radon Concentration:	64.1 pCi/L, 2370 Bq/m3		
Sensitivity, Normal Mode:	0.382 CPM/(pCi/L), 0.0103 CPM/(Bq/m3)		
Sensitivity, Sniff Mode:	0.185 CPM/(pCi/L), 0.00500 CPM/(Bq/m3)		
Spill Factor:	0.019		
Calibration Uncertainty:	2% 2-Sigma (See Notes 1, 2)		
Conversion Factor, Normal:	2.62 (pCi/L)/cpm, 96.9 (Bq/m3)/cpm		
Conversion Factor, Sniff:	5.41 (pCi/L)/cpm, 200 (Bq/m3)/cpm		

Note 1) Based on counting statistics of the reference and this unit.

Note 2) No account has been made for the calibration uncertainty of the reference unit relative to an absolute standard, which we estimate to be within +/- 5%.

COPY

NRSB Accredited Radon Chamber Certificate Number: NRSB TRC0003

NRSB Certification Number: 14SS023

Calibration Technician: Linda M. Albertelli

Signature: LM Albertelli Date: February 15, 2016

It is recommended that this unit be calibrated again on or before: February 15, 2017

29.03"

Rad-7 Functional Test Procedure

Date	170104	SN	516	CERETS	ERT-743	Case #	191	RnSrc #	Rn-004
Temp	69.8°F	Pressure	~~29.03~~"	Humidity	32%	Test Location	Warehouse		
Calib Date	160215			Calib Due	170215			PC #	ERT-290

The general process for performing the Rad-7 Functional Test is:

- put the unit into operation
- collect internal chamber readings for approximately one hour
- collect background reading for approximately one hour
- collect radon/thoron samples from check source for approximately 2 hours
- collect background readings for approximately 2 hours
- download the data and evaluate the results

The face of the Rad-7 has the following features:

• Power connector • ON/OFF switch • Display panel • Serial port • Infrared detector • Air inlet & Air outlet
• Control panel: consists of the following buttons • [MENU] • [ENTER] • ⇒ • ⇐

The arrow keys toggle between menu items. There are 4 pages: • Test • Data • Setup • Special
Pressing the MENU button always returns the unit to the Test page. Each page has a set of menu selections.
Some menu selections have a submenu selections. See Rad-7 Manual for a complete description of the selections.

The unit can store a maximum of 1000 readings. Data is collected in groups of data points called Cycles.
Each cycle is numbered 01, 02, ... to 99. A cycle can hold up to 99 readings. Each time a test is terminated,
the next test starts a new Cycle. An uninterrupted test will store store samples, for example 0301 to 0399.

Initial Setup

☑ 1. Verify the instrument manual, CD, calibration sheet, and D-006 Rad-7 Setup Summary
☑ 2. Inspect unit for damage and cleanliness. Report any occurrence and do NOT proceed until corrected.
☑ 3. Connect power cord, connect Air IN to Air OUT with tygon tubing. Turn unit ON.
☑ 4. [MENU] (Test) ⇒ to (Setup) [ENTER] (Setup Protocol) [ENTER]
Input the following parameters. Only one parameter can be entered at a time.
Protocol (none) Cycle 00:10 Recycle 00 Mode Normal Thoron ON Pump Auto
Tone Geiger Format Long Units pCi/F SavUser No Clock Enter DTG Review [ENTER]
☑ 5. [MENU] (Test) ⇒ to (Special) ⇒ to SPrOFF [ENTER]

Functional Testing

☑ 6. [MENU] (Test) [ENTER] ⇒ (Test Start) [ENTER] **Start Date** 170104 **Time** 0850 **Cycle** 0101
Allow unit to collect data approximately 1 hour. Turn unit OFF, turn unit ON.
☑ 7. Disconnect the Air IN/OUT tubing. Connect the desiccant tube to the Air IN. In dirty atmospheres, connect filter between desiccant and the Air IN. **Start Date** 170104 **Time** 1001 **Cycle** 0201
Collect samples for approximately 1 hour. Turn unit OFF, turn unit ON.
☑ 8. Disconnect desiccant tube. Connect the tubing from the Radon Check Source "To Rad-7" to the Air IN and Air OUT to Radon Check Source "From Rad-7" **Start Date** 170104 **Time** 1104 **Cycle** 0301
Collect samples for approximately 2 hours. Turn unit OFF, turn unit ON.
☑ 9. Disconnect the check source from the Rad-7. Place attachment tubes in the Accessory Bag. Connect Rad-7 Air IN to desiccant tube and dump Air OUT. **Start Date** 170104 **Time** 1306 **Cycle** 0401
Collect samples for approximately 2 hours. Turn unit OFF, turn unit ON. **Last Cycle** 0416
☑ 10. [MENU] (Test) ⇒ (Test Stop) [ENTER]

Comments:

W.D.Connell	WDC	170104		D.G.Draper	DGD	170105
Test Performed By:		**Date**		**Reviewed By:**		**Date**

COPY

Rad-7 Functional Test Procedure

Download Data

☑ 11. Connect serial cable to "Serial to USB" adaptor. Connect USB to computer, serial to Rad-7.
[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to SPrON [ENTER], (Special) ⇒ Set Baud, 19200 [ENTER]

Turn computer ON, START, Control Panel, Administrative Tools, Computer Management, Device Manager, Ports, Belkin Serial, Port Settings. Bits per second 19200, Data bits 8, Parity None, Stop bits 1, Flow control None ADVANCED, Com Port Number 1, OK, OK, OK

☑ 12. Plug a USB flash drive into the computer.
START, All Programs, Accessories, Communications, Hyperterminal. NAME Rad-7
NAME Rad-7 CONNECT TO, Connect Using COM 1, OK
Bits per Second 19200, Data Bits 8, Parity None, Stop Bits 1, Flow Control None, APPLY, OK

☑ 13. Select TRANSFER. Click on Capture Text. Browse to USB flash drive.
Enter Filename using the convention Rad7-SN-yymmdd-x where SN is 516 or 1048, yy is the year, mm is the month, dd is the day, and x is the sequential data packet stored this date. SAVE
Example: Rad7-1048-080328-1 START

☑ 14. On the Rad-7, [MENU] (Test) ⇒ to (Special) [ENTER] (Ident) [ENTER] ⇒ to (Setup) [ENTER] ⇒ to (Setup Protocol) ⇒ to (Review) [ENTER]

Note: Current settings on the Rad-7 (19200, 8, N, 1) should be displayed on the Hyperterminal screen

[MENU] (Test) ⇒ to (Data) [ENTER] ⇒ to (Data Print) [ENTER] (01) [ENTER]
Note: Data from the first Cycle will be captured on the screen as it is sent to Hyperterminal
REPEAT operation for all subsequent Data Cycles (02....)
Note: Each time the Rad7 was turned OFF, then ON, another Cycle was started

[MENU] (Test) ⇒ (Data) [ENTER] ⇒ to (Data Summary) [ENTER] (01) [ENTER]
Ccollect Summary Data for all Data Cycles

[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to (Special ComAll) [ENTER] (all readings)
[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to (Special ComSpec) [ENTER] (all channels)
Note: All data should have been sent to Hyperterminal in text format

[MENU] (Test) ⇒ to (Special) [ENTER] ⇒ (Special Ident) [ENTER]

☑ 15. On the computer, Select Call, Click on Disconnect (Yes). CLOSE Hyperterminal
Open the Rad-7 folder on the Desktop. Open Data Subfolder. Open the file to verify the data was collected and transferred. If not, repeat steps 12, 13 and 14. [MENU] (Test) ⇒ (Special) ⇒ to SPrOFF [ENTER]

☑ 16. [MENU] (Test) ⇒ (Data) [ENTER] ⇒ to (Data Erase) [ENTER] to (No) ⇒ (Yes)

☑ 17. Disconnect the Rad-7 from the computer. Turn computer OFF. Turn Rad-7 OFF.

Comments:

Rad-7 Functional Test Procedure

Rn-004

Date 161206	SN 516	CERETS SRT-743	Case # 191	RnSrc # ~~Rn-005~~
Temp 70.0°F	Pressure 28.73"	Humidity 31%	Test Location	Warehouse
Calib Date	160215	Calib Due	170215	PC # ERT-290

The general process for performing the Rad-7 Functional Test is:

- put the unit into operation
- collect internal chamber readings for approximately one hour
- collect background reading for approximately one hour
- collect radon/thoron samples from check source for approximately 2 hours
- collect background readings for approximately 2 hours
- download the data and evaluate the results

The face of the Rad-7 has the following features:

• Power connector • ON/OFF switch • Display panel • Serial port • Infrared detector • Air inlet & Air outlet
• Control panel: consists of the following buttons • [MENU] • [ENTER] • ⇒ • ⇐

The arrow keys toggle between menu items. There are 4 pages: • Test • Data • Setup • Special
Pressing the MENU button always returns the unit to the Test page. Each page has a set of menu selections.
Some menu selections have a submenu selections. See Rad-7 Manual for a complete description of the selections.

The unit can store a maximum of 1000 readings. Data is collected in groups of data points called Cycles.
Each cycle is numbered 01, 02, ... to 99. A cycle can hold up to 99 readings. Each time a test is terminated,
the next test starts a new Cycle. An uninterrupted test will store store samples, for example 0301 to 0399.

Initial Setup

☑ 1. Verify the instrument manual, CD, calibration sheet, and D-006 Rad-7 Setup Summary
☑ 2. Inspect unit for damage and cleanliness. Report any occurrence and do NOT proceed until corrected.
☑ 3. Connect power cord, connect Air IN to Air OUT with tygon tubing. Turn unit ON.
☑ 4. [MENU] (Test) ⇒ to (Setup) [ENTER] (Setup Protocol) [ENTER]
Input the following parameters. Only one parameter can be entered at a time.
Protocol (none) Cycle 00:10 Recycle 00 Mode Normal Thoron ON Pump Auto
Tone Geiger Format Long Units pCi/F SavUser No Clock Enter DTG Review [ENTER]
☑ 5. [MENU] (Test) ⇒ to (Special) ⇒ to SPrOFF [ENTER]

Functional Testing

☑ 6. [MENU] (Test) [ENTER] ⇒ (Test Start) [ENTER] **Start Date** 161206 **Time** 0830 **Cycle** 0101
Allow unit to collect data approximately 1 hour. Turn unit OFF, turn unit ON.
☑ 7. Disconnect the Air IN/OUT tubing. Connect the desiccant tube to the Air IN. In dirty atmospheres, connect filter between desiccant and the Air IN. **Start Date** 161206 **Time** 0933 **Cycle** 0201
Collect samples for approximately 1 hour. Turn unit OFF, turn unit ON.
☑ 8. Disconnect desiccant tube. Connect the tubing from the Radon Check Source "To Rad-7" to the Air IN and Air OUT to Radon Check Source "From Rad-7" **Start Date** 161206 **Time** 1046 **Cycle** 0301
Collect samples for approximately 2 hours. Turn unit OFF, turn unit ON.
☑ 9. Disconnect the check source from the Rad-7. Place attachment tubes in the Accessory Bag. Connect Rad-7 Air IN to desiccant tube and dump Air OUT. **Start Date** 161206 **Time** 1257 **Cycle** 0401
Collect samples for approximately 2 hours. Turn unit OFF, turn unit ON. **Last Cycle** 0407
☑ 10. [MENU] (Test) ⇒ (Test Stop) [ENTER]

Comments:

W.D.Connell	WConnell	161206	D.G.Draper	
Test Performed By:		**Date**	**Reviewed By:**	**Date**

COPY

Rad-7 Functional Test Procedure

Download Data

☑ 11. Connect serial cable to "Serial to USB" adaptor. Connect USB to computer, serial to Rad-7.
[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to SPrON [ENTER], (Special) ⇒ Set Baud, 19200 [ENTER]

Turn computer ON, START, Control Panel, Administrative Tools, Computer Management, Device Manager, Ports, Belkin Serial, Port Settings. Bits per second 19200, Data bits 8, Parity None, Stop bits 1, Flow control None ADVANCED, Com Port Number 1, OK, OK, OK

☑ 12. Plug a USB flash drive into the computer.
START, All Programs, Accessories, Communications, Hyperterminal. NAME Rad-7
NAME Rad-7 CONNECT TO, Connect Using COM 1, OK
Bits per Second 19200, Data Bits 8, Parity None, Stop Bits 1, Flow Control None, APPLY, OK

☑ 13. Select TRANSFER. Click on Capture Text. Browse to USB flash drive.
Enter Filename using the convention Rad7-SN-yymmdd-x where SN is 516 or 1048, yy is the year, mm is the month, dd is the day, and x is the sequential data packet stored this date. SAVE
Example: Rad7-1048-080328-1 START

☑ 14. On the Rad-7, [MENU] (Test) ⇒ to (Special) [ENTER] (Ident) [ENTER] ⇒ to (Setup) [ENTER] ⇒ to (Setup Protocol) ⇒ to (Review) [ENTER]

Note: Current settings on the Rad-7 (19200, 8, N, 1) should be displayed on the Hyperterminal screen

[MENU] (Test) ⇒ to (Data) [ENTER] ⇒ to (Data Print) [ENTER] (01) [ENTER]
Note: Data from the first Cycle will be captured on the screen as it is sent to Hyperterminal
REPEAT operation for all subsequent Data Cycles (02....)
Note: Each time the Rad7 was turned OFF, then ON, another Cycle was started

[MENU] (Test) ⇒ (Data) [ENTER] ⇒ to (Data Summary) [ENTER] (01) [ENTER]
Ccollect Summary Data for all Data Cycles

[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to (Special ComAll) [ENTER] (all readings)
[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to (Special ComSpec) [ENTER] (all channels)
Note: All data should have been sent to Hyperterminal in text format

[MENU] (Test) ⇒ to (Special) [ENTER] ⇒ (Special Ident) [ENTER]

☑ 15. On the computer, Select Call, Click on Disconnect (Yes). CLOSE Hyperterminal
Open the Rad-7 folder on the Desktop. Open Data Subfolder. Open the file to verify the data was collected and transferred. If not, repeat steps 12, 13 and 14. [MENU] (Test) ⇒ (Special) ⇒ to SPrOFF [ENTER]

☑ 16. [MENU] (Test) ⇒ (Data) [ENTER] ⇒ to (Data Erase) [ENTER] to (No) ⇒ (Yes)

☑ 17. Disconnect the Rad-7 from the computer. Turn computer OFF. Turn Rad-7 OFF.

Comments: Also used CAPTURE.exe

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Rad-7 Functional Test Procedure

Date 161109	SN 516	CERETS ERT-743	Case # 191	RnSrc # 001
Temp 66.0°F	Pressure 29.24"	Humidity 54%	Test Location Warehouse	
Calib Date 160215		Calib Due 170215		PC # ERT-290

The general process for performing the Rad-7 Functional Test is:

- put the unit into operation
- collect internal chamber readings for approximately one hour
- collect background reading for approximately one hour
- collect radon/thoron samples from check source for approximately 2 hours
- collect background readings for approximately 2 hours
- download the data and evaluate the results

The face of the Rad-7 has the following features:

• Power connector • ON/OFF switch • Display panel • Serial port • Infrared detector • Air inlet & Air outlet
• Control panel: consists of the following buttons • [MENU] • [ENTER] • ⇒ • ⇐

The arrow keys toggle between menu items. There are 4 pages: • Test • Data • Setup • Special
Pressing the MENU button always returns the unit to the Test page. Each page has a set of menu selections.
Some menu selections have a submenu selections. See Rad-7 Manual for a complete description of the selections.

The unit can store a maximum of 1000 readings. Data is collected in groups of data points called Cycles.
Each cycle is numbered 01, 02, ... to 99. A cycle can hold up to 99 readings. Each time a test is terminated,
the next test starts a new Cycle. An uninterrupted test will store store samples, for example 0301 to 0399.

Initial Setup

☑ 1. Verify the instrument manual, CD, calibration sheet, and D-006 Rad-7 Setup Summary
☑ 2. Inspect unit for damage and cleanliness. Report any occurrence and do NOT proceed until corrected.
☑ 3. Connect power cord, connect Air IN to Air OUT with tygon tubing. Turn unit ON.
☑ 4. [MENU] (Test) ⇒ to (Setup) [ENTER] (Setup Protocol) [ENTER]
Input the following parameters. Only one parameter can be entered at a time.
Protocol (none) Cycle 00:10 Recycle 00 Mode Normal Thoron ON Pump Auto
Tone Geiger Format Long Units pCi/F SavUser No Clock Enter DTG Review [ENTER]
☑ 5. [MENU] (Test) ⇒ to (Special) ⇒ to SPrOFF [ENTER]

Functional Testing

☑ 6. [MENU] (Test) [ENTER] ⇒ (Test Start) [ENTER] **Start Date** 161109 **Time** 0855 **Cycle** 0101
Allow unit to collect data approximately 1 hour. Turn unit OFF, turn unit ON.
☑ 7. Disconnect the Air IN/OUT tubing. Connect the desiccant tube to the Air IN. In dirty atmospheres, connect filter between desiccant and the Air IN. **Start Date** 161109 **Time** 0957 **Cycle** 0201
Collect samples for approximately 1 hour. Turn unit OFF, turn unit ON.
☑ 8. Disconnect desiccant tube. Connect the tubing from the Radon Check Source "To Rad-7" to the Air IN and Air OUT to Radon Check Source "From Rad-7" **Start Date** 161109 **Time** 1100 **Cycle** 0301
Collect samples for approximately 2 hours. Turn unit OFF, turn unit ON.
☑ 9. Disconnect the check source from the Rad-7. Place attachment tubes in the Accessory Bag. Connect Rad-7 Air IN to desiccant tube and dump Air OUT. **Start Date** 161109 **Time** 1403 **Cycle** 0401
Collect samples for approximately 2 hours. Turn unit OFF, turn unit ON. **Last Cycle** 0416
☑ 10. [MENU] (Test) ⇒ (Test Stop) [ENTER]

Comments:

W.D.Connell	161109	D.G.Draper	02Dec2016
Test Performed By:	**Date**	**Reviewed By:**	**Date**

COPY

Rad-7 Functional Test Procedure

Download Data

☑ 11. Connect serial cable to "Serial to USB" adaptor. Connect USB to computer, serial to Rad-7.
[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to SPrON [ENTER], (Special) ⇒ Set Baud, 19200 [ENTER]

Turn computer ON, START, Control Panel, Administrative Tools, Computer Management, Device Manager, Ports, Belkin Serial, Port Settings. Bits per second 19200, Data bits 8, Parity None, Stop bits 1, Flow control None ADVANCED, Com Port Number 1, OK, OK, OK

☑ 12. Plug a USB flash drive into the computer.
START, All Programs, Accessories, Communications, Hyperterminal. NAME Rad-7
NAME Rad-7 CONNECT TO, Connect Using COM 1, OK
Bits per Second 19200, Data Bits 8, Parity None, Stop Bits 1, Flow Control None, APPLY, OK

☑ 13. Select TRANSFER. Click on Capture Text. Browse to USB flash drive.
Enter Filename using the convention Rad7-SN-yymmdd-x where SN is 516 or 1048, yy is the year, mm is the month, dd is the day, and x is the sequential data packet stored this date. SAVE
Example: Rad7-1048-080328-1 START

☑ 14. On the Rad-7, [MENU] (Test) ⇒ to (Special) [ENTER] (Ident) [ENTER] ⇒ to (Setup) [ENTER] ⇒ to (Setup Protocol) ⇒ to (Review) [ENTER]

Note: Current settings on the Rad-7 (19200, 8, N, 1) should be displayed on the Hyperterminal screen

[MENU] (Test) ⇒ to (Data) [ENTER] ⇒ to (Data Print) [ENTER] (01) [ENTER]
Note: Data from the first Cycle will be captured on the screen as it is sent to Hyperterminal
REPEAT operation for all subsequent Data Cycles (02....)
Note: Each time the Rad7 was turned OFF, then ON, another Cycle was started

[MENU] (Test) ⇒ (Data) [ENTER] ⇒ to (Data Summary) [ENTER] (01) [ENTER]
Ccollect Summary Data for all Data Cycles

[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to (Special ComAll) [ENTER] (all readings)
[MENU] (Test) ⇒ (Special) [ENTER] ⇒ to (Special ComSpec) [ENTER] (all channels)
Note: All data should have been sent to Hyperterminal in text format

[MENU] (Test) ⇒ to (Special) [ENTER] ⇒ (Special Ident) [ENTER]

☑ 15. On the computer, Select Call, Click on Disconnect (Yes). CLOSE Hyperterminal
Open the Rad-7 folder on the Desktop. Open Data Subfolder. Open the file to verify the data was collected and transferred. If not, repeat steps 12, 13 and 14. [MENU] (Test) ⇒ (Special) ⇒ to SPrOFF [ENTER]

☑ 16. [MENU] (Test) ⇒ (Data) [ENTER] ⇒ to (Data Erase) [ENTER] to (No) ⇒ (Yes)

☑ 17. Disconnect the Rad-7 from the computer. Turn computer OFF. Turn Rad-7 OFF.

Comments:

Rad-7 Setup Summary

Test									Data								Special																
Status	Start/stop	Save	Clear	Purge	Lock	Sleep	Print	Com	Read	Print	Com	Summary	Free	Delete	Renumber	Erase	Ident	S Pr ON	S Pr OFF	Set Baud	Status	Start	Stop	ComSpec	ComAll	S Pr All	S Load	Version	Model	Serial	Beep	Set Relays
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

1 Status info windows- Sniff, Normal or Grab and Timer
2 Start run, pause run- Displays cycle and total counts
3 Save last cycle whether completed counting or not
4 Finish run, discard last cycle. Prompts user
5 Starts pump, purges chamber. To Stop, push MENU
6 Lock keypad. Unlock- Enter and both arrow keys 5 sec
7 Minimize power use (for older models)
8 Prints data of current cycle
9 Download data of current cycle

10 Display data stored in memory
11 Print data stored in memory
12 Download data stored in memory
13 Print summary of data by cycle, includes start times
14 Displays number of free records remaining
15 Delete a single record in memory, prompts user
16 Renumbers all cycles and eliminates deleted cycle numbers
17 Erases data in memory. Will prompt user

18 S- Sniff 1- 1 Day Test 2- 2 Day Test W- Weeks U- User
19 Set cycle time in hours and minutes
20 Set number of cycles to run
21 S- Sniff N- Normal A- Auto Wat-40 Wat-250
22 Enable thoron on printout, disabled if SNIFF is selected
23 Pump control mode- Auto On Off Grab
24 OFF, Chime or Geiger
25 Set length of printout S- Short M- Medium L- Long
26 Set concentration and temperature units
27 Save current setup protocol
28 Set date and time, select time zone or DST, synchronize
29 Display current protocol setup

30 Print firmware version, hardware model, Unit SN, Calib Date
31 Direct output to Serial Port
32 Direct output to infrared port
33 Set baud rate. Convention: 8 bit, No parity, 1 Stop Bit, X-Off/X-On
34 Instantaneous summary of data
35 Same as Test Start, but does not update display
36 Same as Test Stop
37 Output data in 200 channel MCA. Save and graph to see spectrum
38 Output all test data in comma delimited file to serial port
39 Output all test data in comma delimited file to infrared port
40 Used to load special software through serial port
41 Display Special Version Number
42 Display Rad-7 hardware version number
43 Display Rad-7 serial number
44 Select whether to have audio signal at conclusion of operation
45 Invoke either of two relays at end of each counting cycle

Protocol

	Protocol 18	Cycle 19	Recycle 20	Mode 21	Thoron 22	Pump 23	Tone 24	Format 25	Units 26	SavUser 27	Clock 28	Review 29
Defined Protocols	Sniff Test	5m	00	S	Off	A						
	1 Day Test	30m	48	A	Off	A						
	2 Day Test	1H	48	A	Off	A						
	Continuous	2H	00	A	Off	A						
	Thoron	5m	0	S	On	A						
	Grab	5m	04	S	Off	G						
	Wat-40	5m	04		Off	G		Use Wat-40 mode				
	Wat-250	5m	04		Off	G		Use Wat-250 mode				
	User							User defined protocols				

Durridge Company
524 Boston Road, Billerica, MA 01821
Tel: (978) 667-9556, Fax: (978) 667-9557
www.durridge.com

Certificate of Calibration

RAD7 PROFESSIONAL RADON DETECTOR (NRSB Device Code - 31810 CR)

Calibration Date:	November 7, 2016	*Date of Previous Calibration:*	*November 16, 2015*
Serial Number:	3465	*Previous Sensitivity, Normal mode:*	*0.452*
Model Number:	RAD7-716	*Previous Sensitivity, Sniff mode:*	*0.215*
Firmware Version:	3.1a 151208	*Previous Spill Factor:*	*0.017*
RADLINK Version:	311		

Dates of Calibration Run:	November 4, 2016 to November 7, 2016
Reference Unit Number(s):	504, 961, 1277, 4232
Mean Temperature:	22.8 °C
Mean Radon Concentration:	64.3 pCi/L, 2380 Bq/m3
Sensitivity, Normal Mode:	0.444 CPM/(pCi/L), 0.0120 CPM/(Bq/m3)
Sensitivity, Sniff Mode:	0.211 CPM/(pCi/L), 0.00570 CPM/(Bq/m3)
Spill Factor:	0.016
Calibration Uncertainty:	2% 2-Sigma (See Notes 1, 2)
Conversion Factor, Normal:	2.25 (pCi/L)/cpm, 83.3 (Bq/m3)/cpm
Conversion Factor, Sniff:	4.74 (pCi/L)/cpm, 175 (Bq/m3)/cpm

Note 1) Based on counting statistics of the reference and this unit.

Note 2) No account has been made for the calibration uncertainty of the reference unit relative to an absolute standard, which we estimate to be within +/- 5%.

NRSB Accredited Radon Chamber Certificate Number: NRSB TRC0003

NRSB Certification Number: 14SS023

Calibration Technician: Linda M. Albertelli

Signature: LM Albertelli Date: November 7, 2016

It is recommended that this unit be calibrated again on or before: November 7, 2017

Designer and Manufacturer of Scientific and Industrial Instruments

649

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.
☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER US ENV PROT AGENCY ORDER NO. 20291736/436970

Mfg. Ludlum Measurements, Inc. Model 2241-2 Serial No. 198313

Mfg. Ludlum Measurements, Inc. Model 44-10 Serial No. PR207968

Cal. Date 21-Jun-16 Cal Due Date 21-Jun-17 Cal. Interval 1 Year Meterface cpm

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 47 % Alt 710.0 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☐ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation
☑ Audio ck. ☑ Alarm Setting ck. ☐ Batt. ck. (Min. Volt) 2.2 VDC
☑ Calibrated in accordance with LMI SOP 14.8 ☐ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. Comment mV Det. Oper. Comments V at Comment mV Threshold Dial Ratio = mV

COMMENTS:

	Det1(44-10)	Det2(44-9,43-90)	
Deadtime:	0 µSec	0 µSec	Firmware: P-0613
Cal Constant:	100e-2	100e-2	Calibrated using 9' C-cable.
Ratemeter Alarm:	050.0 kcpm	050.0 kcpm	Overload set to 1 R/hr with Det2(44-9).
Ratemeter Alert:	020.0 kcpm	020.0 kcpm	Pulser calibration "RATEMETER READOUT"
High Voltage:	1100V	900V	performed without deadtime.
Sensitivity:	10 mV	35 mV	

Cs-137 ≈ 1 µCi check source SN 379 reads ≈ 201 kcpm with 44-10(Det1)crystal end against check source with door open≈ 4.24 kcpm with 44-9(Det2)screen against check source with door open.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
Dig.rate			
Dig.rate			

*Uncertainty within ± 10% C.F. within ± 20%

Range(s) Calibrated Electronically

Ratemeter Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	800K cpm	797 kc/m	797 kc/m
	200K cpm	199	199
	80K cpm	79.7	79.7
	20K cpm	20.0	20.0
	8K cpm	7.97	7.97
	2K cpm	1.99	1.99
	800 cpm	800 c/m	800 c/m
	200 cpm	200 c/m	200 c/m

Scaler Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	800K cpm	79720(0)	79720(0)
	200K cpm	19940(0)	19940(0)
	80K cpm	7971(0)	7971(0)
	20K cpm	1995(0)	1995(0)
	8K cpm	797(0)	797(0)
	2K cpm	199(0)	199(0)
	800 cpm	80(0)	80(0)
	200 cpm	20(0)	20(0)

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☑ 1909 ☐ 1916CP ☐ 2324/2521
☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☑ G112 ☑ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982

☑ Alpha S/N Pu239(#8744) 365,644dpm ☐ Beta S/N ☐ Other

☑ m 500 S/N 247891 ☐ Oscilloscope S/N ☑ Multimeter S/N 17500076

Calibrated By: Scott O'Neill Date 21 JUNE 16

Reviewed By: [illegible] Date 22 JUN 16

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

Bench Test Data For Detector

Detector 44-10 Serial No. PR207968

Customer US ENV PROT AGENCY Order #. 20291736/436970

Counter 2241-2 Serial No. 198313 Counter Input Sensitivity 10 mV

Count Time 6 SECOND Distance Source to Detector SURFACE

Other

High Voltage	Background	Isotope Am241 Size ≈0.79μC:	Isotope Size	Isotope Size	Isotope Size
900	261	7406			
950	257	8412			
1000	287	9299			
1050	284	9491			
→ 1100	239	9482			
1150	269	9544			
1200	379	9591			
1250	488	10091			
1300	567	10568			
1350	937	10789			
1400	1320	11794			

Signature Scat O'Dell Date 21 JUNE 16

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CONVERSION CHART

Customer: US ENV PROT AGENCY Date: 21-Jun-16 Order #.: 20291736/436970

Model: 2241-2 Serial No.: 198313 Detector Model: 44-9 Serial No.: PR 206158

Source: Cs-137 194.6 mCi Cs137 3mC. High Voltage: 900 V

Count time: RATEMETER Input Sensitivity: 35 mV

Reference Point	"As Found" Readings (CPM): with Deadtime	"As Found" Readings (CPM): w/o Deadtime	After Adjustment Readings (CPM): with Deadtime	After Adjustment Readings (CPM): w/o Deadtime
150 mR/hr	N/A	321 k	N/A	321 k
50 mR/hr		138 k		138 k
15 mR/hr		48.1 k		48.1 k
5 mR/hr		16.7 k		16.7 k
1.5 mR/hr		4.96 k		4.96 k
1.0 mR/hr		3.34 k		3.34 k

Signature: [signature] Date: 21 JUNE 16

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Bench Test Data For Alpha Detector

Detector 43-90 Serial No. PR205937

Customer US ENV PROT AGENCY Order #. 20291736/436970

Counter 2241-2 Serial No. 198313 Counter Input Sensitivity 35 mV

Count Time 60 SECOND Distance Source to Detector SURFACE

Isotope Pu239(#8744) 365,644dpm Other

43-4/43-44 HV Adjust for Altitude

Altitude	High Voltage
Sea Level	2050 V
1000 foot	2025 V
2000 foot	2000 V
3000 foot	1975 V
4000 foot	1950 V
5000 foot	1925 V
6000 foot	1900 V
7000 foot	1875 V

Alpha Scintillation Detector

HV Plateau	Background	Source Count
800	0	70303
850	0	79029
900	0	82366
950	0	83239
1000	0	84388

Operating Voltage Set at 900 V

Air Proportional	43-5	43-65	43-90	Background	Meter Reading	Range/Scale
Toe	Toe	L/S*	Toe	0	81053	N/A
Center	Center	Center	Center	0	82366	
Heel	Heel	Other**	Heel	0	81899	

☑ Uniformity (± 10%) Average Efficiency 22.53 % 4π

* Least Sensitive Position (Heel of Detector)
** Opposite Least Sensitive Position (Top of Detector)

Signature Scott Wall Date 21 JUNE 16

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Functional Check

Customer US ENV PROT AGENCY

Order #. 20291736/436970

This Certifies that Ludlum Model 44-10-22 Serial No. PR316153 has been functionally checked.
Refer to applicable instrument manuals for specific operating instructions.

Check performed by Scot Wall

Date 21 JUNE 16

648

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
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Knoxville, TN 37932, U.S.A.

CUSTOMER U.S. EPA REGION 7 WHSE ORDER NO. 20288099/434579

Mfg. Ludlum Measurements, Inc. Model 2241-2 Serial No. 198201

Mfg. Ludlum Measurements, Inc. Model 44-10 Serial No. PR207972

Cal. Date 25-Apr-16 Cal Due Date 25-Apr-17 Cal. Interval 1 Year Meterface digital

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 51 % Alt 698.0 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☐ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation
☑ Audio ck. ☑ Alarm Setting ck. ☐ Batt. ck. (Min. Volt) 2.2 VDC
☑ Calibrated in accordance with LMI SOP 14.8 ☐ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set Comments V Input Sens. Comment mV Det. Oper. Comments V at Comment mV Threshold Dial Ratio = mV

COMMENTS:

	Det1(44-10)	Det2(44-9,43-90)
Deadtime:	0 µSec	0 µSec
Cal Constant:	100e-2	100e-2
Ratemeter Alarm:	050.0 kcpm	050.0 kcpm
Ratemeter Alert:	020.0 kcpm	020.0 kcpm
High Voltage:	950V	900V
Sensitivity:	10 mV	35 mV

Firmware: P-0613
Calibrated using 10' C-cable.
Overload set to 1 R/hr with Det2(44-9).
Pulser calibration "RATEMETER READOUT" performed without deadtime.

Cs-137 ≈ 1 µCi check source SN 1863 reads ≈ 191 kcpm with 44-10(Det1)crystal end against check source with door open and ≈ 6.44 kcpm with 44-9(Det2)screen against check source with door open.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
Dig.rate			
Dig.rate			

*Uncertainty within ± 10% C.F. within ± 20%

Range(s) Calibrated Electronically

Ratemeter Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	800K cpm	797 kc/m	797 kc/m
	200K cpm	199	199
	80K cpm	79.7	79.7
	20K cpm	19.9	19.9
	8K cpm	7.97	7.97
	2K cpm	1.99	1.99
	800 cpm	800 c/m	800 c/m
	200 cpm	200 c/m	200 c/m

Scaler Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	800K cpm	79746(0)	79746(0)
	200K cpm	19942(0)	19942(0)
	80K cpm	7974(0)	7974(0)
	20K cpm	1994(0)	1994(0)
	8K cpm	797(0)	797(0)
	2K cpm	199(0)	199(0)
	800 cpm	80(0)	80(0)
	200 cpm	20(0)	20(0)

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 2324/2521
☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☑ G112 ☑ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982

☑ Alpha S/N Pu239(#8744) 365,646dpm ☐ Beta S/N ☐ Other

☑ m 500 S/N 247891 ☐ Oscilloscope S/N ☑ Multimeter S/N 17500076

Calibrated By: [signature] Date 25 APR 16

Reviewed By: [signature] Date 25 Apr 16

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865-392-4601
Knoxville, TN 37932, U.S.A.

Bench Test Data For Detector

Detector 44-10 Serial No. PR207972

Customer U.S. EPA REGION 7 WHSE Order #. 20288099/434579

Counter 2241-2 Serial No. 198201 Counter Input Sensitivity 10 mV

Count Time 6 SECOND Distance Source to Detector SURFACE

Other

High Voltage	Background	Isotope Am241 Size ≈0.79μC:	Isotope Size	Isotope Size	Isotope Size
800	515	9469			
850	486	10676			
900	513	10972			
→ 950	517	10951			
1000	506	10968			
1050	481	11011			
1100	543	11089			
1150	483	11029			
1200	531	10960			

Signature Scat Wall Date 25 APR 16

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CONVERSION CHART

Customer U.S. EPA REGION 7 WHSE Date 25-Apr-16 Order #. 20288099/434579

Model 2241-2 Serial No. 198201 Detector Model 44-9 Serial No. PR206141

Source Cs-137 194.6 mCi Cs137 3mC: High Voltage 900 V

Count time RATEMETER Input Sensitivity 35 mV

Reference Point	"As Found" Readings (CPM): with Deadtime	"As Found" Readings (CPM): w/o Deadtime	After Adjustment Readings (CPM): with Deadtime	After Adjustment Readings (CPM): w/o Deadtime
150 mR/hr	N/A	341 k	N/A	341 k
50 mR/hr		147 k		147 k
15 mR/hr		49.9 k		49.9 k
5 mR/hr		16.4 k		16.4 k
1.5 mR/hr		5.07 k		5.07 k
1.0 mR/hr		3.27 k		3.27 k

Signature: [illegible] Date 25 APR 16

Designer and Manufacturer
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Bench Test Data For Alpha Detector

Detector 43-90 Serial No. PR205934

Customer U.S. EPA REGION 7 WHSE Order #. 20288099/434579

Counter 2241-2 Serial No. 198201 Counter Input Sensitivity 35 mV

Count Time 60 SECOND Distance Source to Detector SURFACE

Isotope Pu239(#8744) 365,646dpm Other

43-4/43-44 HV Adjust for Altitude

Altitude	High Voltage
Sea Level	2050 V
1000 foot	2025 V
2000 foot	2000 V
3000 foot	1975 V
4000 foot	1950 V
5000 foot	1925 V
6000 foot	1900 V
7000 foot	1875 V

Alpha Scintillation Detector

HV Plateau	Background	Source Count
800	0	62705
850	1	72957
900	2	76491
950	0	77983
1000	0	78660

Operating Voltage Set at 900 V

Air Proportional	43-5	43-65	43-90	Background	Meter Reading	Range/Scale
Toe	Toe	L/S*	Toe	2	74864	N/A
Center	Center	Center	Center	2	76491	
Heel	Heel	Other**	Heel	2	76217	

☑ Uniformity (± 10%) Average Efficiency 20.92 % 4π

* Least Sensitive Position (Heel of Detector)
** Opposite Least Sensitive Position (Top of Detector)

Signature Scott Wall Date 25 APR 16

Ratemeter Daily Response Check

Ratemeter:	Ludlum 2221-44-20
SN:	290808
Detector:	44-20
Detector SN:	PR 342692
Check Source:	~~[illegible]~~ Cs-137 1mCi
Check Source SN:	828
Calibration Due:	23 Nov 17

Project:	Bridgeton Dust
Location:	Bridgeton, MO
Operator:	

[redacted]

Date	Time	Battery (volts)	HV Setting (volts)	Threshold	Window Value	Window Setting (in/out)	Response (fast/slow)	~~One Minute~~ Background Reading (Rate cpm)	~~One Minute~~ Source Reading (Rate cpm)	Approval	Comments
12/29	0923	✓	✓				F	13.5Kc/m	44Kc/m	[illegible]	

Ratemeter Daily Response Check

Ratemeter:	2241
SN:	160834
Detector:	44-9
Detector SN:	164377
Check Source:	Cs - 137 (11.2 - 16.8 kcpm)
Check Source SN:	991156
Calibration Due:	6/28/17

Project:	Bridgeton Dust
Location:	Spanish Village
Operator:	Danny O'Connor

Date	Time	Battery (volts)	HV Setting (volts)	Threshold	Window Value	Window Setting (in/out)	Response (fast/slow)	One Minute Background Reading	One Minute Source Reading	Approval	Comments
12/27/16	1141	NA	NA	NA	NA	NA	Fast	Rate = 34.4-47.1 Scale =	Scale = 14.3 kcpm 14.7 kcpm	DO	
12/27/16	1750						Fast	Rate = 29.9-46.4 Scale = 46	Rate 15.7 kcpm Scale 14,176	DO	
12/28/16	0939						Fast	Rate: 36 - 49.9 Scale: 39	Rate: 16.6 Scale: 14596	DO	
12/28/16	1847						Fast	R 35.4-60.6 S 44	R 12.9-15.2 S 14617	DO	
12/29/16	0910						Fast	R 26.9-53.8 S 33	R 13.3-15.7 S 14515	DO	
12/29/16	1321						Fast	R 30.2-49.9 S 40	R 13.6-16.0 S 14295	DO	

Ratemeter Daily Response Check

Ratemeter:	2241
SN:	198201
Detector:	44-9
Detector SN:	PR 206141
Check Source:	Cs-137 (6.44 kcpm)
Check Source SN:	1863
Calibration Due:	4/25/17

Project:	Bridgeton Dust
Location:	[redacted]
Operator:	Doug Ferguson

Date	Time	Battery (volts)	HV Setting (volts)	Threshold	Window Value	Window Setting (in/out)	Response (fast/slow)	One Minute Background Reading	One Minute Source Reading	Approval	Comments
12/27/16	1150						Fast	Rate: 31.9-50.1	~~Rate: 31.9-50.1~~ DO 5.2kcpm	DF	
12/27/16	1801						Fast	Rate: 19.9-26.4 Scale: 35	Rate: 5.36 Scale 5296	DO	
12/28/16	0933						Fast	Rate: 27.9-44.7 Scale: 51	Rate: 5.6 Scale: 5507	DO	
12/28/16	1845						Fast	R = 31.8-46.1 S = 41	R 5.44 S 5317	DO	
12/29/16	0912						Fast	R 36.3-52.9 S 36	R 5542 2 S R 5.570	DO	
12/29/16	1243						Fast	R 36 - 55.3 S 68	R 5.66 S 5242	DO	

Drawer Counter Data Sheet

Model Number:	3030	Project:	Bridgeton Dust
Serial or Unit Number:	#643	Location:	#1
Calibration Due:	11/18/2016	Operator:	C. Hope

Alpha Check Source:	Th230 18,500 DPM 12/2/2003	Beta Source:	Sr90 2310 DPM 4/4/2011
Check Source SN:	#0769 s/n 5159-03	Check Source SN:	#0771 s/n 7193-11

Date	Time	QC Check Result	Count Units (cpm or dpm)	Counting Time (seconds)	Empty Count		Media Blank Count		Alpha Source Count		Beta Source Count		
					Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	
12/27/16	12:24	QC	cpm	60	—	—	—	—	4762	—	—	681	
"	12:45	BKGD	CPM	60	—	—	0	40	—	—	—	—	
"	12:58	ALPHA	CPM	60	—	—	—	—	4641	660	—	—	
"	13:01	BETA	CPM	60	—	—	—	—	—	—	4	681	
"	15:10	BKGD	CPM	60	—	—	0	30	—	—	—	—	
12/28/16	06:31	ALPHA	CPM	60	—	—	—	—	4812	651	—	—	
12/28/16	06:34	BETA	CPM	60	—	—	—	—	—	—	3	675	
12/28/16	06:35	BKGD	CPM	60	—	—	0	36	—	—	—	—	
12/28/16	08:11	BKGD	CPM	60	—	—	0	40	—	—	—	—	After counting 1-24
12/29/16	09:59	QC	CPM	60	—	—	—	—	4798	—	—	679	
12/29/16	10:02	BKGD	CPM	60	—	—	0	45	—	—	—	—	
12/29/16	11:34	BKGD	CPM	60	—	—	0	39	—	—	—	—	
12/29/16	11:35	BKGD	CPM	60	0	36	—	—	—	—	—	—	
12/29/16	11:36	ALPHA	CPM	60	—	—	—	—	4933	615	—	—	
12/29/16	11:37	BETA	CPM	60	—	—	—	—	—	—	3	649	
12/29/16	13:01	BKGD	CPM	60	0	39	—	—	—	—	—	—	
12/29/16	13:18	ALPHA	CPM	60	—	—	—	—	4803	616	—	—	
12/29/16	13:19	BETA	CPM	60	—	—	—	—	—	—	4	672	

Drawer Counter Data Sheet

Model Number:	3030 P
Serial or Unit Number:	#1963
Calibration Due:	12/12/2016

Project:	Bridgeton Dust
Location:	#1
Operator:	C. Hooper

Alpha Check Source:	Th 230 18,500 DPM 12/2/2003
Check Source SN:	#0769 S/n 5159-03

Beta Source:	Sr90 2310 DPM 4/4/2011
Check Source SN:	#0771 S/n 7193-11

Date	Time	QC Check Result	Count Units (cpm or dpm)	Counting Time (seconds)	Empty Count		Media Blank Count		Alpha Source Count		Beta Source Count	
					Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
12/27/16	12:51	QC	CPM	60	—	—	—	—	4818	—	—	459
"	12:56	BKGD	CPM	60	—	—	1	21	—	—	—	—
"	13:02	ALPHA	CPM	60	—	—	—	—	4927	237	—	—
"	13:05	BETA	CPM	60	—	—	—	—	—	—	0	496

Drawer Counter Data Sheet

Model Number:	3030	**Project:**	Bridgeton Dust
Serial or Unit Number:	#643	**Location:**	
Calibration Due:	11/18/17	**Operator:**	R. Monnig

Alpha Check Source:	Th-230 18,500 DPM 12/2/2003	**Beta Source:**	Sr-90 2310 DPM 4/4/2011
Check Source SN:	#0769 S/N 5159-03	**Check Source SN:**	#0771 S/N 7193-11

Date	Time	QC Check Result	Count Units (cpm or dpm)	Counting Time (seconds)	Empty Count		Media Blank Count		Alpha Source Count		Beta Source Count		
					Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	
1/4/17	0829	QC	CPM	60	~~0~~ Rm	—	—	—	4941	—	3	~~610~~ Rm	QC Pass
	0842	Beta	CPM	60	—	—	—	—	—	—	9	654	
	0844	Alpha	CPM	60	—	—	—	—	4846	576	—	—	
	0850	Bkgd	CPM	60	—	—	0 Empty	10	—	—	—	—	Empty Drawer
	0852	Bkgd	CPM	60	—	—	0	12	—	—	—	—	Media Blank
	0855	Bkgd	Scaler ~~CPM~~ Rm	300	—	—	0	62	—	—	—	—	Media Blank
	0926	Bkgd	Scaler	300	—	—	1	58	—	—	—	—	
	1617	Bkgd	Scaler	300	1	50	—	—	—	—	—	—	
1/5/17	1008	QC check	CPM	300	0	12	—	—	4804	—	—	642	QC Passed
	1023	Alpha	CPM	60	—	—	—	—	4785	578	—	—	
	1025	Alpha	CPM	60	—	—	—	—	4802	603	—	—	
	1026	Alpha	CPM	60	—	—	—	—	4740	594	—	—	
	1052	Media Blank	Counts	300	—	—	2	75	—	—	—	—	
	1220	QC check	CPM Counts am	300	Pass	Pass	—	—	4 Pass 939	—	Pass	—	QC Pass

Drawer Counter Data Sheet

Model Number:	Ludlum 3030	Project:	Bridgeton Dust
Serial or Unit Number:	#642	Location:	27 Warehouse
Calibration Due:	12/28/2017	Operator:	C. Hooper
Alpha Check Source:	Th-230 19,100 dpm 12-01-03	Beta Source:	Sr-90 5,510 dpm 12-2-03
Check Source SN:	5158-3	Check Source SN:	S/N 5156-03

Date	Time	QC Check Result	Count Units (cpm or dpm)	Counting Time (seconds)	Empty Count		Media Blank Count		Alpha Source Count		Beta Source Count	
					Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1/4/2017	09:37	Cal. NA	Counts	60	scaler 1	scaler 16	—		scaler:	16	—	
1/4/17	10:11	—	Counts	60	0	22	—					
1/4/17	16:15	—	Counts	300	5	106						
1/5/17	1106	QC check	Counts	~~300~~ 60 cm	0	22	~~2761~~ cm	~~307~~ cm	2761	309	93	1075
	1120	Alpha	CPM	60	—	—	—	—	2729	311	—	—
	1123	Alpha	CPM	60	—	—	—	—	2824	273	—	—
	1126	Alpha	CPM	60	—	—	—	—	2775	322	—	—
	1134	Bkgd	Counts	300	2	110	—	—	—	—	—	—
	1140	Media Blk	Counts	300	—	—	1	115	—	—	—	—
	1233	QC check	CPM	60	2	24	—	—	2695	309	93	1186

Ratemeter Daily Response Check

Ratemeter:	Ludlum 2221 (#1762)
SN:	290808
Detector:	44-20
Detector SN:	342692
Check Source:	1762-10648 1 µCi
Check Source SN:	↓ Cs-137
Calibration Due:	23 Nov 17

Project:	Bridgeton Dust Site
Location:	Bridgeton, Mo
Operator:	Tom Mahler / Rob Monnig

Date	Time	Battery (volts)	HV Setting (volts)	Threshold	Window Value	Window Setting (in/out)	Response (fast/slow)	One Minute Background Reading	~~One Minute~~ Rate Source Reading	Approval	Comments
01/19/17	1244	6.1	1008	102	3949	out	Fast	25,402	548 kcpm	KM	
01/19/17	1720	5.9	1013	102	3958	out	Fast	22,653	547 kcpm	KM	

APPENDIX E

SURFACE SOIL GAMMA SCAN RESULTS

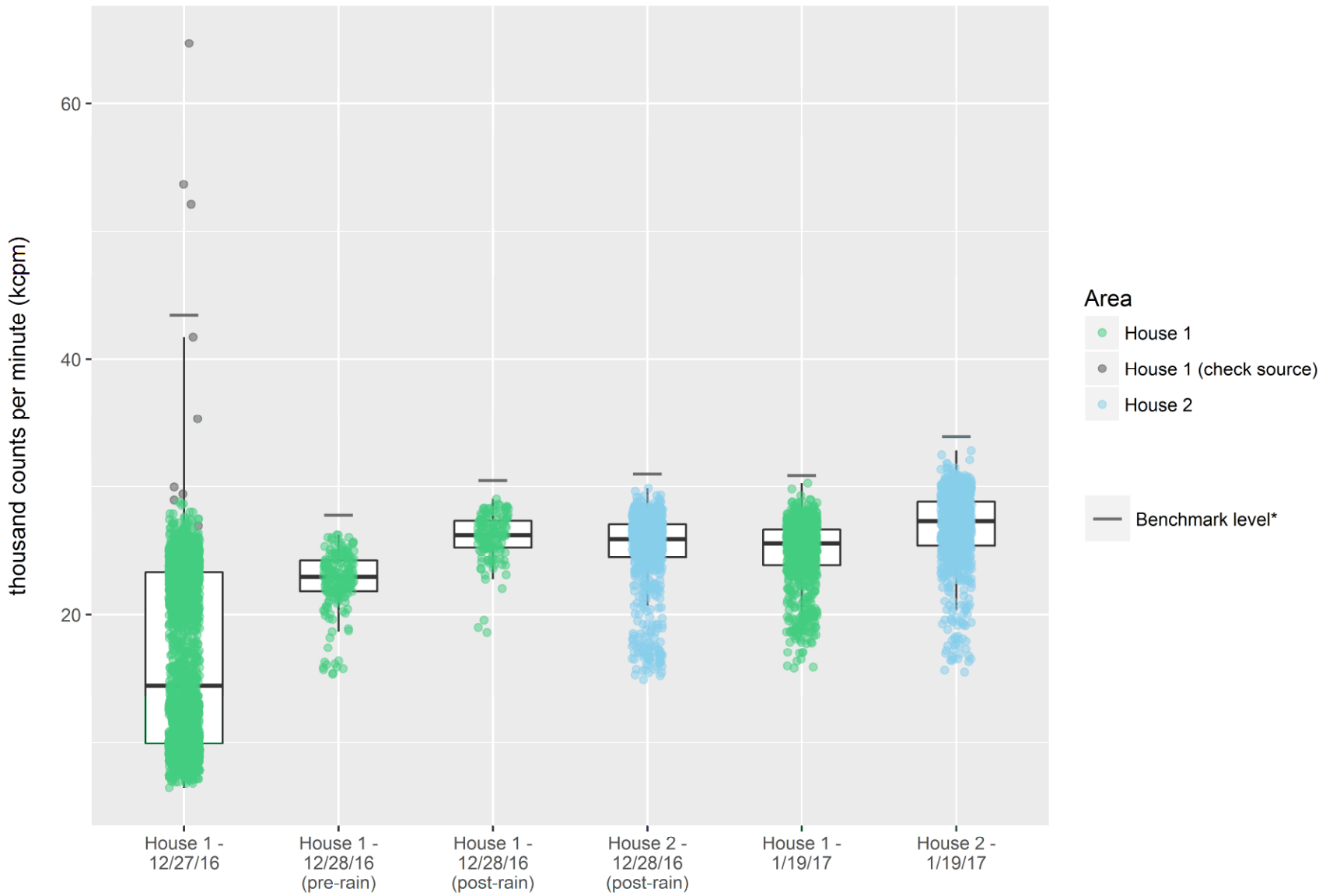
TABLE E-1
SURFACE SOIL GAMMA SCANNING SUMMARY STATISTICS AND INVESTIGATION LEVELS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Surface Soil Gamma Scan Run	Number of Measurements	Minimum Measurement (kcpm)	Maximum Measurement (kcpm)	First Quartile (25th Percentile) (kcpm)	Median (kcpm)	Third Quartile (75th Percentile) (kcpm)	Inter-Quartile Range (IRQ) (kcpm)	Investigation Level (kcpm)[1]
House 1 - 12/27/16	3150	6.4	64.7	9.9	14.4	23.3	13.4	43.5
House 1 - 12/28/16 (pre-rain)	191	15.3	26.3	21.9	23.0	24.2	2.4	27.8
House 1 - 12/28/16 (post-rain)	144	18.6	29.0	25.3	26.3	27.4	2.1	30.5
House 2 - 12/28/16 (post-rain)	787	14.9	29.9	24.5	25.9	27.1	2.6	31.0
House 1 - 1/19/17	892	15.8	30.3	23.9	25.6	26.7	2.8	30.9
House 2 - 1/19/17	824	15.5	32.8	25.4	27.3	28.8	3.4	33.9

Notes
[1] Investigation level is the 75th percentile plus 1.5 times the inter-quartile range (IQR)
kcpm thousand counts per minute

EXHIBIT E-1

Surface Soil Gamma Scanning Results Compared to Investigation Levels



* Investigation level is the 75th percentile plus 1.5 times the inter-quartile range (IQR)

APPENDIX F

HIGH PRESSURE IONIZATION CHAMBER MEASUREMENTS

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 12:00	0.0064
12/27/2016 12:01	0.0066
12/27/2016 12:02	0.0067
12/27/2016 12:03	0.0071
12/27/2016 12:04	0.0069
12/27/2016 12:05	0.0069
12/27/2016 12:06	0.0069
12/27/2016 12:07	0.0073
12/27/2016 12:08	0.0067
12/27/2016 12:09	0.0071
12/27/2016 12:10	0.0069
12/27/2016 12:11	0.0072
12/27/2016 12:12	0.0073
12/27/2016 12:13	0.0075
12/27/2016 12:14	0.007
12/27/2016 12:15	0.0071
12/27/2016 12:16	0.007
12/27/2016 12:17	0.0072
12/27/2016 12:18	0.007
12/27/2016 12:19	0.007
12/27/2016 12:20	0.0071
12/27/2016 12:21	0.0071
12/27/2016 12:22	0.0072
12/27/2016 12:23	0.0072
12/27/2016 12:24	0.0072
12/27/2016 12:25	0.0073
12/27/2016 12:26	0.0068
12/27/2016 12:27	0.007
12/27/2016 12:28	0.0068
12/27/2016 12:29	0.0073
12/27/2016 12:30	0.0072
12/27/2016 12:31	0.0074
12/27/2016 12:32	0.007
12/27/2016 12:33	0.0068
12/27/2016 12:34	0.0072
12/27/2016 12:35	0.007
12/27/2016 12:36	0.0072
12/27/2016 12:37	0.0071
12/27/2016 12:38	0.0073
12/27/2016 12:39	0.007
12/27/2016 12:40	0.0069
12/27/2016 12:41	0.0068
12/27/2016 12:42	0.007
12/27/2016 12:43	0.0071
12/27/2016 12:44	0.0076
12/27/2016 12:45	0.0067
12/27/2016 12:46	0.0072

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 12:47	0.0071
12/27/2016 12:48	0.0067
12/27/2016 12:49	0.0071
12/27/2016 12:50	0.0072
12/27/2016 12:51	0.0071
12/27/2016 12:52	0.007
12/27/2016 12:53	0.0067
12/27/2016 12:54	0.0071
12/27/2016 12:55	0.0071
12/27/2016 12:56	0.0072
12/27/2016 12:57	0.0071
12/27/2016 12:58	0.0072
12/27/2016 12:59	0.0067
12/27/2016 13:00	0.0072
12/27/2016 13:01	0.0071
12/27/2016 13:02	0.0072
12/27/2016 13:03	0.0073
12/27/2016 13:04	0.0074
12/27/2016 13:05	0.0075
12/27/2016 13:06	0.0069
12/27/2016 13:07	0.0073
12/27/2016 13:08	0.0073
12/27/2016 13:09	0.0075
12/27/2016 13:10	0.007
12/27/2016 13:11	0.0066
12/27/2016 13:12	0.007
12/27/2016 13:13	0.0073
12/27/2016 13:14	0.0072
12/27/2016 13:15	0.0074
12/27/2016 13:16	0.0073
12/27/2016 13:17	0.007
12/27/2016 13:18	0.007
12/27/2016 13:19	0.0068
12/27/2016 13:20	0.0072
12/27/2016 13:21	0.0074
12/27/2016 13:22	0.0071
12/27/2016 13:23	0.0075
12/27/2016 13:24	0.0074
12/27/2016 13:25	0.0073
12/27/2016 13:26	0.0068
12/27/2016 13:27	0.0067
12/27/2016 13:28	0.0074
12/27/2016 13:29	0.0073
12/27/2016 13:30	0.0073
12/27/2016 13:31	0.0073
12/27/2016 13:32	0.0073
12/27/2016 13:33	0.007

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 13:34	0.007
12/27/2016 13:35	0.0069
12/27/2016 13:36	0.0071
12/27/2016 13:37	0.0069
12/27/2016 13:38	0.0073
12/27/2016 13:39	0.0073
12/27/2016 13:40	0.0071
12/27/2016 13:41	0.0071
12/27/2016 13:42	0.0074
12/27/2016 13:43	0.0072
12/27/2016 13:44	0.0071
12/27/2016 13:45	0.0071
12/27/2016 13:46	0.0071
12/27/2016 13:47	0.007
12/27/2016 13:48	0.007
12/27/2016 13:49	0.0071
12/27/2016 13:50	0.0071
12/27/2016 13:51	0.0074
12/27/2016 13:52	0.0069
12/27/2016 13:53	0.0073
12/27/2016 13:54	0.0071
12/27/2016 13:55	0.007
12/27/2016 13:56	0.0071
12/27/2016 13:57	0.0073
12/27/2016 13:58	0.007
12/27/2016 13:59	0.0071
12/27/2016 14:00	0.0074
12/27/2016 14:01	0.007
12/27/2016 14:02	0.0073
12/27/2016 14:03	0.0073
12/27/2016 14:04	0.0073
12/27/2016 14:05	0.0076
12/27/2016 14:06	0.0071
12/27/2016 14:07	0.0073
12/27/2016 14:08	0.0071
12/27/2016 14:09	0.0075
12/27/2016 14:10	0.0069
12/27/2016 14:11	0.0067
12/27/2016 14:12	0.0074
12/27/2016 14:13	0.007
12/27/2016 14:14	0.0073
12/27/2016 14:15	0.0071
12/27/2016 14:16	0.0073
12/27/2016 14:17	0.0071
12/27/2016 14:18	0.0072
12/27/2016 14:19	0.0074
12/27/2016 14:20	0.0071

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 14:21	0.0067
12/27/2016 14:22	0.0072
12/27/2016 14:23	0.007
12/27/2016 14:24	0.0071
12/27/2016 14:25	0.0073
12/27/2016 14:26	0.0072
12/27/2016 14:27	0.0073
12/27/2016 14:28	0.0068
12/27/2016 14:29	0.007
12/27/2016 14:30	0.0068
12/27/2016 14:31	0.0067
12/27/2016 14:32	0.0072
12/27/2016 14:33	0.0072
12/27/2016 14:34	0.0071
12/27/2016 14:35	0.007
12/27/2016 14:36	0.007
12/27/2016 14:37	0.0068
12/27/2016 14:38	0.0071
12/27/2016 14:39	0.007
12/27/2016 14:40	0.0072
12/27/2016 14:41	0.0075
12/27/2016 14:42	0.0071
12/27/2016 14:43	0.0071
12/27/2016 14:44	0.0072
12/27/2016 14:45	0.0068
12/27/2016 14:46	0.0068
12/27/2016 14:47	0.0068
12/27/2016 14:48	0.0068
12/27/2016 14:49	0.0071
12/27/2016 14:50	0.007
12/27/2016 14:51	0.0069
12/27/2016 14:52	0.007
12/27/2016 14:53	0.0072
12/27/2016 14:54	0.0076
12/27/2016 14:55	0.0071
12/27/2016 14:56	0.0072
12/27/2016 14:57	0.0071
12/27/2016 14:58	0.0073
12/27/2016 14:59	0.0068
12/27/2016 15:00	0.007
12/27/2016 15:01	0.0073
12/27/2016 15:02	0.0074
12/27/2016 15:03	0.0073
12/27/2016 15:04	0.0067
12/27/2016 15:05	0.0069
12/27/2016 15:06	0.0072
12/27/2016 15:07	0.0074

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 15:08	0.0075
12/27/2016 15:09	0.0073
12/27/2016 15:10	0.0071
12/27/2016 15:11	0.0072
12/27/2016 15:12	0.0068
12/27/2016 15:13	0.0073
12/27/2016 15:14	0.0072
12/27/2016 15:15	0.0077
12/27/2016 15:16	0.0075
12/27/2016 15:17	0.0069
12/27/2016 15:18	0.0069
12/27/2016 15:19	0.0068
12/27/2016 15:20	0.007
12/27/2016 15:21	0.0072
12/27/2016 15:22	0.007
12/27/2016 15:23	0.007
12/27/2016 15:24	0.0072
12/27/2016 15:25	0.0072
12/27/2016 15:26	0.0071
12/27/2016 15:27	0.0072
12/27/2016 15:28	0.0072
12/27/2016 15:29	0.0067
12/27/2016 15:30	0.0071
12/27/2016 15:31	0.007
12/27/2016 15:32	0.0073
12/27/2016 15:33	0.007
12/27/2016 15:34	0.0071
12/27/2016 15:35	0.0071
12/27/2016 15:36	0.0071
12/27/2016 15:37	0.0065
12/27/2016 15:38	0.0072
12/27/2016 15:39	0.0071
12/27/2016 15:40	0.0071
12/27/2016 15:41	0.0073
12/27/2016 15:42	0.007
12/27/2016 15:43	0.0072
12/27/2016 15:44	0.007
12/27/2016 15:45	0.0072
12/27/2016 15:46	0.0067
12/27/2016 15:47	0.0072
12/27/2016 15:48	0.0072
12/27/2016 15:49	0.0073
12/27/2016 15:50	0.0077
12/27/2016 15:51	0.007
12/27/2016 15:52	0.0072
12/27/2016 15:53	0.0073
12/27/2016 15:54	0.0074

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 15:55	0.0072
12/27/2016 15:56	0.0073
12/27/2016 15:57	0.0072
12/27/2016 15:58	0.007
12/27/2016 15:59	0.007
12/27/2016 16:00	0.0072
12/27/2016 16:01	0.0067
12/27/2016 16:02	0.0074
12/27/2016 16:03	0.0071
12/27/2016 16:04	0.007
12/27/2016 16:05	0.0073
12/27/2016 16:06	0.007
12/27/2016 16:07	0.0074
12/27/2016 16:08	0.0071
12/27/2016 16:09	0.007
12/27/2016 16:10	0.007
12/27/2016 16:11	0.0069
12/27/2016 16:12	0.0069
12/27/2016 16:13	0.0071
12/27/2016 16:14	0.0068
12/27/2016 16:15	0.0068
12/27/2016 16:16	0.0067
12/27/2016 16:17	0.0072
12/27/2016 16:18	0.0072
12/27/2016 16:19	0.0069
12/27/2016 16:20	0.007
12/27/2016 16:21	0.0075
12/27/2016 16:22	0.0076
12/27/2016 16:23	0.0069
12/27/2016 16:24	0.0073
12/27/2016 16:25	0.0072
12/27/2016 16:26	0.0072
12/27/2016 16:27	0.0073
12/27/2016 16:28	0.0071
12/27/2016 16:29	0.0071
12/27/2016 16:30	0.0071
12/27/2016 16:31	0.0071
12/27/2016 16:32	0.0071
12/27/2016 16:33	0.0073
12/27/2016 16:34	0.0069
12/27/2016 16:35	0.0069
12/27/2016 16:36	0.0072
12/27/2016 16:37	0.0073
12/27/2016 16:38	0.0071
12/27/2016 16:39	0.0068
12/27/2016 16:40	0.0069
12/27/2016 16:41	0.0066

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 16:42	0.0069
12/27/2016 16:43	0.0069
12/27/2016 16:44	0.0071
12/27/2016 16:45	0.007
12/27/2016 16:46	0.0074
12/27/2016 16:47	0.0077
12/27/2016 16:48	0.0069
12/27/2016 16:49	0.0073
12/27/2016 16:50	0.0069
12/27/2016 16:51	0.007
12/27/2016 16:52	0.0071
12/27/2016 16:53	0.0073
12/27/2016 16:54	0.0073
12/27/2016 16:55	0.0072
12/27/2016 16:56	0.0069
12/27/2016 16:57	0.0072
12/27/2016 16:58	0.0071
12/27/2016 16:59	0.0073
12/27/2016 17:00	0.0072
12/27/2016 17:01	0.0071
12/27/2016 17:02	0.0071
12/27/2016 17:03	0.0073
12/27/2016 17:04	0.0075
12/27/2016 17:05	0.0072
12/27/2016 17:06	0.0069
12/27/2016 17:07	0.0076
12/27/2016 17:08	0.007
12/27/2016 17:09	0.0078
12/27/2016 17:10	0.0072
12/27/2016 17:11	0.0073
12/27/2016 17:12	0.007
12/27/2016 17:13	0.007
12/27/2016 17:14	0.007
12/27/2016 17:15	0.0073
12/27/2016 17:16	0.0071
12/27/2016 17:17	0.007
12/27/2016 17:18	0.0071
12/27/2016 17:19	0.007
12/27/2016 17:20	0.0071
12/27/2016 17:21	0.0071
12/27/2016 17:22	0.007
12/27/2016 17:23	0.0071
12/27/2016 17:24	0.0067
12/27/2016 17:25	0.0069
12/27/2016 17:26	0.0068
12/27/2016 17:27	0.0071
12/27/2016 17:28	0.0069

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 17:29	0.0072
12/27/2016 17:30	0.0071
12/27/2016 17:31	0.0071
12/27/2016 17:32	0.007
12/27/2016 17:33	0.007
12/27/2016 17:34	0.0071
12/27/2016 17:35	0.007
12/27/2016 17:36	0.0073
12/27/2016 17:37	0.0072
12/27/2016 17:38	0.0071
12/27/2016 17:39	0.0072
12/27/2016 17:40	0.0074
Mean	**0.0071**

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 12:06	0.0067
12/27/2016 12:07	0.0063
12/27/2016 12:08	0.007
12/27/2016 12:09	0.007
12/27/2016 12:10	0.0074
12/27/2016 12:11	0.0073
12/27/2016 12:12	0.0071
12/27/2016 12:13	0.0071
12/27/2016 12:14	0.0073
12/27/2016 12:15	0.0075
12/27/2016 12:16	0.0073
12/27/2016 12:17	0.0075
12/27/2016 12:18	0.0078
12/27/2016 12:19	0.0072
12/27/2016 12:20	0.0077
12/27/2016 12:21	0.0074
12/27/2016 12:22	0.0072
12/27/2016 12:23	0.0074
12/27/2016 12:24	0.0074
12/27/2016 12:25	0.0075
12/27/2016 12:26	0.0072
12/27/2016 12:27	0.0073
12/27/2016 12:28	0.0072
12/27/2016 12:29	0.0073
12/27/2016 12:30	0.0073
12/27/2016 12:31	0.0073
12/27/2016 12:32	0.0076
12/27/2016 12:33	0.0073
12/27/2016 12:34	0.0073
12/27/2016 12:35	0.0074
12/27/2016 12:36	0.0074
12/27/2016 12:37	0.0076
12/27/2016 12:38	0.0075
12/27/2016 12:39	0.0072
12/27/2016 12:40	0.0073
12/27/2016 12:41	0.0074
12/27/2016 12:42	0.0075
12/27/2016 12:43	0.0072
12/27/2016 12:44	0.0077
12/27/2016 12:45	0.0076
12/27/2016 12:46	0.0078
12/27/2016 12:47	0.0073
12/27/2016 12:48	0.0072
12/27/2016 12:49	0.0074
12/27/2016 12:50	0.0075
12/27/2016 12:51	0.0074
12/27/2016 12:52	0.0073

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 12:53	0.0075
12/27/2016 12:54	0.0074
12/27/2016 12:55	0.0076
12/27/2016 12:56	0.0074
12/27/2016 12:57	0.0073
12/27/2016 12:58	0.0072
12/27/2016 12:59	0.0074
12/27/2016 13:00	0.0073
12/27/2016 13:01	0.0073
12/27/2016 13:02	0.0074
12/27/2016 13:03	0.0075
12/27/2016 13:04	0.007
12/27/2016 13:05	0.0072
12/27/2016 13:06	0.0073
12/27/2016 13:07	0.0071
12/27/2016 13:08	0.0073
12/27/2016 13:09	0.0074
12/27/2016 13:10	0.0072
12/27/2016 13:11	0.0077
12/27/2016 13:12	0.0081
12/27/2016 13:13	0.007
12/27/2016 13:14	0.0077
12/27/2016 13:15	0.0075
12/27/2016 13:16	0.0074
12/27/2016 13:17	0.0076
12/27/2016 13:18	0.0073
12/27/2016 13:19	0.0073
12/27/2016 13:20	0.0069
12/27/2016 13:21	0.0075
12/27/2016 13:22	0.0076
12/27/2016 13:23	0.0073
12/27/2016 13:24	0.0072
12/27/2016 13:25	0.0078
12/27/2016 13:26	0.0073
12/27/2016 13:27	0.0073
12/27/2016 13:28	0.0072
12/27/2016 13:29	0.0072
12/27/2016 13:30	0.0075
12/27/2016 13:31	0.0071
12/27/2016 13:32	0.007
12/27/2016 13:33	0.0073
12/27/2016 13:34	0.0071
12/27/2016 13:35	0.0072
12/27/2016 13:36	0.0072
12/27/2016 13:37	0.0079
12/27/2016 13:38	0.0074
12/27/2016 13:39	0.0074

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 13:40	0.0072
12/27/2016 13:41	0.0076
12/27/2016 13:42	0.0077
12/27/2016 13:43	0.0073
12/27/2016 13:44	0.0075
12/27/2016 13:45	0.0074
12/27/2016 13:46	0.0076
12/27/2016 13:47	0.0073
12/27/2016 13:48	0.0075
12/27/2016 13:49	0.0075
12/27/2016 13:50	0.0072
12/27/2016 13:51	0.0075
12/27/2016 13:52	0.0073
12/27/2016 13:53	0.0075
12/27/2016 13:54	0.0071
12/27/2016 13:55	0.0071
12/27/2016 13:56	0.0074
12/27/2016 13:57	0.0073
12/27/2016 13:58	0.0073
12/27/2016 13:59	0.0075
12/27/2016 14:00	0.0074
12/27/2016 14:01	0.0078
12/27/2016 14:02	0.0075
12/27/2016 14:03	0.0075
12/27/2016 14:04	0.0077
12/27/2016 14:05	0.0075
12/27/2016 14:06	0.0076
12/27/2016 14:07	0.0072
12/27/2016 14:08	0.0074
12/27/2016 14:09	0.0074
12/27/2016 14:10	0.0072
12/27/2016 14:11	0.0073
12/27/2016 14:12	0.0072
12/27/2016 14:13	0.0076
12/27/2016 14:14	0.0076
12/27/2016 14:15	0.0073
12/27/2016 14:16	0.0071
12/27/2016 14:17	0.0074
12/27/2016 14:18	0.0074
12/27/2016 14:19	0.0074
12/27/2016 14:20	0.0073
12/27/2016 14:21	0.0072
12/27/2016 14:22	0.0073
12/27/2016 14:23	0.0075
12/27/2016 14:24	0.0078
12/27/2016 14:25	0.0068
12/27/2016 14:26	0.0076

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 14:27	0.0076
12/27/2016 14:28	0.0071
12/27/2016 14:29	0.0074
12/27/2016 14:30	0.0076
12/27/2016 14:31	0.0074
12/27/2016 14:32	0.0075
12/27/2016 14:33	0.0077
12/27/2016 14:34	0.0072
12/27/2016 14:35	0.0068
12/27/2016 14:36	0.0075
12/27/2016 14:37	0.0073
12/27/2016 14:38	0.0072
12/27/2016 14:39	0.0075
12/27/2016 14:40	0.0075
12/27/2016 14:41	0.007
12/27/2016 14:42	0.0075
12/27/2016 14:43	0.0072
12/27/2016 14:44	0.007
12/27/2016 14:45	0.0072
12/27/2016 14:46	0.0076
12/27/2016 14:47	0.0074
12/27/2016 14:48	0.0077
12/27/2016 14:49	0.0072
12/27/2016 14:50	0.0072
12/27/2016 14:51	0.0072
12/27/2016 14:52	0.0077
12/27/2016 14:53	0.0075
12/27/2016 14:54	0.0071
12/27/2016 14:55	0.0075
12/27/2016 14:56	0.0074
12/27/2016 14:57	0.0072
12/27/2016 14:58	0.0073
12/27/2016 14:59	0.0074
12/27/2016 15:00	0.0076
12/27/2016 15:01	0.0076
12/27/2016 15:02	0.0075
12/27/2016 15:03	0.0076
12/27/2016 15:04	0.0073
12/27/2016 15:05	0.0074
12/27/2016 15:06	0.0073
12/27/2016 15:07	0.0073
12/27/2016 15:08	0.0076
12/27/2016 15:09	0.0074
12/27/2016 15:10	0.0071
12/27/2016 15:11	0.0076
12/27/2016 15:12	0.0075
12/27/2016 15:13	0.0077

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 15:14	0.0073
12/27/2016 15:15	0.0075
12/27/2016 15:16	0.0075
12/27/2016 15:17	0.0073
12/27/2016 15:18	0.0076
12/27/2016 15:19	0.0075
12/27/2016 15:20	0.0075
12/27/2016 15:21	0.0072
12/27/2016 15:22	0.0078
12/27/2016 15:23	0.0073
12/27/2016 15:24	0.0078
12/27/2016 15:25	0.0075
12/27/2016 15:26	0.0073
12/27/2016 15:27	0.0072
12/27/2016 15:28	0.0073
12/27/2016 15:29	0.0073
12/27/2016 15:30	0.0075
12/27/2016 15:31	0.0075
12/27/2016 15:32	0.0074
12/27/2016 15:33	0.0074
12/27/2016 15:34	0.0073
12/27/2016 15:35	0.0073
12/27/2016 15:36	0.0071
12/27/2016 15:37	0.0075
12/27/2016 15:38	0.0075
12/27/2016 15:39	0.0074
12/27/2016 15:40	0.0074
12/27/2016 15:41	0.0073
12/27/2016 15:42	0.0075
12/27/2016 15:43	0.0075
12/27/2016 15:44	0.0073
12/27/2016 15:45	0.0074
12/27/2016 15:46	0.0075
12/27/2016 15:47	0.0076
12/27/2016 15:48	0.0075
12/27/2016 15:49	0.0075
12/27/2016 15:50	0.0074
12/27/2016 15:51	0.0073
12/27/2016 15:52	0.0074
12/27/2016 15:53	0.0075
12/27/2016 15:54	0.0073
12/27/2016 15:55	0.0074
12/27/2016 15:56	0.0073
12/27/2016 15:57	0.0074
12/27/2016 15:58	0.0075
12/27/2016 15:59	0.0072
12/27/2016 16:00	0.0075

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 16:01	0.0074
12/27/2016 16:02	0.0077
12/27/2016 16:03	0.0073
12/27/2016 16:04	0.0071
12/27/2016 16:05	0.0075
12/27/2016 16:06	0.0074
12/27/2016 16:07	0.0073
12/27/2016 16:08	0.0078
12/27/2016 16:09	0.0076
12/27/2016 16:10	0.0073
12/27/2016 16:11	0.0074
12/27/2016 16:12	0.0074
12/27/2016 16:13	0.0075
12/27/2016 16:14	0.0076
12/27/2016 16:15	0.0073
12/27/2016 16:16	0.0075
12/27/2016 16:17	0.0077
12/27/2016 16:18	0.0076
12/27/2016 16:19	0.0072
12/27/2016 16:20	0.0075
12/27/2016 16:21	0.0075
12/27/2016 16:22	0.0074
12/27/2016 16:23	0.0073
12/27/2016 16:24	0.0077
12/27/2016 16:25	0.0075
12/27/2016 16:26	0.0074
12/27/2016 16:27	0.0075
12/27/2016 16:28	0.0078
12/27/2016 16:29	0.0069
12/27/2016 16:30	0.0069
12/27/2016 16:31	0.0072
12/27/2016 16:32	0.0077
12/27/2016 16:33	0.007
12/27/2016 16:34	0.0072
12/27/2016 16:35	0.0073
12/27/2016 16:36	0.0074
12/27/2016 16:37	0.0076
12/27/2016 16:38	0.0073
12/27/2016 16:39	0.0069
12/27/2016 16:40	0.0073
12/27/2016 16:41	0.0075
12/27/2016 16:42	0.0076
12/27/2016 16:43	0.007
12/27/2016 16:44	0.007
12/27/2016 16:45	0.0076
12/27/2016 16:46	0.0071
12/27/2016 16:47	0.0074

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 16:48	0.0075
12/27/2016 16:49	0.007
12/27/2016 16:50	0.0076
12/27/2016 16:51	0.0074
12/27/2016 16:52	0.0073
12/27/2016 16:53	0.0073
12/27/2016 16:54	0.0077
12/27/2016 16:55	0.0074
12/27/2016 16:56	0.0074
12/27/2016 16:57	0.0072
12/27/2016 16:58	0.0073
12/27/2016 16:59	0.0073
12/27/2016 17:00	0.0074
12/27/2016 17:01	0.0069
12/27/2016 17:02	0.0072
12/27/2016 17:03	0.0076
12/27/2016 17:04	0.0073
12/27/2016 17:05	0.0073
12/27/2016 17:06	0.007
12/27/2016 17:07	0.007
12/27/2016 17:08	0.0073
12/27/2016 17:09	0.0073
12/27/2016 17:10	0.0074
12/27/2016 17:11	0.0076
12/27/2016 17:12	0.0076
12/27/2016 17:13	0.0075
12/27/2016 17:14	0.0073
12/27/2016 17:15	0.0074
12/27/2016 17:16	0.0075
12/27/2016 17:17	0.0075
12/27/2016 17:18	0.0076
12/27/2016 17:19	0.0072
12/27/2016 17:20	0.0076
12/27/2016 17:21	0.007
12/27/2016 17:22	0.0076
12/27/2016 17:23	0.0074
12/27/2016 17:24	0.0072
12/27/2016 17:25	0.0072
12/27/2016 17:26	0.0076
12/27/2016 17:27	0.0073
12/27/2016 17:28	0.0076
12/27/2016 17:29	0.0073
12/27/2016 17:30	0.0072
12/27/2016 17:31	0.0077
12/27/2016 17:32	0.0071
12/27/2016 17:33	0.0072
12/27/2016 17:34	0.0075

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 1 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/27/2016 17:35	0.0073
12/27/2016 17:36	0.0074
12/27/2016 17:37	0.0076
12/27/2016 17:38	0.0076
12/27/2016 17:39	0.0076
12/27/2016 17:40	0.0073
12/27/2016 17:41	0.0071
12/27/2016 17:42	0.0075
Mean	**0.00738**

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 17:05	0.0087
12/28/2016 17:06	0.0087
12/28/2016 17:07	0.0083
12/28/2016 17:08	0.0087
12/28/2016 17:09	0.0087
12/28/2016 17:10	0.0087
12/28/2016 17:11	0.0089
12/28/2016 17:12	0.0087
12/28/2016 17:13	0.0085
12/28/2016 17:14	0.0085
12/28/2016 17:15	0.0087
12/28/2016 17:16	0.0085
12/28/2016 17:17	0.0085
12/28/2016 17:18	0.0086
12/28/2016 17:19	0.0088
12/28/2016 17:20	0.0083
12/28/2016 17:21	0.0087
12/28/2016 17:22	0.0086
12/28/2016 17:23	0.0083
12/28/2016 17:24	0.0089
12/28/2016 17:25	0.0092
12/28/2016 17:26	0.0085
12/28/2016 17:27	0.0084
12/28/2016 17:28	0.0088
12/28/2016 17:29	0.0087
12/28/2016 17:30	0.0086
12/28/2016 17:31	0.0086
12/28/2016 17:32	0.0088
12/28/2016 17:33	0.009
12/28/2016 17:34	0.0084
12/28/2016 17:35	0.0086
12/28/2016 17:36	0.0082
12/28/2016 17:37	0.0091
12/28/2016 17:38	0.0088
12/28/2016 17:39	0.0087
12/28/2016 17:40	0.0088
12/28/2016 17:41	0.0084
12/28/2016 17:42	0.0088
12/28/2016 17:43	0.0088
12/28/2016 17:44	0.0086
12/28/2016 17:45	0.0084
12/28/2016 17:46	0.0087
12/28/2016 17:47	0.0088
12/28/2016 17:48	0.0085
12/28/2016 17:49	0.0091
12/28/2016 17:50	0.0091
12/28/2016 17:51	0.0088

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 17:52	0.0089
12/28/2016 17:53	0.0086
12/28/2016 17:54	0.0086
12/28/2016 17:55	0.0086
12/28/2016 17:56	0.009
12/28/2016 17:57	0.009
12/28/2016 17:58	0.0088
12/28/2016 17:59	0.0088
12/28/2016 18:00	0.0083
12/28/2016 18:01	0.0087
12/28/2016 18:02	0.0085
12/28/2016 18:03	0.0084
12/28/2016 18:04	0.0086
12/28/2016 18:05	0.0089
12/28/2016 18:06	0.0087
12/28/2016 18:07	0.0083
12/28/2016 18:08	0.0089
12/28/2016 18:09	0.0084
12/28/2016 18:10	0.0088
12/28/2016 18:11	0.0086
12/28/2016 18:12	0.0086
12/28/2016 18:13	0.0088
12/28/2016 18:14	0.009
12/28/2016 18:15	0.0089
12/28/2016 18:16	0.0085
12/28/2016 18:17	0.0089
12/28/2016 18:18	0.0085
12/28/2016 18:19	0.0086
12/28/2016 18:20	0.0088
12/28/2016 18:21	0.0086
12/28/2016 18:22	0.0088
12/28/2016 18:23	0.0088
12/28/2016 18:24	0.0086
12/28/2016 18:25	0.0084
12/28/2016 18:26	0.0086
12/28/2016 18:27	0.0085
12/28/2016 18:28	0.0086
12/28/2016 18:29	0.0088
12/28/2016 18:30	0.0085
12/28/2016 18:31	0.0088
12/28/2016 18:32	0.0087
12/28/2016 18:33	0.0088
12/28/2016 18:34	0.0088
12/28/2016 18:35	0.0086
12/28/2016 18:36	0.0087
12/28/2016 18:37	0.0085
12/28/2016 18:38	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 18:39	0.0083
12/28/2016 18:40	0.0091
12/28/2016 18:41	0.0092
12/28/2016 18:42	0.0089
12/28/2016 18:43	0.0092
12/28/2016 18:44	0.0086
12/28/2016 18:45	0.0082
12/28/2016 18:46	0.0085
12/28/2016 18:47	0.0083
12/28/2016 18:48	0.0086
12/28/2016 18:49	0.0084
12/28/2016 18:50	0.0087
12/28/2016 18:51	0.009
12/28/2016 18:52	0.0085
12/28/2016 18:53	0.0082
12/28/2016 18:54	0.0085
12/28/2016 18:55	0.0087
12/28/2016 18:56	0.0085
12/28/2016 18:57	0.0086
12/28/2016 18:58	0.0084
12/28/2016 18:59	0.0089
12/28/2016 19:00	0.0086
12/28/2016 19:01	0.0086
12/28/2016 19:02	0.0087
12/28/2016 19:03	0.0088
12/28/2016 19:04	0.0086
12/28/2016 19:05	0.0086
12/28/2016 19:06	0.0088
12/28/2016 19:07	0.0088
12/28/2016 19:08	0.0091
12/28/2016 19:09	0.0091
12/28/2016 19:10	0.0085
12/28/2016 19:11	0.0085
12/28/2016 19:12	0.0084
12/28/2016 19:13	0.009
12/28/2016 19:14	0.0088
12/28/2016 19:15	0.0089
12/28/2016 19:16	0.0088
12/28/2016 19:17	0.0089
12/28/2016 19:18	0.0085
12/28/2016 19:19	0.0086
12/28/2016 19:20	0.0089
12/28/2016 19:21	0.0085
12/28/2016 19:22	0.0085
12/28/2016 19:23	0.009
12/28/2016 19:24	0.0085
12/28/2016 19:25	0.0091

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 19:26	0.0088
12/28/2016 19:27	0.0089
12/28/2016 19:28	0.0087
12/28/2016 19:29	0.0089
12/28/2016 19:30	0.0088
12/28/2016 19:31	0.0087
12/28/2016 19:32	0.0088
12/28/2016 19:33	0.0085
12/28/2016 19:34	0.0088
12/28/2016 19:35	0.0084
12/28/2016 19:36	0.0087
12/28/2016 19:37	0.0083
12/28/2016 19:38	0.0086
12/28/2016 19:39	0.0088
12/28/2016 19:40	0.0084
12/28/2016 19:41	0.0083
12/28/2016 19:42	0.0085
12/28/2016 19:43	0.0087
12/28/2016 19:44	0.0086
12/28/2016 19:45	0.0085
12/28/2016 19:46	0.0089
12/28/2016 19:47	0.0086
12/28/2016 19:48	0.0086
12/28/2016 19:49	0.009
12/28/2016 19:50	0.0085
12/28/2016 19:51	0.0088
12/28/2016 19:52	0.0089
12/28/2016 19:53	0.0083
12/28/2016 19:54	0.0089
12/28/2016 19:55	0.0088
12/28/2016 19:56	0.0086
12/28/2016 19:57	0.0088
12/28/2016 19:58	0.0088
12/28/2016 19:59	0.0086
12/28/2016 20:00	0.009
12/28/2016 20:01	0.0088
12/28/2016 20:02	0.0088
12/28/2016 20:03	0.0086
12/28/2016 20:04	0.0087
12/28/2016 20:05	0.009
12/28/2016 20:06	0.0088
12/28/2016 20:07	0.0088
12/28/2016 20:08	0.0088
12/28/2016 20:09	0.0088
12/28/2016 20:10	0.009
12/28/2016 20:11	0.0088
12/28/2016 20:12	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 20:13	0.0088
12/28/2016 20:14	0.0084
12/28/2016 20:15	0.0085
12/28/2016 20:16	0.0086
12/28/2016 20:17	0.0084
12/28/2016 20:18	0.0089
12/28/2016 20:19	0.009
12/28/2016 20:20	0.009
12/28/2016 20:21	0.0088
12/28/2016 20:22	0.0085
12/28/2016 20:23	0.009
12/28/2016 20:24	0.0085
12/28/2016 20:25	0.0085
12/28/2016 20:26	0.0088
12/28/2016 20:27	0.0086
12/28/2016 20:28	0.0085
12/28/2016 20:29	0.0085
12/28/2016 20:30	0.0085
12/28/2016 20:31	0.0083
12/28/2016 20:32	0.0088
12/28/2016 20:33	0.0086
12/28/2016 20:34	0.0085
12/28/2016 20:35	0.0085
12/28/2016 20:36	0.0088
12/28/2016 20:37	0.0082
12/28/2016 20:38	0.0084
12/28/2016 20:39	0.0085
12/28/2016 20:40	0.009
12/28/2016 20:41	0.0085
12/28/2016 20:42	0.0091
12/28/2016 20:43	0.0082
12/28/2016 20:44	0.009
12/28/2016 20:45	0.0086
12/28/2016 20:46	0.0085
12/28/2016 20:47	0.0089
12/28/2016 20:48	0.0086
12/28/2016 20:49	0.0086
12/28/2016 20:50	0.0092
12/28/2016 20:51	0.0086
12/28/2016 20:52	0.0089
12/28/2016 20:53	0.0086
12/28/2016 20:54	0.0085
12/28/2016 20:55	0.0085
12/28/2016 20:56	0.0089
12/28/2016 20:57	0.0086
12/28/2016 20:58	0.0088
12/28/2016 20:59	0.0087

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 21:00	0.0087
12/28/2016 21:01	0.0087
12/28/2016 21:02	0.0088
12/28/2016 21:03	0.0085
12/28/2016 21:04	0.0085
12/28/2016 21:05	0.0082
12/28/2016 21:06	0.0085
12/28/2016 21:07	0.0086
12/28/2016 21:08	0.0088
12/28/2016 21:09	0.0085
12/28/2016 21:10	0.0088
12/28/2016 21:11	0.0089
12/28/2016 21:12	0.0086
12/28/2016 21:13	0.0088
12/28/2016 21:14	0.0083
12/28/2016 21:15	0.0087
12/28/2016 21:16	0.0084
12/28/2016 21:17	0.0086
12/28/2016 21:18	0.0085
12/28/2016 21:19	0.0086
12/28/2016 21:20	0.0086
12/28/2016 21:21	0.0085
12/28/2016 21:22	0.0082
12/28/2016 21:23	0.0084
12/28/2016 21:24	0.0088
12/28/2016 21:25	0.0084
12/28/2016 21:26	0.0087
12/28/2016 21:27	0.0089
12/28/2016 21:28	0.0088
12/28/2016 21:29	0.0088
12/28/2016 21:30	0.0083
12/28/2016 21:31	0.0087
12/28/2016 21:32	0.0088
12/28/2016 21:33	0.009
12/28/2016 21:34	0.0087
12/28/2016 21:35	0.0088
12/28/2016 21:36	0.0088
12/28/2016 21:37	0.0087
12/28/2016 21:38	0.0085
12/28/2016 21:39	0.0085
12/28/2016 21:40	0.0083
12/28/2016 21:41	0.0082
12/28/2016 21:42	0.0086
12/28/2016 21:43	0.0085
12/28/2016 21:44	0.0089
12/28/2016 21:45	0.0087
12/28/2016 21:46	0.0089

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 21:47	0.0084
12/28/2016 21:48	0.0085
12/28/2016 21:49	0.0083
12/28/2016 21:50	0.0088
12/28/2016 21:51	0.0085
12/28/2016 21:52	0.0086
12/28/2016 21:53	0.0087
12/28/2016 21:54	0.0084
12/28/2016 21:55	0.0086
12/28/2016 21:56	0.0087
12/28/2016 21:57	0.0086
12/28/2016 21:58	0.0085
12/28/2016 21:59	0.0088
12/28/2016 22:00	0.0086
12/28/2016 22:01	0.0083
12/28/2016 22:02	0.0085
12/28/2016 22:03	0.0085
12/28/2016 22:04	0.0087
12/28/2016 22:05	0.0084
12/28/2016 22:06	0.0087
12/28/2016 22:07	0.0085
12/28/2016 22:08	0.009
12/28/2016 22:09	0.0087
12/28/2016 22:10	0.0087
12/28/2016 22:11	0.0087
12/28/2016 22:12	0.009
12/28/2016 22:13	0.0091
12/28/2016 22:14	0.0086
12/28/2016 22:15	0.0083
12/28/2016 22:16	0.0085
12/28/2016 22:17	0.0091
12/28/2016 22:18	0.0085
12/28/2016 22:19	0.0086
12/28/2016 22:20	0.0085
12/28/2016 22:21	0.0082
12/28/2016 22:22	0.0089
12/28/2016 22:23	0.0089
12/28/2016 22:24	0.0085
12/28/2016 22:25	0.0088
12/28/2016 22:26	0.0085
12/28/2016 22:27	0.0085
12/28/2016 22:28	0.0085
12/28/2016 22:29	0.0089
12/28/2016 22:30	0.0086
12/28/2016 22:31	0.0087
12/28/2016 22:32	0.0087
12/28/2016 22:33	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 22:34	0.0086
12/28/2016 22:35	0.0087
12/28/2016 22:36	0.0086
12/28/2016 22:37	0.0084
12/28/2016 22:38	0.0088
12/28/2016 22:39	0.0083
12/28/2016 22:40	0.0086
12/28/2016 22:41	0.0087
12/28/2016 22:42	0.0089
12/28/2016 22:43	0.0086
12/28/2016 22:44	0.0085
12/28/2016 22:45	0.0084
12/28/2016 22:46	0.009
12/28/2016 22:47	0.0085
12/28/2016 22:48	0.0087
12/28/2016 22:49	0.0086
12/28/2016 22:50	0.0087
12/28/2016 22:51	0.0089
12/28/2016 22:52	0.0081
12/28/2016 22:53	0.0087
12/28/2016 22:54	0.009
12/28/2016 22:55	0.0087
12/28/2016 22:56	0.0087
12/28/2016 22:57	0.0086
12/28/2016 22:58	0.0088
12/28/2016 22:59	0.0087
12/28/2016 23:00	0.0087
12/28/2016 23:01	0.0086
12/28/2016 23:02	0.009
12/28/2016 23:03	0.0086
12/28/2016 23:04	0.0082
12/28/2016 23:05	0.0084
12/28/2016 23:06	0.0084
12/28/2016 23:07	0.009
12/28/2016 23:08	0.0087
12/28/2016 23:09	0.0085
12/28/2016 23:10	0.0085
12/28/2016 23:11	0.0086
12/28/2016 23:12	0.0084
12/28/2016 23:13	0.0087
12/28/2016 23:14	0.0088
12/28/2016 23:15	0.0086
12/28/2016 23:16	0.0089
12/28/2016 23:17	0.0088
12/28/2016 23:18	0.0087
12/28/2016 23:19	0.0087
12/28/2016 23:20	0.0087

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 23:21	0.0084
12/28/2016 23:22	0.0087
12/28/2016 23:23	0.0085
12/28/2016 23:24	0.0086
12/28/2016 23:25	0.0083
12/28/2016 23:26	0.0088
12/28/2016 23:27	0.0086
12/28/2016 23:28	0.009
12/28/2016 23:29	0.0083
12/28/2016 23:30	0.0087
12/28/2016 23:31	0.0086
12/28/2016 23:32	0.0087
12/28/2016 23:33	0.0085
12/28/2016 23:34	0.0088
12/28/2016 23:35	0.0085
12/28/2016 23:36	0.0085
12/28/2016 23:37	0.0084
12/28/2016 23:38	0.0084
12/28/2016 23:39	0.0087
12/28/2016 23:40	0.0084
12/28/2016 23:41	0.0086
12/28/2016 23:42	0.0088
12/28/2016 23:43	0.0086
12/28/2016 23:44	0.0086
12/28/2016 23:45	0.0085
12/28/2016 23:46	0.0086
12/28/2016 23:47	0.0088
12/28/2016 23:48	0.0087
12/28/2016 23:49	0.0082
12/28/2016 23:50	0.0081
12/28/2016 23:51	0.0085
12/28/2016 23:52	0.0087
12/28/2016 23:53	0.0087
12/28/2016 23:54	0.0086
12/28/2016 23:55	0.0083
12/28/2016 23:56	0.0088
12/28/2016 23:57	0.0092
12/28/2016 23:58	0.0082
12/28/2016 23:59	0.0085
12/29/2016 0:00	0.0086
12/29/2016 0:01	0.0082
12/29/2016 0:02	0.0089
12/29/2016 0:03	0.0086
12/29/2016 0:04	0.0086
12/29/2016 0:05	0.0086
12/29/2016 0:06	0.0086
12/29/2016 0:07	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 0:08	0.0086
12/29/2016 0:09	0.0091
12/29/2016 0:10	0.009
12/29/2016 0:11	0.0085
12/29/2016 0:12	0.0083
12/29/2016 0:13	0.0087
12/29/2016 0:14	0.0087
12/29/2016 0:15	0.0084
12/29/2016 0:16	0.0084
12/29/2016 0:17	0.0083
12/29/2016 0:18	0.0087
12/29/2016 0:19	0.0083
12/29/2016 0:20	0.0087
12/29/2016 0:21	0.0086
12/29/2016 0:22	0.0081
12/29/2016 0:23	0.0084
12/29/2016 0:24	0.0082
12/29/2016 0:25	0.0087
12/29/2016 0:26	0.0086
12/29/2016 0:27	0.0089
12/29/2016 0:28	0.0089
12/29/2016 0:29	0.0086
12/29/2016 0:30	0.0086
12/29/2016 0:31	0.0088
12/29/2016 0:32	0.0086
12/29/2016 0:33	0.009
12/29/2016 0:34	0.0088
12/29/2016 0:35	0.0082
12/29/2016 0:36	0.0089
12/29/2016 0:37	0.0089
12/29/2016 0:38	0.0082
12/29/2016 0:39	0.0086
12/29/2016 0:40	0.0088
12/29/2016 0:41	0.009
12/29/2016 0:42	0.0086
12/29/2016 0:43	0.0085
12/29/2016 0:44	0.0085
12/29/2016 0:45	0.0088
12/29/2016 0:46	0.0086
12/29/2016 0:47	0.0086
12/29/2016 0:48	0.0087
12/29/2016 0:49	0.0089
12/29/2016 0:50	0.0085
12/29/2016 0:51	0.0085
12/29/2016 0:52	0.009
12/29/2016 0:53	0.0083
12/29/2016 0:54	0.0087

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 0:55	0.0084
12/29/2016 0:56	0.0084
12/29/2016 0:57	0.0085
12/29/2016 0:58	0.0088
12/29/2016 0:59	0.0084
12/29/2016 1:00	0.0087
12/29/2016 1:01	0.0087
12/29/2016 1:02	0.0085
12/29/2016 1:03	0.0083
12/29/2016 1:04	0.0087
12/29/2016 1:05	0.0085
12/29/2016 1:06	0.0086
12/29/2016 1:07	0.0087
12/29/2016 1:08	0.0088
12/29/2016 1:09	0.0084
12/29/2016 1:10	0.0087
12/29/2016 1:11	0.0089
12/29/2016 1:12	0.0083
12/29/2016 1:13	0.0087
12/29/2016 1:14	0.0087
12/29/2016 1:15	0.0084
12/29/2016 1:16	0.0086
12/29/2016 1:17	0.0086
12/29/2016 1:18	0.0087
12/29/2016 1:19	0.0088
12/29/2016 1:20	0.0082
12/29/2016 1:21	0.0085
12/29/2016 1:22	0.0083
12/29/2016 1:23	0.0087
12/29/2016 1:24	0.0084
12/29/2016 1:25	0.0083
12/29/2016 1:26	0.0084
12/29/2016 1:27	0.0086
12/29/2016 1:28	0.0081
12/29/2016 1:29	0.0085
12/29/2016 1:30	0.0082
12/29/2016 1:31	0.0089
12/29/2016 1:32	0.0081
12/29/2016 1:33	0.0085
12/29/2016 1:34	0.0083
12/29/2016 1:35	0.0087
12/29/2016 1:36	0.0086
12/29/2016 1:37	0.0087
12/29/2016 1:38	0.0082
12/29/2016 1:39	0.0087
12/29/2016 1:40	0.0086
12/29/2016 1:41	0.0082

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 1:42	0.0087
12/29/2016 1:43	0.0086
12/29/2016 1:44	0.0085
12/29/2016 1:45	0.0083
12/29/2016 1:46	0.0088
12/29/2016 1:47	0.0085
12/29/2016 1:48	0.0084
12/29/2016 1:49	0.0087
12/29/2016 1:50	0.0085
12/29/2016 1:51	0.0084
12/29/2016 1:52	0.0085
12/29/2016 1:53	0.0086
12/29/2016 1:54	0.0085
12/29/2016 1:55	0.0088
12/29/2016 1:56	0.0085
12/29/2016 1:57	0.0085
12/29/2016 1:58	0.0087
12/29/2016 1:59	0.0089
12/29/2016 2:00	0.0084
12/29/2016 2:01	0.0082
12/29/2016 2:02	0.0082
12/29/2016 2:03	0.0086
12/29/2016 2:04	0.0086
12/29/2016 2:05	0.0086
12/29/2016 2:06	0.0088
12/29/2016 2:07	0.0085
12/29/2016 2:08	0.0089
12/29/2016 2:09	0.0085
12/29/2016 2:10	0.0084
12/29/2016 2:11	0.0077
12/29/2016 2:12	0.0086
12/29/2016 2:13	0.0082
12/29/2016 2:14	0.0083
12/29/2016 2:15	0.0083
12/29/2016 2:16	0.0085
12/29/2016 2:17	0.0088
12/29/2016 2:18	0.0086
12/29/2016 2:19	0.0086
12/29/2016 2:20	0.0083
12/29/2016 2:21	0.0086
12/29/2016 2:22	0.0089
12/29/2016 2:23	0.0085
12/29/2016 2:24	0.0089
12/29/2016 2:25	0.0086
12/29/2016 2:26	0.0085
12/29/2016 2:27	0.0085
12/29/2016 2:28	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 2:29	0.008
12/29/2016 2:30	0.0085
12/29/2016 2:31	0.0087
12/29/2016 2:32	0.0087
12/29/2016 2:33	0.0085
12/29/2016 2:34	0.008
12/29/2016 2:35	0.0085
12/29/2016 2:36	0.0084
12/29/2016 2:37	0.0083
12/29/2016 2:38	0.0083
12/29/2016 2:39	0.0087
12/29/2016 2:40	0.0085
12/29/2016 2:41	0.0085
12/29/2016 2:42	0.0087
12/29/2016 2:43	0.0083
12/29/2016 2:44	0.0081
12/29/2016 2:45	0.0087
12/29/2016 2:46	0.0086
12/29/2016 2:47	0.0084
12/29/2016 2:48	0.0087
12/29/2016 2:49	0.0084
12/29/2016 2:50	0.0085
12/29/2016 2:51	0.0085
12/29/2016 2:52	0.0087
12/29/2016 2:53	0.0085
12/29/2016 2:54	0.0085
12/29/2016 2:55	0.0092
12/29/2016 2:56	0.0083
12/29/2016 2:57	0.0084
12/29/2016 2:58	0.009
12/29/2016 2:59	0.0086
12/29/2016 3:00	0.0082
12/29/2016 3:01	0.0085
12/29/2016 3:02	0.0086
12/29/2016 3:03	0.0085
12/29/2016 3:04	0.0086
12/29/2016 3:05	0.0081
12/29/2016 3:06	0.0084
12/29/2016 3:07	0.0086
12/29/2016 3:08	0.0087
12/29/2016 3:09	0.0085
12/29/2016 3:10	0.0086
12/29/2016 3:11	0.0083
12/29/2016 3:12	0.0089
12/29/2016 3:13	0.0084
12/29/2016 3:14	0.0087
12/29/2016 3:15	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - D[redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 3:16	0.0081
12/29/2016 3:17	0.0087
12/29/2016 3:18	0.0085
12/29/2016 3:19	0.0085
12/29/2016 3:20	0.0089
12/29/2016 3:21	0.0085
12/29/2016 3:22	0.0091
12/29/2016 3:23	0.0088
12/29/2016 3:24	0.0084
12/29/2016 3:25	0.0085
12/29/2016 3:26	0.0086
12/29/2016 3:27	0.0087
12/29/2016 3:28	0.0083
12/29/2016 3:29	0.0084
12/29/2016 3:30	0.0081
12/29/2016 3:31	0.0086
12/29/2016 3:32	0.0084
12/29/2016 3:33	0.0083
12/29/2016 3:34	0.0092
12/29/2016 3:35	0.0086
12/29/2016 3:36	0.0084
12/29/2016 3:37	0.0088
12/29/2016 3:38	0.0085
12/29/2016 3:39	0.0085
12/29/2016 3:40	0.0084
12/29/2016 3:41	0.0085
12/29/2016 3:42	0.0085
12/29/2016 3:43	0.0086
12/29/2016 3:44	0.0081
12/29/2016 3:45	0.0084
12/29/2016 3:46	0.0083
12/29/2016 3:47	0.0085
12/29/2016 3:48	0.0084
12/29/2016 3:49	0.0085
12/29/2016 3:50	0.0082
12/29/2016 3:51	0.0086
12/29/2016 3:52	0.0085
12/29/2016 3:53	0.0081
12/29/2016 3:54	0.0086
12/29/2016 3:55	0.0086
12/29/2016 3:56	0.0086
12/29/2016 3:57	0.0092
12/29/2016 3:58	0.009
12/29/2016 3:59	0.0088
12/29/2016 4:00	0.0086
12/29/2016 4:01	0.0086
12/29/2016 4:02	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 4:03	0.0085
12/29/2016 4:04	0.0083
12/29/2016 4:05	0.0085
12/29/2016 4:06	0.0084
12/29/2016 4:07	0.0087
12/29/2016 4:08	0.008
12/29/2016 4:09	0.0084
12/29/2016 4:10	0.0087
12/29/2016 4:11	0.0092
12/29/2016 4:12	0.009
12/29/2016 4:13	0.0082
12/29/2016 4:14	0.0084
12/29/2016 4:15	0.0084
12/29/2016 4:16	0.0085
12/29/2016 4:17	0.0084
12/29/2016 4:18	0.0087
12/29/2016 4:19	0.0083
12/29/2016 4:20	0.0085
12/29/2016 4:21	0.0085
12/29/2016 4:22	0.0083
12/29/2016 4:23	0.0085
12/29/2016 4:24	0.0086
12/29/2016 4:25	0.0085
12/29/2016 4:26	0.0087
12/29/2016 4:27	0.0086
12/29/2016 4:28	0.0083
12/29/2016 4:29	0.0084
12/29/2016 4:30	0.0089
12/29/2016 4:31	0.0091
12/29/2016 4:32	0.0085
12/29/2016 4:33	0.0089
12/29/2016 4:34	0.0086
12/29/2016 4:35	0.0091
12/29/2016 4:36	0.0085
12/29/2016 4:37	0.0085
12/29/2016 4:38	0.0089
12/29/2016 4:39	0.009
12/29/2016 4:40	0.0083
12/29/2016 4:41	0.0086
12/29/2016 4:42	0.009
12/29/2016 4:43	0.0085
12/29/2016 4:44	0.0087
12/29/2016 4:45	0.0091
12/29/2016 4:46	0.0085
12/29/2016 4:47	0.0086
12/29/2016 4:48	0.0086
12/29/2016 4:49	0.0084

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 4:50	0.0087
12/29/2016 4:51	0.0089
12/29/2016 4:52	0.0086
12/29/2016 4:53	0.0083
12/29/2016 4:54	0.0087
12/29/2016 4:55	0.0088
12/29/2016 4:56	0.0085
12/29/2016 4:57	0.009
12/29/2016 4:58	0.0088
12/29/2016 4:59	0.0088
12/29/2016 5:00	0.0087
12/29/2016 5:01	0.0087
12/29/2016 5:02	0.0084
12/29/2016 5:03	0.0087
12/29/2016 5:04	0.0087
12/29/2016 5:05	0.0086
12/29/2016 5:06	0.0084
12/29/2016 5:07	0.0084
12/29/2016 5:08	0.0089
12/29/2016 5:09	0.0084
12/29/2016 5:10	0.0089
12/29/2016 5:11	0.0087
12/29/2016 5:12	0.0086
12/29/2016 5:13	0.0084
12/29/2016 5:14	0.0082
12/29/2016 5:15	0.0084
12/29/2016 5:16	0.0083
12/29/2016 5:17	0.0086
12/29/2016 5:18	0.0087
12/29/2016 5:19	0.0084
12/29/2016 5:20	0.0086
12/29/2016 5:21	0.0083
12/29/2016 5:22	0.0084
12/29/2016 5:23	0.0088
12/29/2016 5:24	0.0087
12/29/2016 5:25	0.0085
12/29/2016 5:26	0.0085
12/29/2016 5:27	0.0086
12/29/2016 5:28	0.0086
12/29/2016 5:29	0.0086
12/29/2016 5:30	0.0084
12/29/2016 5:31	0.0083
12/29/2016 5:32	0.0088
12/29/2016 5:33	0.0086
12/29/2016 5:34	0.0085
12/29/2016 5:35	0.0086
12/29/2016 5:36	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 5:37	0.0087
12/29/2016 5:38	0.0086
12/29/2016 5:39	0.0085
12/29/2016 5:40	0.0088
12/29/2016 5:41	0.0086
12/29/2016 5:42	0.0085
12/29/2016 5:43	0.0084
12/29/2016 5:44	0.0087
12/29/2016 5:45	0.009
12/29/2016 5:46	0.0081
12/29/2016 5:47	0.0084
12/29/2016 5:48	0.0085
12/29/2016 5:49	0.0085
12/29/2016 5:50	0.0084
12/29/2016 5:51	0.0084
12/29/2016 5:52	0.0086
12/29/2016 5:53	0.0089
12/29/2016 5:54	0.0083
12/29/2016 5:55	0.0086
12/29/2016 5:56	0.0083
12/29/2016 5:57	0.0084
12/29/2016 5:58	0.0081
12/29/2016 5:59	0.0088
12/29/2016 6:00	0.0084
12/29/2016 6:01	0.0086
12/29/2016 6:02	0.0082
12/29/2016 6:03	0.0086
12/29/2016 6:04	0.0087
12/29/2016 6:05	0.0082
12/29/2016 6:06	0.0086
12/29/2016 6:07	0.0088
12/29/2016 6:08	0.0085
12/29/2016 6:09	0.0084
12/29/2016 6:10	0.0087
12/29/2016 6:11	0.0085
12/29/2016 6:12	0.0082
12/29/2016 6:13	0.0086
12/29/2016 6:14	0.0088
12/29/2016 6:15	0.0084
12/29/2016 6:16	0.0087
12/29/2016 6:17	0.0092
12/29/2016 6:18	0.009
12/29/2016 6:19	0.0084
12/29/2016 6:20	0.0086
12/29/2016 6:21	0.0084
12/29/2016 6:22	0.0084
12/29/2016 6:23	0.0084

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 6:24	0.0083
12/29/2016 6:25	0.0087
12/29/2016 6:26	0.0083
12/29/2016 6:27	0.0085
12/29/2016 6:28	0.0087
12/29/2016 6:29	0.0084
12/29/2016 6:30	0.0085
12/29/2016 6:31	0.0086
12/29/2016 6:32	0.0085
12/29/2016 6:33	0.0087
12/29/2016 6:34	0.0084
12/29/2016 6:35	0.0084
12/29/2016 6:36	0.0086
12/29/2016 6:37	0.0086
12/29/2016 6:38	0.0084
12/29/2016 6:39	0.0088
12/29/2016 6:40	0.0089
12/29/2016 6:41	0.0088
12/29/2016 6:42	0.0088
12/29/2016 6:43	0.0087
12/29/2016 6:44	0.0087
12/29/2016 6:45	0.0085
12/29/2016 6:46	0.0084
12/29/2016 6:47	0.0083
12/29/2016 6:48	0.0081
12/29/2016 6:49	0.0088
12/29/2016 6:50	0.0087
12/29/2016 6:51	0.0084
12/29/2016 6:52	0.0088
12/29/2016 6:53	0.0087
12/29/2016 6:54	0.0083
12/29/2016 6:55	0.0083
12/29/2016 6:56	0.0082
12/29/2016 6:57	0.0084
12/29/2016 6:58	0.0086
12/29/2016 6:59	0.0082
12/29/2016 7:00	0.0079
12/29/2016 7:01	0.0085
12/29/2016 7:02	0.0086
12/29/2016 7:03	0.0085
12/29/2016 7:04	0.0083
12/29/2016 7:05	0.0087
12/29/2016 7:06	0.0085
12/29/2016 7:07	0.0088
12/29/2016 7:08	0.0086
12/29/2016 7:09	0.0088
12/29/2016 7:10	0.0084

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 7:11	0.0083
12/29/2016 7:12	0.0086
12/29/2016 7:13	0.0087
12/29/2016 7:14	0.0086
12/29/2016 7:15	0.0084
12/29/2016 7:16	0.0089
12/29/2016 7:17	0.0084
12/29/2016 7:18	0.0089
12/29/2016 7:19	0.0083
12/29/2016 7:20	0.0087
12/29/2016 7:21	0.0087
12/29/2016 7:22	0.0083
12/29/2016 7:23	0.0087
12/29/2016 7:24	0.0088
12/29/2016 7:25	0.0086
12/29/2016 7:26	0.0086
12/29/2016 7:27	0.0084
12/29/2016 7:28	0.0083
12/29/2016 7:29	0.0085
12/29/2016 7:30	0.0087
12/29/2016 7:31	0.0084
12/29/2016 7:32	0.0086
12/29/2016 7:33	0.0086
12/29/2016 7:34	0.0088
12/29/2016 7:35	0.0085
12/29/2016 7:36	0.0085
12/29/2016 7:37	0.0088
12/29/2016 7:38	0.0085
12/29/2016 7:39	0.0084
12/29/2016 7:40	0.0086
12/29/2016 7:41	0.0084
12/29/2016 7:42	0.0085
12/29/2016 7:43	0.0088
12/29/2016 7:44	0.0084
12/29/2016 7:45	0.008
12/29/2016 7:46	0.0085
12/29/2016 7:47	0.0082
12/29/2016 7:48	0.0087
12/29/2016 7:49	0.0084
12/29/2016 7:50	0.0085
12/29/2016 7:51	0.0085
12/29/2016 7:52	0.0085
12/29/2016 7:53	0.0084
12/29/2016 7:54	0.0086
12/29/2016 7:55	0.0084
12/29/2016 7:56	0.0087
12/29/2016 7:57	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 7:58	0.0084
12/29/2016 7:59	0.0082
12/29/2016 8:00	0.0084
12/29/2016 8:01	0.0086
12/29/2016 8:02	0.0085
12/29/2016 8:03	0.0081
12/29/2016 8:04	0.0082
12/29/2016 8:05	0.0085
12/29/2016 8:06	0.0085
12/29/2016 8:07	0.0087
12/29/2016 8:08	0.0084
12/29/2016 8:09	0.0082
12/29/2016 8:10	0.0085
12/29/2016 8:11	0.0083
12/29/2016 8:12	0.0082
12/29/2016 8:13	0.0085
12/29/2016 8:14	0.0086
12/29/2016 8:15	0.0083
12/29/2016 8:16	0.0083
12/29/2016 8:17	0.0085
12/29/2016 8:18	0.0084
12/29/2016 8:19	0.0083
12/29/2016 8:20	0.0082
12/29/2016 8:21	0.0083
12/29/2016 8:22	0.0083
12/29/2016 8:23	0.0087
12/29/2016 8:24	0.0086
12/29/2016 8:25	0.0084
12/29/2016 8:26	0.0086
12/29/2016 8:27	0.0086
12/29/2016 8:28	0.0084
12/29/2016 8:29	0.0085
12/29/2016 8:30	0.0089
12/29/2016 8:31	0.0087
12/29/2016 8:32	0.0083
12/29/2016 8:33	0.0086
12/29/2016 8:34	0.0088
12/29/2016 8:35	0.0085
12/29/2016 8:36	0.0085
12/29/2016 8:37	0.0084
12/29/2016 8:38	0.0084
12/29/2016 8:39	0.0083
12/29/2016 8:40	0.0088
12/29/2016 8:41	0.0084
12/29/2016 8:42	0.0087
12/29/2016 8:43	0.0085
12/29/2016 8:44	0.0084

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 8:45	0.0086
12/29/2016 8:46	0.0081
12/29/2016 8:47	0.0079
12/29/2016 8:48	0.0086
12/29/2016 8:49	0.0085
12/29/2016 8:50	0.008
12/29/2016 8:51	0.0085
12/29/2016 8:52	0.0085
12/29/2016 8:53	0.0088
12/29/2016 8:54	0.0083
12/29/2016 8:55	0.0089
12/29/2016 8:56	0.009
12/29/2016 8:57	0.0085
12/29/2016 8:58	0.0084
12/29/2016 8:59	0.0084
12/29/2016 9:00	0.0086
12/29/2016 9:01	0.0087
12/29/2016 9:02	0.0085
12/29/2016 9:03	0.008
12/29/2016 9:04	0.0088
12/29/2016 9:05	0.0086
12/29/2016 9:06	0.0085
12/29/2016 9:07	0.0085
12/29/2016 9:08	0.0084
12/29/2016 9:09	0.0082
12/29/2016 9:10	0.0087
12/29/2016 9:11	0.0085
12/29/2016 9:12	0.0083
12/29/2016 9:13	0.0085
12/29/2016 9:14	0.0083
12/29/2016 9:15	0.0086
12/29/2016 9:16	0.0083
12/29/2016 9:17	0.0084
12/29/2016 9:18	0.0082
12/29/2016 9:19	0.0087
12/29/2016 9:20	0.0083
12/29/2016 9:21	0.0085
12/29/2016 9:22	0.0083
12/29/2016 9:23	0.0085
12/29/2016 9:24	0.0083
12/29/2016 9:25	0.0086
12/29/2016 9:26	0.0084
12/29/2016 9:27	0.0085
12/29/2016 9:28	0.0083
12/29/2016 9:29	0.0084
12/29/2016 9:30	0.0088
12/29/2016 9:31	0.0082

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 9:32	0.0085
12/29/2016 9:33	0.0087
12/29/2016 9:34	0.008
12/29/2016 9:35	0.0082
12/29/2016 9:36	0.0086
12/29/2016 9:37	0.0085
12/29/2016 9:38	0.0084
12/29/2016 9:39	0.0083
12/29/2016 9:40	0.0084
12/29/2016 9:41	0.0086
12/29/2016 9:42	0.0085
12/29/2016 9:43	0.0083
12/29/2016 9:44	0.0084
12/29/2016 9:45	0.0082
12/29/2016 9:46	0.0083
12/29/2016 9:47	0.0086
12/29/2016 9:48	0.0082
12/29/2016 9:49	0.0084
12/29/2016 9:50	0.0084
12/29/2016 9:51	0.0085
12/29/2016 9:52	0.0083
12/29/2016 9:53	0.0083
12/29/2016 9:54	0.0082
12/29/2016 9:55	0.0085
12/29/2016 9:56	0.0082
12/29/2016 9:57	0.0084
12/29/2016 9:58	0.0083
12/29/2016 9:59	0.0084
Mean	**0.0086**

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 17:06	0.0075
12/28/2016 17:07	0.0078
12/28/2016 17:08	0.0075
12/28/2016 17:09	0.0085
12/28/2016 17:10	0.008
12/28/2016 17:11	0.0083
12/28/2016 17:12	0.0082
12/28/2016 17:13	0.0082
12/28/2016 17:14	0.0083
12/28/2016 17:15	0.0085
12/28/2016 17:16	0.0088
12/28/2016 17:17	0.0086
12/28/2016 17:18	0.0087
12/28/2016 17:19	0.0085
12/28/2016 17:20	0.0084
12/28/2016 17:21	0.0088
12/28/2016 17:22	0.008
12/28/2016 17:23	0.0082
12/28/2016 17:24	0.0088
12/28/2016 17:25	0.0086
12/28/2016 17:26	0.0083
12/28/2016 17:27	0.0086
12/28/2016 17:28	0.0085
12/28/2016 17:29	0.0089
12/28/2016 17:30	0.0084
12/28/2016 17:31	0.0083
12/28/2016 17:32	0.0085
12/28/2016 17:33	0.0089
12/28/2016 17:34	0.009
12/28/2016 17:35	0.0083
12/28/2016 17:36	0.0087
12/28/2016 17:37	0.0085
12/28/2016 17:38	0.0085
12/28/2016 17:39	0.0087
12/28/2016 17:40	0.0085
12/28/2016 17:41	0.0086
12/28/2016 17:42	0.0086
12/28/2016 17:43	0.0085
12/28/2016 17:44	0.0087
12/28/2016 17:45	0.0083
12/28/2016 17:46	0.0085
12/28/2016 17:47	0.0094
12/28/2016 17:48	0.0084
12/28/2016 17:49	0.0083
12/28/2016 17:50	0.0086
12/28/2016 17:51	0.0086
12/28/2016 17:52	0.0088

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 17:53	0.0088
12/28/2016 17:54	0.0085
12/28/2016 17:55	0.0084
12/28/2016 17:56	0.0086
12/28/2016 17:57	0.0083
12/28/2016 17:58	0.0086
12/28/2016 17:59	0.0091
12/28/2016 18:00	0.0087
12/28/2016 18:01	0.0087
12/28/2016 18:02	0.0089
12/28/2016 18:03	0.0082
12/28/2016 18:04	0.0091
12/28/2016 18:05	0.0086
12/28/2016 18:06	0.0088
12/28/2016 18:07	0.0086
12/28/2016 18:08	0.0091
12/28/2016 18:09	0.0086
12/28/2016 18:10	0.0087
12/28/2016 18:11	0.0084
12/28/2016 18:12	0.0089
12/28/2016 18:13	0.0085
12/28/2016 18:14	0.0086
12/28/2016 18:15	0.0082
12/28/2016 18:16	0.0084
12/28/2016 18:17	0.0085
12/28/2016 18:18	0.0086
12/28/2016 18:19	0.0086
12/28/2016 18:20	0.0089
12/28/2016 18:21	0.0086
12/28/2016 18:22	0.0086
12/28/2016 18:23	0.0084
12/28/2016 18:24	0.0088
12/28/2016 18:25	0.0085
12/28/2016 18:26	0.0087
12/28/2016 18:27	0.0088
12/28/2016 18:28	0.0088
12/28/2016 18:29	0.0088
12/28/2016 18:30	0.0087
12/28/2016 18:31	0.0087
12/28/2016 18:32	0.009
12/28/2016 18:33	0.0088
12/28/2016 18:34	0.0085
12/28/2016 18:35	0.0086
12/28/2016 18:36	0.0087
12/28/2016 18:37	0.0089
12/28/2016 18:38	0.0091
12/28/2016 18:39	0.0089

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 18:40	0.0087
12/28/2016 18:41	0.0086
12/28/2016 18:42	0.0091
12/28/2016 18:43	0.0087
12/28/2016 18:44	0.0085
12/28/2016 18:45	0.0087
12/28/2016 18:46	0.0086
12/28/2016 18:47	0.0086
12/28/2016 18:48	0.0085
12/28/2016 18:49	0.0086
12/28/2016 18:50	0.0088
12/28/2016 18:51	0.0089
12/28/2016 18:52	0.0089
12/28/2016 18:53	0.0086
12/28/2016 18:54	0.0088
12/28/2016 18:55	0.0084
12/28/2016 18:56	0.0082
12/28/2016 18:57	0.0084
12/28/2016 18:58	0.0092
12/28/2016 18:59	0.0087
12/28/2016 19:00	0.0084
12/28/2016 19:01	0.0081
12/28/2016 19:02	0.009
12/28/2016 19:03	0.0088
12/28/2016 19:04	0.0086
12/28/2016 19:05	0.0084
12/28/2016 19:06	0.0087
12/28/2016 19:07	0.0088
12/28/2016 19:08	0.0084
12/28/2016 19:09	0.0084
12/28/2016 19:10	0.0084
12/28/2016 19:11	0.0086
12/28/2016 19:12	0.0087
12/28/2016 19:13	0.0084
12/28/2016 19:14	0.0085
12/28/2016 19:15	0.0087
12/28/2016 19:16	0.0085
12/28/2016 19:17	0.0087
12/28/2016 19:18	0.0089
12/28/2016 19:19	0.0086
12/28/2016 19:20	0.0087
12/28/2016 19:21	0.0085
12/28/2016 19:22	0.0083
12/28/2016 19:23	0.0085
12/28/2016 19:24	0.0087
12/28/2016 19:25	0.0085
12/28/2016 19:26	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 19:27	0.0084
12/28/2016 19:28	0.0088
12/28/2016 19:29	0.0085
12/28/2016 19:30	0.0088
12/28/2016 19:31	0.0085
12/28/2016 19:32	0.0089
12/28/2016 19:33	0.0084
12/28/2016 19:34	0.0087
12/28/2016 19:35	0.0086
12/28/2016 19:36	0.0086
12/28/2016 19:37	0.0085
12/28/2016 19:38	0.0091
12/28/2016 19:39	0.0086
12/28/2016 19:40	0.009
12/28/2016 19:41	0.0086
12/28/2016 19:42	0.0086
12/28/2016 19:43	0.0089
12/28/2016 19:44	0.0088
12/28/2016 19:45	0.0084
12/28/2016 19:46	0.0087
12/28/2016 19:47	0.0087
12/28/2016 19:48	0.0088
12/28/2016 19:49	0.0084
12/28/2016 19:50	0.0085
12/28/2016 19:51	0.0086
12/28/2016 19:52	0.0087
12/28/2016 19:53	0.0086
12/28/2016 19:54	0.0086
12/28/2016 19:55	0.0087
12/28/2016 19:56	0.0088
12/28/2016 19:57	0.0087
12/28/2016 19:58	0.0084
12/28/2016 19:59	0.0085
12/28/2016 20:00	0.0088
12/28/2016 20:01	0.0089
12/28/2016 20:02	0.0088
12/28/2016 20:03	0.0088
12/28/2016 20:04	0.0089
12/28/2016 20:05	0.0092
12/28/2016 20:06	0.0087
12/28/2016 20:07	0.0088
12/28/2016 20:08	0.0083
12/28/2016 20:09	0.0088
12/28/2016 20:10	0.0089
12/28/2016 20:11	0.0087
12/28/2016 20:12	0.0086
12/28/2016 20:13	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 20:14	0.009
12/28/2016 20:15	0.0087
12/28/2016 20:16	0.0088
12/28/2016 20:17	0.0086
12/28/2016 20:18	0.0091
12/28/2016 20:19	0.0086
12/28/2016 20:20	0.0087
12/28/2016 20:21	0.0087
12/28/2016 20:22	0.0087
12/28/2016 20:23	0.0088
12/28/2016 20:24	0.0084
12/28/2016 20:25	0.0085
12/28/2016 20:26	0.0087
12/28/2016 20:27	0.0087
12/28/2016 20:28	0.0088
12/28/2016 20:29	0.0087
12/28/2016 20:30	0.0083
12/28/2016 20:31	0.0086
12/28/2016 20:32	0.0087
12/28/2016 20:33	0.0087
12/28/2016 20:34	0.0083
12/28/2016 20:35	0.0088
12/28/2016 20:36	0.0085
12/28/2016 20:37	0.0086
12/28/2016 20:38	0.0085
12/28/2016 20:39	0.0084
12/28/2016 20:40	0.0087
12/28/2016 20:41	0.0091
12/28/2016 20:42	0.0086
12/28/2016 20:43	0.0087
12/28/2016 20:44	0.0086
12/28/2016 20:45	0.0086
12/28/2016 20:46	0.009
12/28/2016 20:47	0.0085
12/28/2016 20:48	0.0084
12/28/2016 20:49	0.0088
12/28/2016 20:50	0.0086
12/28/2016 20:51	0.0084
12/28/2016 20:52	0.0087
12/28/2016 20:53	0.0087
12/28/2016 20:54	0.0089
12/28/2016 20:55	0.0083
12/28/2016 20:56	0.0084
12/28/2016 20:57	0.0082
12/28/2016 20:58	0.0086
12/28/2016 20:59	0.0085
12/28/2016 21:00	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 21:01	0.0085
12/28/2016 21:02	0.0084
12/28/2016 21:03	0.0087
12/28/2016 21:04	0.0093
12/28/2016 21:05	0.0085
12/28/2016 21:06	0.0085
12/28/2016 21:07	0.0084
12/28/2016 21:08	0.0087
12/28/2016 21:09	0.009
12/28/2016 21:10	0.0089
12/28/2016 21:11	0.0085
12/28/2016 21:12	0.0084
12/28/2016 21:13	0.0086
12/28/2016 21:14	0.0092
12/28/2016 21:15	0.0088
12/28/2016 21:16	0.0086
12/28/2016 21:17	0.0087
12/28/2016 21:18	0.0085
12/28/2016 21:19	0.0086
12/28/2016 21:20	0.0084
12/28/2016 21:21	0.0084
12/28/2016 21:22	0.0088
12/28/2016 21:23	0.0087
12/28/2016 21:24	0.0088
12/28/2016 21:25	0.0087
12/28/2016 21:26	0.0087
12/28/2016 21:27	0.0085
12/28/2016 21:28	0.0084
12/28/2016 21:29	0.0091
12/28/2016 21:30	0.0082
12/28/2016 21:31	0.0086
12/28/2016 21:32	0.0086
12/28/2016 21:33	0.0088
12/28/2016 21:34	0.0086
12/28/2016 21:35	0.0089
12/28/2016 21:36	0.009
12/28/2016 21:37	0.0087
12/28/2016 21:38	0.0086
12/28/2016 21:39	0.0086
12/28/2016 21:40	0.0087
12/28/2016 21:41	0.0089
12/28/2016 21:42	0.0087
12/28/2016 21:43	0.0089
12/28/2016 21:44	0.0087
12/28/2016 21:45	0.0087
12/28/2016 21:46	0.0088
12/28/2016 21:47	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 21:48	0.0087
12/28/2016 21:49	0.0087
12/28/2016 21:50	0.0091
12/28/2016 21:51	0.0089
12/28/2016 21:52	0.0085
12/28/2016 21:53	0.0085
12/28/2016 21:54	0.0085
12/28/2016 21:55	0.0085
12/28/2016 21:56	0.0085
12/28/2016 21:57	0.0083
12/28/2016 21:58	0.009
12/28/2016 21:59	0.009
12/28/2016 22:00	0.009
12/28/2016 22:01	0.0088
12/28/2016 22:02	0.0089
12/28/2016 22:03	0.0083
12/28/2016 22:04	0.0087
12/28/2016 22:05	0.0087
12/28/2016 22:06	0.0086
12/28/2016 22:07	0.0089
12/28/2016 22:08	0.0085
12/28/2016 22:09	0.0086
12/28/2016 22:10	0.0088
12/28/2016 22:11	0.0084
12/28/2016 22:12	0.0084
12/28/2016 22:13	0.0088
12/28/2016 22:14	0.0084
12/28/2016 22:15	0.0088
12/28/2016 22:16	0.0089
12/28/2016 22:17	0.0086
12/28/2016 22:18	0.0088
12/28/2016 22:19	0.0089
12/28/2016 22:20	0.0085
12/28/2016 22:21	0.0087
12/28/2016 22:22	0.0086
12/28/2016 22:23	0.0089
12/28/2016 22:24	0.0087
12/28/2016 22:25	0.0086
12/28/2016 22:26	0.0088
12/28/2016 22:27	0.0086
12/28/2016 22:28	0.0086
12/28/2016 22:29	0.0088
12/28/2016 22:30	0.0085
12/28/2016 22:31	0.0085
12/28/2016 22:32	0.0087
12/28/2016 22:33	0.0085
12/28/2016 22:34	0.0088

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 22:35	0.0085
12/28/2016 22:36	0.009
12/28/2016 22:37	0.0085
12/28/2016 22:38	0.0087
12/28/2016 22:39	0.0087
12/28/2016 22:40	0.0085
12/28/2016 22:41	0.0086
12/28/2016 22:42	0.0085
12/28/2016 22:43	0.0088
12/28/2016 22:44	0.0088
12/28/2016 22:45	0.0087
12/28/2016 22:46	0.0085
12/28/2016 22:47	0.0088
12/28/2016 22:48	0.0087
12/28/2016 22:49	0.0086
12/28/2016 22:50	0.0084
12/28/2016 22:51	0.0085
12/28/2016 22:52	0.0084
12/28/2016 22:53	0.0084
12/28/2016 22:54	0.009
12/28/2016 22:55	0.0085
12/28/2016 22:56	0.0088
12/28/2016 22:57	0.0082
12/28/2016 22:58	0.0089
12/28/2016 22:59	0.0082
12/28/2016 23:00	0.0084
12/28/2016 23:01	0.0084
12/28/2016 23:02	0.0087
12/28/2016 23:03	0.0089
12/28/2016 23:04	0.0084
12/28/2016 23:05	0.0088
12/28/2016 23:06	0.0083
12/28/2016 23:07	0.0088
12/28/2016 23:08	0.0086
12/28/2016 23:09	0.0086
12/28/2016 23:10	0.0087
12/28/2016 23:11	0.0084
12/28/2016 23:12	0.0089
12/28/2016 23:13	0.0083
12/28/2016 23:14	0.0085
12/28/2016 23:15	0.0088
12/28/2016 23:16	0.0089
12/28/2016 23:17	0.0084
12/28/2016 23:18	0.0089
12/28/2016 23:19	0.0087
12/28/2016 23:20	0.0085
12/28/2016 23:21	0.0083

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/28/2016 23:22	0.0088
12/28/2016 23:23	0.0084
12/28/2016 23:24	0.0084
12/28/2016 23:25	0.0087
12/28/2016 23:26	0.009
12/28/2016 23:27	0.0083
12/28/2016 23:28	0.0082
12/28/2016 23:29	0.0089
12/28/2016 23:30	0.0084
12/28/2016 23:31	0.0083
12/28/2016 23:32	0.0085
12/28/2016 23:33	0.0086
12/28/2016 23:34	0.0087
12/28/2016 23:35	0.0086
12/28/2016 23:36	0.0081
12/28/2016 23:37	0.0086
12/28/2016 23:38	0.0088
12/28/2016 23:39	0.0086
12/28/2016 23:40	0.0084
12/28/2016 23:41	0.0086
12/28/2016 23:42	0.0083
12/28/2016 23:43	0.0085
12/28/2016 23:44	0.0084
12/28/2016 23:45	0.0086
12/28/2016 23:46	0.0083
12/28/2016 23:47	0.0087
12/28/2016 23:48	0.0086
12/28/2016 23:49	0.0086
12/28/2016 23:50	0.0087
12/28/2016 23:51	0.0089
12/28/2016 23:52	0.0086
12/28/2016 23:53	0.0085
12/28/2016 23:54	0.0086
12/28/2016 23:55	0.0086
12/28/2016 23:56	0.0084
12/28/2016 23:57	0.0086
12/28/2016 23:58	0.0086
12/28/2016 23:59	0.0082
12/29/2016 0:00	0.0082
12/29/2016 0:01	0.0086
12/29/2016 0:02	0.0087
12/29/2016 0:03	0.0086
12/29/2016 0:04	0.0089
12/29/2016 0:05	0.0086
12/29/2016 0:06	0.0085
12/29/2016 0:07	0.0085
12/29/2016 0:08	0.0086

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 0:09	0.0085
12/29/2016 0:10	0.0086
12/29/2016 0:11	0.0087
12/29/2016 0:12	0.0085
12/29/2016 0:13	0.0087
12/29/2016 0:14	0.0087
12/29/2016 0:15	0.0086
12/29/2016 0:16	0.0087
12/29/2016 0:17	0.0085
12/29/2016 0:18	0.0082
12/29/2016 0:19	0.0089
12/29/2016 0:20	0.0087
12/29/2016 0:21	0.0088
12/29/2016 0:22	0.0085
12/29/2016 0:23	0.0086
12/29/2016 0:24	0.0081
12/29/2016 0:25	0.0086
12/29/2016 0:26	0.0082
12/29/2016 0:27	0.0084
12/29/2016 0:28	0.0084
12/29/2016 0:29	0.0088
12/29/2016 0:30	0.0087
12/29/2016 0:31	0.0083
12/29/2016 0:32	0.0087
12/29/2016 0:33	0.0086
12/29/2016 0:34	0.0091
12/29/2016 0:35	0.0085
12/29/2016 0:36	0.0093
12/29/2016 0:37	0.0089
12/29/2016 0:38	0.0085
12/29/2016 0:39	0.0088
12/29/2016 0:40	0.0087
12/29/2016 0:41	0.0087
12/29/2016 0:42	0.0088
12/29/2016 0:43	0.009
12/29/2016 0:44	0.0082
12/29/2016 0:45	0.0084
12/29/2016 0:46	0.0084
12/29/2016 0:47	0.0085
12/29/2016 0:48	0.0086
12/29/2016 0:49	0.009
12/29/2016 0:50	0.0085
12/29/2016 0:51	0.0088
12/29/2016 0:52	0.0088
12/29/2016 0:53	0.0086
12/29/2016 0:54	0.0086
12/29/2016 0:55	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 0:56	0.0083
12/29/2016 0:57	0.0086
12/29/2016 0:58	0.0086
12/29/2016 0:59	0.0086
12/29/2016 1:00	0.0081
12/29/2016 1:01	0.0083
12/29/2016 1:02	0.0084
12/29/2016 1:03	0.0087
12/29/2016 1:04	0.0087
12/29/2016 1:05	0.0086
12/29/2016 1:06	0.0085
12/29/2016 1:07	0.0086
12/29/2016 1:08	0.0081
12/29/2016 1:09	0.0087
12/29/2016 1:10	0.0084
12/29/2016 1:11	0.0083
12/29/2016 1:12	0.0085
12/29/2016 1:13	0.0084
12/29/2016 1:14	0.0084
12/29/2016 1:15	0.009
12/29/2016 1:16	0.0087
12/29/2016 1:17	0.0085
12/29/2016 1:18	0.0087
12/29/2016 1:19	0.0088
12/29/2016 1:20	0.0084
12/29/2016 1:21	0.0083
12/29/2016 1:22	0.0088
12/29/2016 1:23	0.0086
12/29/2016 1:24	0.0086
12/29/2016 1:25	0.0087
12/29/2016 1:26	0.0084
12/29/2016 1:27	0.0086
12/29/2016 1:28	0.0087
12/29/2016 1:29	0.0087
12/29/2016 1:30	0.0086
12/29/2016 1:31	0.0091
12/29/2016 1:32	0.0084
12/29/2016 1:33	0.0086
12/29/2016 1:34	0.0086
12/29/2016 1:35	0.0086
12/29/2016 1:36	0.0088
12/29/2016 1:37	0.0083
12/29/2016 1:38	0.0087
12/29/2016 1:39	0.0089
12/29/2016 1:40	0.0082
12/29/2016 1:41	0.0089
12/29/2016 1:42	0.0087

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 1:43	0.0086
12/29/2016 1:44	0.0092
12/29/2016 1:45	0.0086
12/29/2016 1:46	0.0088
12/29/2016 1:47	0.0087
12/29/2016 1:48	0.0081
12/29/2016 1:49	0.0082
12/29/2016 1:50	0.0091
12/29/2016 1:51	0.0085
12/29/2016 1:52	0.0087
12/29/2016 1:53	0.0083
12/29/2016 1:54	0.0089
12/29/2016 1:55	0.0088
12/29/2016 1:56	0.0086
12/29/2016 1:57	0.0086
12/29/2016 1:58	0.0087
12/29/2016 1:59	0.0084
12/29/2016 2:00	0.0085
12/29/2016 2:01	0.0087
12/29/2016 2:02	0.0084
12/29/2016 2:03	0.0085
12/29/2016 2:04	0.0085
12/29/2016 2:05	0.0086
12/29/2016 2:06	0.0088
12/29/2016 2:07	0.0083
12/29/2016 2:08	0.0083
12/29/2016 2:09	0.0087
12/29/2016 2:10	0.0085
12/29/2016 2:11	0.0086
12/29/2016 2:12	0.0083
12/29/2016 2:13	0.0085
12/29/2016 2:14	0.0086
12/29/2016 2:15	0.0089
12/29/2016 2:16	0.0086
12/29/2016 2:17	0.0087
12/29/2016 2:18	0.009
12/29/2016 2:19	0.0087
12/29/2016 2:20	0.0084
12/29/2016 2:21	0.0084
12/29/2016 2:22	0.0082
12/29/2016 2:23	0.0085
12/29/2016 2:24	0.0083
12/29/2016 2:25	0.0086
12/29/2016 2:26	0.0085
12/29/2016 2:27	0.0085
12/29/2016 2:28	0.0083
12/29/2016 2:29	0.0082

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 2:30	0.0084
12/29/2016 2:31	0.0089
12/29/2016 2:32	0.0086
12/29/2016 2:33	0.0083
12/29/2016 2:34	0.0086
12/29/2016 2:35	0.0084
12/29/2016 2:36	0.0089
12/29/2016 2:37	0.0084
12/29/2016 2:38	0.0081
12/29/2016 2:39	0.0083
12/29/2016 2:40	0.0085
12/29/2016 2:41	0.0085
12/29/2016 2:42	0.009
12/29/2016 2:43	0.0085
12/29/2016 2:44	0.0085
12/29/2016 2:45	0.0088
12/29/2016 2:46	0.0086
12/29/2016 2:47	0.0089
12/29/2016 2:48	0.0085
12/29/2016 2:49	0.0085
12/29/2016 2:50	0.0085
12/29/2016 2:51	0.0088
12/29/2016 2:52	0.0086
12/29/2016 2:53	0.008
12/29/2016 2:54	0.0087
12/29/2016 2:55	0.0085
12/29/2016 2:56	0.0084
12/29/2016 2:57	0.0086
12/29/2016 2:58	0.0088
12/29/2016 2:59	0.0085
12/29/2016 3:00	0.0087
12/29/2016 3:01	0.0084
12/29/2016 3:02	0.0085
12/29/2016 3:03	0.0084
12/29/2016 3:04	0.0086
12/29/2016 3:05	0.0086
12/29/2016 3:06	0.0084
12/29/2016 3:07	0.0085
12/29/2016 3:08	0.0085
12/29/2016 3:09	0.0088
12/29/2016 3:10	0.0087
12/29/2016 3:11	0.0086
12/29/2016 3:12	0.0086
12/29/2016 3:13	0.0088
12/29/2016 3:14	0.0086
12/29/2016 3:15	0.0087
12/29/2016 3:16	0.0084

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 3:17	0.0082
12/29/2016 3:18	0.0083
12/29/2016 3:19	0.0085
12/29/2016 3:20	0.0086
12/29/2016 3:21	0.0085
12/29/2016 3:22	0.0091
12/29/2016 3:23	0.0086
12/29/2016 3:24	0.0082
12/29/2016 3:25	0.0083
12/29/2016 3:26	0.0084
12/29/2016 3:27	0.0083
12/29/2016 3:28	0.0085
12/29/2016 3:29	0.0086
12/29/2016 3:30	0.0082
12/29/2016 3:31	0.0089
12/29/2016 3:32	0.0084
12/29/2016 3:33	0.0088
12/29/2016 3:34	0.0083
12/29/2016 3:35	0.0087
12/29/2016 3:36	0.0088
12/29/2016 3:37	0.0085
12/29/2016 3:38	0.0086
12/29/2016 3:39	0.0088
12/29/2016 3:40	0.0085
12/29/2016 3:41	0.0088
12/29/2016 3:42	0.0088
12/29/2016 3:43	0.0083
12/29/2016 3:44	0.0085
12/29/2016 3:45	0.0089
12/29/2016 3:46	0.0088
12/29/2016 3:47	0.0082
12/29/2016 3:48	0.0087
12/29/2016 3:49	0.0085
12/29/2016 3:50	0.0086
12/29/2016 3:51	0.0088
12/29/2016 3:52	0.0086
12/29/2016 3:53	0.0082
12/29/2016 3:54	0.0085
12/29/2016 3:55	0.0089
12/29/2016 3:56	0.0088
12/29/2016 3:57	0.0088
12/29/2016 3:58	0.0087
12/29/2016 3:59	0.0082
12/29/2016 4:00	0.0087
12/29/2016 4:01	0.0082
12/29/2016 4:02	0.0084
12/29/2016 4:03	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 4:04	0.0089
12/29/2016 4:05	0.0089
12/29/2016 4:06	0.0086
12/29/2016 4:07	0.0087
12/29/2016 4:08	0.0085
12/29/2016 4:09	0.0085
12/29/2016 4:10	0.0084
12/29/2016 4:11	0.0088
12/29/2016 4:12	0.0085
12/29/2016 4:13	0.0084
12/29/2016 4:14	0.0088
12/29/2016 4:15	0.0085
12/29/2016 4:16	0.0085
12/29/2016 4:17	0.0088
12/29/2016 4:18	0.008
12/29/2016 4:19	0.0087
12/29/2016 4:20	0.0084
12/29/2016 4:21	0.0086
12/29/2016 4:22	0.0086
12/29/2016 4:23	0.0086
12/29/2016 4:24	0.0087
12/29/2016 4:25	0.0086
12/29/2016 4:26	0.0086
12/29/2016 4:27	0.0081
12/29/2016 4:28	0.0084
12/29/2016 4:29	0.0084
12/29/2016 4:30	0.0087
12/29/2016 4:31	0.0084
12/29/2016 4:32	0.0087
12/29/2016 4:33	0.0088
12/29/2016 4:34	0.0086
12/29/2016 4:35	0.008
12/29/2016 4:36	0.0086
12/29/2016 4:37	0.0084
12/29/2016 4:38	0.0088
12/29/2016 4:39	0.0085
12/29/2016 4:40	0.0085
12/29/2016 4:41	0.0088
12/29/2016 4:42	0.0091
12/29/2016 4:43	0.0087
12/29/2016 4:44	0.0086
12/29/2016 4:45	0.0086
12/29/2016 4:46	0.0087
12/29/2016 4:47	0.0084
12/29/2016 4:48	0.0083
12/29/2016 4:49	0.0087
12/29/2016 4:50	0.0083

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 4:51	0.0086
12/29/2016 4:52	0.0084
12/29/2016 4:53	0.0088
12/29/2016 4:54	0.0088
12/29/2016 4:55	0.0086
12/29/2016 4:56	0.0086
12/29/2016 4:57	0.0086
12/29/2016 4:58	0.0087
12/29/2016 4:59	0.0089
12/29/2016 5:00	0.0084
12/29/2016 5:01	0.0084
12/29/2016 5:02	0.0087
12/29/2016 5:03	0.0084
12/29/2016 5:04	0.0085
12/29/2016 5:05	0.0083
12/29/2016 5:06	0.0088
12/29/2016 5:07	0.0083
12/29/2016 5:08	0.0083
12/29/2016 5:09	0.0088
12/29/2016 5:10	0.0082
12/29/2016 5:11	0.0086
12/29/2016 5:12	0.0086
12/29/2016 5:13	0.009
12/29/2016 5:14	0.0086
12/29/2016 5:15	0.0086
12/29/2016 5:16	0.0084
12/29/2016 5:17	0.0089
12/29/2016 5:18	0.0089
12/29/2016 5:19	0.0084
12/29/2016 5:20	0.0086
12/29/2016 5:21	0.0088
12/29/2016 5:22	0.0092
12/29/2016 5:23	0.0087
12/29/2016 5:24	0.0085
12/29/2016 5:25	0.0086
12/29/2016 5:26	0.0086
12/29/2016 5:27	0.0086
12/29/2016 5:28	0.0087
12/29/2016 5:29	0.0083
12/29/2016 5:30	0.0086
12/29/2016 5:31	0.0083
12/29/2016 5:32	0.0086
12/29/2016 5:33	0.0087
12/29/2016 5:34	0.0084
12/29/2016 5:35	0.0086
12/29/2016 5:36	0.0085
12/29/2016 5:37	0.0088

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 5:38	0.0083
12/29/2016 5:39	0.0086
12/29/2016 5:40	0.0084
12/29/2016 5:41	0.0084
12/29/2016 5:42	0.009
12/29/2016 5:43	0.0087
12/29/2016 5:44	0.0087
12/29/2016 5:45	0.0085
12/29/2016 5:46	0.0085
12/29/2016 5:47	0.0081
12/29/2016 5:48	0.0085
12/29/2016 5:49	0.0086
12/29/2016 5:50	0.0085
12/29/2016 5:51	0.0083
12/29/2016 5:52	0.0083
12/29/2016 5:53	0.009
12/29/2016 5:54	0.0084
12/29/2016 5:55	0.0086
12/29/2016 5:56	0.0086
12/29/2016 5:57	0.0086
12/29/2016 5:58	0.0086
12/29/2016 5:59	0.0088
12/29/2016 6:00	0.0086
12/29/2016 6:01	0.0086
12/29/2016 6:02	0.0084
12/29/2016 6:03	0.0087
12/29/2016 6:04	0.0085
12/29/2016 6:05	0.0086
12/29/2016 6:06	0.0085
12/29/2016 6:07	0.0088
12/29/2016 6:08	0.0088
12/29/2016 6:09	0.0086
12/29/2016 6:10	0.0087
12/29/2016 6:11	0.0088
12/29/2016 6:12	0.0083
12/29/2016 6:13	0.0086
12/29/2016 6:14	0.0087
12/29/2016 6:15	0.0085
12/29/2016 6:16	0.0086
12/29/2016 6:17	0.0085
12/29/2016 6:18	0.0085
12/29/2016 6:19	0.0087
12/29/2016 6:20	0.0086
12/29/2016 6:21	0.0085
12/29/2016 6:22	0.0085
12/29/2016 6:23	0.0084
12/29/2016 6:24	0.0087

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 6:25	0.0084
12/29/2016 6:26	0.0085
12/29/2016 6:27	0.0083
12/29/2016 6:28	0.0088
12/29/2016 6:29	0.0087
12/29/2016 6:30	0.0086
12/29/2016 6:31	0.0081
12/29/2016 6:32	0.0089
12/29/2016 6:33	0.0086
12/29/2016 6:34	0.0082
12/29/2016 6:35	0.0084
12/29/2016 6:36	0.0086
12/29/2016 6:37	0.0083
12/29/2016 6:38	0.0086
12/29/2016 6:39	0.0086
12/29/2016 6:40	0.0085
12/29/2016 6:41	0.0081
12/29/2016 6:42	0.0088
12/29/2016 6:43	0.0084
12/29/2016 6:44	0.0087
12/29/2016 6:45	0.0086
12/29/2016 6:46	0.0086
12/29/2016 6:47	0.0084
12/29/2016 6:48	0.0085
12/29/2016 6:49	0.0086
12/29/2016 6:50	0.0088
12/29/2016 6:51	0.0083
12/29/2016 6:52	0.0079
12/29/2016 6:53	0.0083
12/29/2016 6:54	0.0084
12/29/2016 6:55	0.0084
12/29/2016 6:56	0.0084
12/29/2016 6:57	0.0084
12/29/2016 6:58	0.0083
12/29/2016 6:59	0.0083
12/29/2016 7:00	0.0087
12/29/2016 7:01	0.0087
12/29/2016 7:02	0.0085
12/29/2016 7:03	0.0087
12/29/2016 7:04	0.0085
12/29/2016 7:05	0.0082
12/29/2016 7:06	0.0081
12/29/2016 7:07	0.0087
12/29/2016 7:08	0.0082
12/29/2016 7:09	0.0083
12/29/2016 7:10	0.0084
12/29/2016 7:11	0.0083

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 7:12	0.0086
12/29/2016 7:13	0.0084
12/29/2016 7:14	0.0086
12/29/2016 7:15	0.0086
12/29/2016 7:16	0.0084
12/29/2016 7:17	0.0084
12/29/2016 7:18	0.0084
12/29/2016 7:19	0.0085
12/29/2016 7:20	0.0084
12/29/2016 7:21	0.0088
12/29/2016 7:22	0.0085
12/29/2016 7:23	0.0084
12/29/2016 7:24	0.0082
12/29/2016 7:25	0.0085
12/29/2016 7:26	0.0086
12/29/2016 7:27	0.0087
12/29/2016 7:28	0.0083
12/29/2016 7:29	0.0084
12/29/2016 7:30	0.0086
12/29/2016 7:31	0.0085
12/29/2016 7:32	0.0087
12/29/2016 7:33	0.0084
12/29/2016 7:34	0.0086
12/29/2016 7:35	0.0086
12/29/2016 7:36	0.0084
12/29/2016 7:37	0.0085
12/29/2016 7:38	0.0086
12/29/2016 7:39	0.008
12/29/2016 7:40	0.0088
12/29/2016 7:41	0.0086
12/29/2016 7:42	0.0089
12/29/2016 7:43	0.0085
12/29/2016 7:44	0.0082
12/29/2016 7:45	0.0085
12/29/2016 7:46	0.0089
12/29/2016 7:47	0.0083
12/29/2016 7:48	0.0087
12/29/2016 7:49	0.0084
12/29/2016 7:50	0.0083
12/29/2016 7:51	0.0086
12/29/2016 7:52	0.0085
12/29/2016 7:53	0.0085
12/29/2016 7:54	0.0085
12/29/2016 7:55	0.0085
12/29/2016 7:56	0.0088
12/29/2016 7:57	0.0088
12/29/2016 7:58	0.0087

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 7:59	0.0086
12/29/2016 8:00	0.0081
12/29/2016 8:01	0.0084
12/29/2016 8:02	0.0084
12/29/2016 8:03	0.0086
12/29/2016 8:04	0.0085
12/29/2016 8:05	0.0087
12/29/2016 8:06	0.0087
12/29/2016 8:07	0.0082
12/29/2016 8:08	0.0081
12/29/2016 8:09	0.0085
12/29/2016 8:10	0.0084
12/29/2016 8:11	0.0085
12/29/2016 8:12	0.0089
12/29/2016 8:13	0.0083
12/29/2016 8:14	0.0083
12/29/2016 8:15	0.0084
12/29/2016 8:16	0.0082
12/29/2016 8:17	0.0087
12/29/2016 8:18	0.0083
12/29/2016 8:19	0.0084
12/29/2016 8:20	0.0083
12/29/2016 8:21	0.0088
12/29/2016 8:22	0.0087
12/29/2016 8:23	0.0083
12/29/2016 8:24	0.0087
12/29/2016 8:25	0.0085
12/29/2016 8:26	0.0084
12/29/2016 8:27	0.0085
12/29/2016 8:28	0.009
12/29/2016 8:29	0.0085
12/29/2016 8:30	0.0085
12/29/2016 8:31	0.0087
12/29/2016 8:32	0.0086
12/29/2016 8:33	0.0088
12/29/2016 8:34	0.0089
12/29/2016 8:35	0.0087
12/29/2016 8:36	0.0084
12/29/2016 8:37	0.0081
12/29/2016 8:38	0.0084
12/29/2016 8:39	0.0085
12/29/2016 8:40	0.0083
12/29/2016 8:41	0.0085
12/29/2016 8:42	0.0086
12/29/2016 8:43	0.0084
12/29/2016 8:44	0.0084
12/29/2016 8:45	0.0088

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 8:46	0.0088
12/29/2016 8:47	0.0081
12/29/2016 8:48	0.0085
12/29/2016 8:49	0.0085
12/29/2016 8:50	0.0085
12/29/2016 8:51	0.009
12/29/2016 8:52	0.0084
12/29/2016 8:53	0.0086
12/29/2016 8:54	0.0083
12/29/2016 8:55	0.0084
12/29/2016 8:56	0.0091
12/29/2016 8:57	0.0081
12/29/2016 8:58	0.0089
12/29/2016 8:59	0.0084
12/29/2016 9:00	0.0086
12/29/2016 9:01	0.0084
12/29/2016 9:02	0.0087
12/29/2016 9:03	0.0088
12/29/2016 9:04	0.0089
12/29/2016 9:05	0.0087
12/29/2016 9:06	0.0087
12/29/2016 9:07	0.0084
12/29/2016 9:08	0.0086
12/29/2016 9:09	0.0086
12/29/2016 9:10	0.0087
12/29/2016 9:11	0.0083
12/29/2016 9:12	0.0085
12/29/2016 9:13	0.0086
12/29/2016 9:14	0.0086
12/29/2016 9:15	0.0083
12/29/2016 9:16	0.0084
12/29/2016 9:17	0.0084
12/29/2016 9:18	0.0088
12/29/2016 9:19	0.0088
12/29/2016 9:20	0.0086
12/29/2016 9:21	0.0084
12/29/2016 9:22	0.0088
12/29/2016 9:23	0.0085
12/29/2016 9:24	0.0086
12/29/2016 9:25	0.0086
12/29/2016 9:26	0.0083
12/29/2016 9:27	0.0083
12/29/2016 9:28	0.0081
12/29/2016 9:29	0.0089
12/29/2016 9:30	0.0086
12/29/2016 9:31	0.0088
12/29/2016 9:32	0.0085

GE REUTER-STOKES RSS-131 MEASUREMENTS - HOUSE 2 - [redacted]
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Date and Time	Exposure Rate (mR/hr)
12/29/2016 9:33	0.0087
12/29/2016 9:34	0.0084
12/29/2016 9:35	0.0082
12/29/2016 9:36	0.0087
12/29/2016 9:37	0.0085
12/29/2016 9:38	0.0082
12/29/2016 9:39	0.0084
12/29/2016 9:40	0.0085
12/29/2016 9:41	0.0084
12/29/2016 9:42	0.0085
12/29/2016 9:43	0.0087
12/29/2016 9:44	0.0083
12/29/2016 9:45	0.0083
12/29/2016 9:46	0.0081
12/29/2016 9:47	0.0085
12/29/2016 9:48	0.0085
12/29/2016 9:49	0.0086
12/29/2016 9:50	0.0085
12/29/2016 9:51	0.0086
12/29/2016 9:52	0.0086
12/29/2016 9:53	0.0085
12/29/2016 9:54	0.0087
12/29/2016 9:55	0.0083
12/29/2016 9:56	0.0084
12/29/2016 9:57	0.0086
12/29/2016 9:58	0.0084
12/29/2016 9:59	0.0086
Mean	**0.0086**

APPENDIX G

DURRIDGE RAD7 RADON MEASUREMENTS

DURRIDGE RAD7
Vers 3.1a 151208
Model 716
Serial 03465
Calib 07-NOV-16

Last used
TUE 27-DEC-16 11:06

Current settings
TUE 27-DEC-16 11:06

Protocol: (None)
Cycle: 00:10
Recycle: 00
Mode: Auto
Thoron: Off
Pump: Auto
Tone: Geiger
Format: Short
Units: pCi/l °F

0601 0.51±2.44 p Sniff
TUE 27-DEC-16 11:17
61.5°F RH: 7% B:7.06V

0602 2.53±3.50 p Sniff
TUE 27-DEC-16 11:27
62.6°F RH: 7% B:7.15V

0603 1.52±3.04 p Sniff
TUE 27-DEC-16 11:37
63.1°F RH: 6% B:7.03V

0604 2.03±3.28 p Sniff
TUE 27-DEC-16 11:47
63.7°F RH: 5% B:7.03V

0605 0.51±2.45 p Sniff
TUE 27-DEC-16 11:57
64.2°F RH: 5% B:7.03V

0606 2.03±3.28 p Sniff
TUE 27-DEC-16 12:07
64.8°F RH: 5% B:7.03V

0607 1.52±3.04 p Sniff
TUE 27-DEC-16 12:17
65.3°F RH: 4% B:7.00V

0608 0.51±2.44 p Sniff
TUE 27-DEC-16 12:27
65.3°F RH: 4% B:7.00V

0609 1.52±3.04 p Sniff
TUE 27-DEC-16 12:37
65.3°F RH: 4% B:7.00V

0610 2.53±3.50 p Sniff
TUE 27-DEC-16 12:47
65.8°F RH: 4% B:7.03V

0611 2.03±3.28 p Sniff
TUE 27-DEC-16 12:57
65.8°F RH: 4% B:7.03V

0612 1.01±2.77 p Sniff
TUE 27-DEC-16 13:07
65.8°F RH: 4% B:7.00V

0613 3.04±3.70 p Sniff
TUE 27-DEC-16 13:17
66.4°F RH: 4% B:7.03V

0614 1.52±3.04 p Sniff
TUE 27-DEC-16 13:27
66.4°F RH: 4% B:7.00V

0615 1.52±3.04 p Sniff
TUE 27-DEC-16 13:37
66.4°F RH: 4% B:7.03V

0616 2.53±3.50 p Sniff
TUE 27-DEC-16 13:47
66.4°F RH: 3% B:7.03V

0617 2.03±3.28 p Sniff
TUE 27-DEC-16 13:57
66.4°F RH: 3% B:7.00V

0618 1.52±3.04 p Sniff
TUE 27-DEC-16 14:07
66.4°F RH: 3% B:7.00V

0619 1.93±1.93 p Normal
TUE 27-DEC-16 14:17
66.4°F RH: 3% B:7.00V

0620 0.96±1.56 p Normal
TUE 27-DEC-16 14:27
66.4°F RH: 3% B:7.03V

0621 1.93±1.93 p Normal
TUE 27-DEC-16 14:37
66.4°F RH: 3% B:7.00V

0622 2.89±2.22 p Normal
TUE 27-DEC-16 14:47
66.4°F RH: 3% B:7.03V

0623 1.93±1.93 p Normal
TUE 27-DEC-16 14:57
66.4°F RH: 3% B:7.03V

0624 1.45±1.76 p Normal
TUE 27-DEC-16 15:07
66.4°F RH: 3% B:7.03V

0625 1.93±1.93 p Normal
TUE 27-DEC-16 15:17
66.4°F RH: 3% B:7.03V

0626 4.10±2.53 p Normal
TUE 27-DEC-16 15:27
66.4°F RH: 3% B:7.00V

0627 2.89±2.22 p Normal
TUE 27-DEC-16 15:37
66.4°F RH: 3% B:7.03V

0628 3.13±2.28 p Normal
TUE 27-DEC-16 15:47
66.4°F RH: 3% B:7.00V

0629 2.89±2.22 p Normal
TUE 27-DEC-16 15:57
66.4°F RH: 3% B:7.00V

0630 2.41±2.08 p Normal
TUE 27-DEC-16 16:07
66.4°F RH: 3% B:7.03V

0631 2.65±2.15 p Normal
TUE 27-DEC-16 16:17
66.4°F RH: 3% B:7.03V

0632 2.17±2.01 p Normal
TUE 27-DEC-16 16:27
66.4°F RH: 3% B:7.03V

End 17:27
C Hooper 12/27/16

```
>
 DURRIDGE  RAD7
Vers 3.1a 151208
Model 711
Serial 00516
Calib 15-FEB-16

>
>
 DURRIDGE  RAD7
Vers 3.1a 151208
Model 711
Serial 00516
Calib 15-FEB-16

>
Current settings
 THU 29-DEC-16  10:39

Protocol: User
Cycle: 00:10
Recycle: 00
Mode: Normal
Thoron: On
Pump: Auto
Tone: Geiger
Format: Short
Units: pCi/l  `F

>
>

0201 0.28+-1.35 p Normal
     2.00+-5.46 p Thoron
  WED 28-DEC-16 17:21
  57.7`F RH:11% B:7.00V


0202 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 17:31
  59.9`F RH: 8% B:7.00V


0203 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 17:41
  61.5`F RH: 7% B:7.00V


0204 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 17:51
  62.6`F RH: 6% B:7.00V


0205 2.52+-2.33 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 18:01
  63.1`F RH: 6% B:7.00V
```

```
0206 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 18:11
  64.2`F RH: 6% B:7.00V


0207 0.00+-1.12 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 18:21
  64.8`F RH: 5% B:7.00V


0208 1.68+-2.04 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 18:31
  65.3`F RH: 5% B:7.00V


0209 0.56+-1.53 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 18:41
  65.3`F RH: 5% B:6.97V


0210 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 18:51
  65.8`F RH: 5% B:7.00V


0211 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 19:01
  65.8`F RH: 5% B:7.00V


0212 1.40+-1.93 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 19:11
  65.8`F RH: 5% B:7.00V


0213 2.52+-2.33 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 19:21
  66.4`F RH: 4% B:7.00V


0214 0.84+-1.68 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 19:31
  66.4`F RH: 4% B:7.03V


0215 3.08+-2.50 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 19:41
  66.4`F RH: 4% B:7.00V


0216 1.40+-1.93 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 19:51
```

```
  66.4`F RH: 5% B:6.97V


0217 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 20:01
  66.9`F RH: 4% B:7.00V


0218 3.36+-2.58 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 20:11
  66.4`F RH: 4% B:7.00V


0219 1.40+-1.93 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 20:21
  66.9`F RH: 4% B:7.00V


0220 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 20:31
  66.4`F RH: 4% B:7.00V


0221 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 20:41
  66.9`F RH: 4% B:7.00V


0222 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 20:51
  66.9`F RH: 4% B:7.00V


0223 1.68+-2.04 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 21:01
  66.9`F RH: 4% B:7.00V


0224 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 21:11
  66.9`F RH: 4% B:7.00V


0225 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 21:21
  66.9`F RH: 4% B:7.00V


0226 0.84+-1.68 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 21:31
  66.9`F RH: 4% B:7.00V
```

```
0227 1.12+-1.81 p Normal
     2.00+-5.46 p Thoron
  WED 28-DEC-16 21:41
  66.9`F RH: 4% B:7.00V


0228 1.68+-2.04 p Normal
     2.00+-5.46 p Thoron
  WED 28-DEC-16 21:51
  66.9`F RH: 4% B:7.00V


0229 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 22:01
  66.9`F RH: 4% B:7.00V


0230 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 22:11
  66.9`F RH: 4% B:7.00V


0231 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 22:21
  66.9`F RH: 4% B:7.03V


0232 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 22:31
  66.9`F RH: 4% B:6.97V


0233 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 22:41
  66.9`F RH: 4% B:7.00V


0234 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 22:51
  66.9`F RH: 4% B:6.97V


0235 1.68+-2.04 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 23:01
  66.9`F RH: 4% B:7.00V


0236 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 23:11
  66.9`F RH: 3% B:7.00V


0237 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 23:21
```

```
  66.9`F RH: 3% B:6.97V


0238 1.96+-2.14 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 23:31
  66.9`F RH: 3% B:7.00V


0239 0.28+-1.35 p Normal
     1.00+-4.83 p Thoron
  WED 28-DEC-16 23:41
  66.9`F RH: 3% B:7.00V


0240 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  WED 28-DEC-16 23:51
  66.9`F RH: 3% B:7.00V


0241 1.40+-1.93 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 00:01
  66.9`F RH: 3% B:7.00V


0242 1.68+-2.04 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 00:11
  66.9`F RH: 3% B:7.00V


0243 1.40+-1.93 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 00:21
  66.9`F RH: 3% B:7.00V


0244 1.12+-1.81 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 00:31
  66.9`F RH: 3% B:7.00V


0245 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 00:41
  66.9`F RH: 3% B:7.00V


0246 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 00:51
  66.9`F RH: 3% B:7.00V


0247 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 01:01
  66.9`F RH: 3% B:7.00V
```

```
0248 1.12+-1.81 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 01:11
  66.9`F RH: 3% B:7.00V


0249 0.28+-1.35 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 01:21
  66.9`F RH: 3% B:7.03V


0250 1.40+-1.93 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 01:31
  66.9`F RH: 3% B:7.00V


0251 3.36+-2.58 p Normal
     2.00+-5.46 p Thoron
  THU 29-DEC-16 01:42
  66.9`F RH: 3% B:7.00V


0252 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 01:52
  66.9`F RH: 3% B:7.00V


0253 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 02:02
  66.9`F RH: 3% B:7.00V


0254 1.96+-2.14 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 02:12
  66.9`F RH: 3% B:7.00V


0255 0.28+-1.35 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 02:22
  66.9`F RH: 3% B:7.00V


0256 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 02:32
  66.9`F RH: 3% B:7.03V


0257 0.56+-1.53 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 02:42
  66.9`F RH: 3% B:7.00V


0258 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 02:52
```

```
  66.9`F RH: 3% B:7.00V


0259 1.40+-1.93 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 03:02
  66.9`F RH: 3% B:7.00V


0260 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 03:12
  66.9`F RH: 3% B:7.00V


0261 0.56+-1.53 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 03:22
  66.9`F RH: 3% B:7.00V


0262 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 03:32
  66.9`F RH: 3% B:7.00V


0263 2.52+-2.33 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 03:42
  66.9`F RH: 3% B:7.00V


0264 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 03:52
  66.9`F RH: 3% B:7.00V


0265 1.40+-1.93 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 04:02
  66.9`F RH: 3% B:7.00V


0266 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 04:12
  66.9`F RH: 3% B:7.00V


0267 1.12+-1.81 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 04:22
  66.9`F RH: 3% B:7.00V


0268 1.12+-1.81 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 04:32
  66.9`F RH: 3% B:7.00V
```

```
0269 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 04:42
  66.9`F RH: 3% B:7.00V


0270 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 04:52
  66.9`F RH: 3% B:7.00V


0271 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 05:02
  66.9`F RH: 3% B:7.00V


0272 3.08+-2.50 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 05:12
  66.9`F RH: 3% B:7.00V


0273 1.68+-2.04 p Normal
     2.00+-5.46 p Thoron
  THU 29-DEC-16 05:22
  66.9`F RH: 3% B:7.00V


0274 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 05:32
  66.9`F RH: 3% B:7.00V


0275 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 05:42
  66.9`F RH: 3% B:7.00V


0276 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 05:52
  66.9`F RH: 3% B:7.00V


0277 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 06:02
  66.9`F RH: 3% B:7.03V


0278 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 06:12
  66.9`F RH: 3% B:7.03V


0279 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 06:22
```

```
  66.9`F RH: 3% B:7.00V


0280 2.52+-2.33 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 06:32
  66.9`F RH: 3% B:6.97V


0281 0.84+-1.68 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 06:42
  66.9`F RH: 3% B:7.00V


0282 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 06:52
  66.9`F RH: 3% B:7.03V


0283 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 07:02
  66.9`F RH: 3% B:7.00V


0284 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 07:12
  66.9`F RH: 3% B:7.00V


0285 0.56+-1.53 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 07:22
  66.4`F RH: 3% B:6.97V


0286 1.96+-2.14 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 07:32
  66.9`F RH: 3% B:7.00V


0287 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 07:42
  66.9`F RH: 3% B:7.03V


0288 1.96+-2.14 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 07:52
  66.9`F RH: 3% B:7.00V


0289 0.56+-1.53 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 08:02
  66.9`F RH: 3% B:7.00V
```

```
0290 0.56+-1.53 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 08:12
  66.4`F RH: 3% B:7.00V


0291 1.40+-1.93 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 08:22
  66.4`F RH: 3% B:6.97V


0292 0.28+-1.35 p Normal
     1.00+-4.83 p Thoron
  THU 29-DEC-16 08:32
  66.4`F RH: 3% B:7.03V


0293 1.68+-2.04 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 08:42
  66.4`F RH: 3% B:7.00V


0294 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 08:52
  66.4`F RH: 3% B:7.00V


0295 0.56+-1.53 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 09:02
  66.4`F RH: 3% B:7.03V


0296 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 09:12
  66.4`F RH: 3% B:7.03V


0297 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 09:22
  66.4`F RH: 3% B:7.03V


0298 0.84+-1.68 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 09:32
  66.4`F RH: 3% B:7.00V


0299 0.56+-1.53 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 09:42
  66.4`F RH: 3% B:7.00V

>

0301 0.84+-1.68 p Normal
     1.00+-4.83 p Thoron
```

```
  THU 29-DEC-16 09:52
  66.4`F RH: 3% B:7.00V


0302 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  THU 29-DEC-16 10:02
  66.4`F RH: 3% B:7.03V


0303 1.10+-3.01 p Normal
     0.00+-7.87 p Thoron
  THU 29-DEC-16 10:07
  66.4`F RH: 3% B:7.09V

>
>
Run 02
Begin 28-DEC-16 17:21
Serial 00516
Cycles = 099
Mean: 1.35 pCi/l
S.D.: 0.69 pCi/l
High: 3.36 pCi/l
Low:  0.00 pCi/l

     0    pCi/l     5.00
17:21
17:31
17:41
17:51
18:01
18:11
18:21
18:31
18:41
18:51
19:01
19:11
19:21
19:31
19:41
19:51
20:01
20:11
20:21
20:31
20:41
20:51
21:01
21:11
21:21
21:31
21:41
21:51
22:01
22:11
22:21
22:31
22:41
22:51
23:01
23:11
```

23:21
23:31
23:41
23:51
00:01
00:11
00:21
00:31
00:41
00:51
01:01
01:11
01:21
01:31
01:42
01:52
02:02
02:12
02:22
02:32
02:42
02:52
03:02
03:12
03:22
03:32
03:42
03:52
04:02
04:12
04:22
04:32
04:42
04:52
05:02
05:12
05:22
05:32
05:42
05:52
06:02
06:12
06:22
06:32
06:42
06:52
07:02
07:12
07:22
07:32
07:42
07:52
08:02
08:12
08:22
08:32
08:42
08:52
09:02
09:12
09:22
09:32
09:42

```
>
Run 03
Begin 29-DEC-16 09:52
Serial 00516
Cycles = 003
Mean: 0.65 pCi/l
S.D.: 0.58 pCi/l
High: 1.10 pCi/l
Low:  0.00 pCi/l

     0    pCi/l     2.00
09:52
10:02
10:07

>
>
 DURRIDGE  RAD7
Vers 3.1a 151208
Model 711
Serial 00516
Calib 15-FEB-16

>
>
001,16,12,27,12,25, 5.,   9.3,60.0, 0.0,20.0, 0.0,2218,10,  5.7,21, 2,5.94, 80,013,
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002,16,12,27,12,35, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2236,10,  6.3,15, 1,5.97, 80,013,
0., 1.119915,127
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012,16,12,27,14,16, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2236,10,  8.5, 6, 1,6.03, 70,013,
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013,16,12,27,14,26, 1.,   9.3, 0.0, 0.0, 0.0, 0.0,2218,10,  8.8, 6, 1,6.03, 70,013,
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.2799787, 1.351857,127
017,16,12,27,15,06, 2.,   9.3,50.0,50.0, 0.0, 0.0,2218, 9,  9.1, 5, 1,6.06, 70,013,
.2799787, 1.351857,127
018,16,12,27,15,16, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2236,10,  9.1, 5, 1,6.03, 70,013,
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0., 1.545565,127
032,16,12,28,17,21, 3.,   9.3,33.3,66.7, 0.0, 0.0,2218, 9, 14.3,11, 1,7.00, 70,013,
.2799787, 1.351857,127
033,16,12,28,17,31, 5.,   9.3,80.0, 0.0, 0.0, 0.0,2218,10, 15.5, 8, 1,7.00, 70,013,
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034,16,12,28,17,41, 6.,   9.3, 100, 0.0, 0.0, 0.0,2236,10, 16.4, 7, 1,7.00, 70,013,
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035,16,12,28,17,51, 8.,   9.3,25.0, 0.0,50.0, 0.0,2236,10, 17.0, 6, 1,7.00, 70,013,
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055,16,12,28,21,11, 5.,   9.3,40.0, 0.0,40.0, 0.0,2218, 9, 19.4, 4, 1,7.00, 60,013,
1.119915, 1.81206,127
056,16,12,28,21,21, 3.,   9.3, 0.0, 0.0, 100, 0.0,2201,10, 19.4, 4, 1,7.00, 60,013,
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058,16,12,28,21,41, 6.,   9.3,66.7,33.3, 0.0, 0.0,2236,10, 19.4, 4, 1,7.00, 60,013,
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063,16,12,28,22,31, 8.,   9.3,25.0, 0.0,62.5, 0.0,2218, 9, 19.4, 4, 1,6.97, 60,013,
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066,16,12,28,23,01, 8.,   9.3,50.0,12.5,25.0, 0.0,2218,10, 19.4, 4, 1,7.00, 60,013,
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1.119915, 1.81206,127
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1.959851, 2.143756,127
079,16,12,29,01,11, 5.,   9.3,40.0,20.0,40.0, 0.0,2236,10, 19.4, 3, 1,7.00, 60,013,
1.119915, 1.81206,127
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102,16,12,29,05,02, 5.,   9.3,40.0, 0.0,40.0,20.0,2218, 9, 19.4, 3, 1,7.00, 60,013,
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103,16,12,29,05,12, 12.,   9.3,41.7, 0.0,50.0, 0.0,2201,10, 19.4, 3, 1,7.00, 60,013,
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110,16,12,29,06,22, 3.,   9.3,66.7, 0.0,33.3, 0.0,2236,10, 19.4, 3, 1,7.00, 60,013,
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2.519809, 2.330699,127
112,16,12,29,06,42, 4.,   9.3, 0.0,25.0,75.0, 0.0,2236,10, 19.4, 3, 1,7.00, 60,013,
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113,16,12,29,06,52, 6.,   9.3,50.0, 0.0,50.0, 0.0,2218,10, 19.4, 3, 1,7.03, 60,013,
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114,16,12,29,07,02, 4.,   9.3,25.0, 0.0,50.0, 0.0,2236,10, 19.4, 3, 1,7.00, 60,013,
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117,16,12,29,07,32, 8.,   9.3,25.0,12.5,62.5, 0.0,2236,10, 19.4, 3, 1,7.00, 60,013,
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118,16,12,29,07,42, 1.,   9.3, 0.0, 0.0, 100, 0.0,2218,10, 19.4, 3, 1,7.03, 60,013,
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119,16,12,29,07,52, 7.,   9.3,71.4, 0.0,28.6, 0.0,2201,10, 19.4, 3, 1,7.00, 60,013,
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123,16,12,29,08,32, 2.,   9.3, 0.0,50.0,50.0, 0.0,2218,10, 19.1, 3, 1,7.03, 60,013,
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125,16,12,29,08,52, 3.,   9.3,66.7, 0.0,33.3, 0.0,2218,10, 19.1, 3, 1,7.00, 60,013,
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126,16,12,29,09,02, 2.,   9.3, 0.0, 0.0, 100, 0.0,2218, 9, 19.1, 3, 1,7.03, 60,013,
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128,16,12,29,09,22, 3.,   9.3,66.7, 0.0,33.3, 0.0,2218,10, 19.1, 3, 1,7.03, 60,013,
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130,16,12,29,09,42, 2.,   9.3, 100, 0.0, 0.0, 0.0,2218, 9, 19.1, 3, 1,7.00, 60,013,
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131,16,12,29,09,52, 4.,   9.3,50.0,25.0,25.0, 0.0,2218,10, 19.1, 3, 1,7.00, 60,013,
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 DURRIDGE  RAD7
Vers 3.1a 151208
Model 711
Serial 00516
Calib 15-FEB-16

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 DURRIDGE  RAD7
Vers 3.1a 151208
Model 711
Serial 00516
Calib 15-FEB-16

>
Current settings
 TUE 27-DEC-16  21:56

Protocol: User
Cycle: 00:10
Recycle: 00
Mode: Normal
Thoron: On
Pump: Auto
Tone: Geiger
Format: Short
Units: pCi/l  `F

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>

0101 1.12+-1.81 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 12:25
  42.3`F RH:21% B:5.94V


0102 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 12:35
  43.3`F RH:15% B:5.97V


0103 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 12:46
  43.9`F RH:12% B:5.97V


0104 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 12:56
  44.6`F RH:11% B:5.97V


0105 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 13:06
  45.1`F RH:10% B:6.00V


0106 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 13:16
  45.7`F RH: 9% B:6.00V


0107 0.28+-1.35 p Normal
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     0.00+-4.00 p Thoron
  TUE 27-DEC-16 13:26
  45.7`F RH: 8% B:6.00V


0108 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 13:36
  46.2`F RH: 7% B:6.03V


0109 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 13:46
  46.8`F RH: 7% B:6.03V


0110 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 13:56
  46.8`F RH: 7% B:6.00V


0111 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 14:06
  47.3`F RH: 6% B:6.00V


0112 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 14:16
  47.3`F RH: 6% B:6.03V


0113 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 14:26
  47.8`F RH: 6% B:6.03V


0114 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 14:36
  47.8`F RH: 6% B:6.00V


0115 0.00+-1.12 p Normal
     1.00+-4.83 p Thoron
  TUE 27-DEC-16 14:46
  47.8`F RH: 5% B:6.03V


0116 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 14:56
  48.4`F RH: 5% B:6.03V


0117 0.28+-1.35 p Normal
     1.00+-4.83 p Thoron
  TUE 27-DEC-16 15:06
  48.4`F RH: 5% B:6.06V
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0118 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 15:16
  48.4`F RH: 5% B:6.03V


0119 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 15:26
  48.4`F RH: 5% B:6.00V


0120 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 15:36
  48.4`F RH: 4% B:6.03V


0121 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 15:46
  48.4`F RH: 4% B:6.03V


0122 0.56+-1.53 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 15:56
  47.8`F RH: 4% B:6.03V


0123 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 16:06
  47.8`F RH: 4% B:6.03V


0124 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 16:16
  47.8`F RH: 4% B:6.03V


0125 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 16:26
  47.3`F RH: 4% B:6.03V


0126 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 16:36
  46.8`F RH: 4% B:6.03V


0127 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 16:46
  46.2`F RH: 4% B:6.03V


0128 0.28+-1.35 p Normal
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     2.00+-5.46 p Thoron
  TUE 27-DEC-16 16:56
  45.7`F RH: 4% B:6.03V


0129 0.28+-1.35 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 17:06
  45.1`F RH: 4% B:6.03V


0130 0.00+-1.12 p Normal
     0.00+-4.00 p Thoron
  TUE 27-DEC-16 17:16
  44.6`F RH: 4% B:6.00V


0131 0.00+-1.55 p Normal
     0.00+-5.52 p Thoron
  TUE 27-DEC-16 17:23
  43.9`F RH: 4% B:6.15V

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Run 01
Begin 27-DEC-16 12:25
Serial 00516
Cycles = 031
Mean: 0.15 pCi/l
S.D.: 0.24 pCi/l
High: 1.12 pCi/l
Low:  0.00 pCi/l

     0    pCi/l     2.00
12:25
12:35
12:46
12:56
13:06
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17:23

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001,16,12,27,12,25, 5.,   9.3,60.0, 0.0,20.0, 0.0,2218,10,  5.7,21, 2,5.94, 80,013,
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002,16,12,27,12,35, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2236,10,  6.3,15, 1,5.97, 80,013,
0., 1.119915,127
003,16,12,27,12,46, 1.,   9.3, 100, 0.0, 0.0, 0.0,2218,10,  6.6,12, 1,5.97, 70,013,
.2799787, 1.351857,127
004,16,12,27,12,56, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2201,10,  7.0,11, 1,5.97, 70,013,
0., 1.119915,127
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.2799787, 1.351857,127
009,16,12,27,13,46, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2218,10,  8.2, 7, 1,6.03, 70,013,
0., 1.119915,127
010,16,12,27,13,56, 1.,   9.3, 0.0, 0.0, 0.0, 0.0,2218, 9,  8.2, 7, 1,6.00, 70,013,
0., 1.119915,127
011,16,12,27,14,06, 2.,   9.3, 0.0, 0.0, 0.0, 0.0,2218,10,  8.5, 6, 1,6.00, 70,013,
0., 1.119915,127
012,16,12,27,14,16, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2236,10,  8.5, 6, 1,6.03, 70,013,
0., 1.119915,127
013,16,12,27,14,26, 1.,   9.3, 0.0, 0.0, 0.0, 0.0,2218,10,  8.8, 6, 1,6.03, 70,013,
0., 1.119915,127
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.2799787, 1.351857,127
015,16,12,27,14,46, 1.,   9.3, 0.0, 100, 0.0, 0.0,2236,10,  8.8, 5, 1,6.03, 70,013,
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.2799787, 1.351857,127
017,16,12,27,15,06, 2.,   9.3,50.0,50.0, 0.0, 0.0,2218, 9,  9.1, 5, 1,6.06, 70,013,
.2799787, 1.351857,127
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019,16,12,27,15,26, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2218,10,  9.1, 5, 1,6.00, 70,013,
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025,16,12,27,16,26, 2.,   9.3,50.0, 0.0, 0.0, 0.0,2218,10,  8.5, 4, 1,6.03, 70,013,
.2799787, 1.351857,127
026,16,12,27,16,36, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2201,10,  8.2, 4, 1,6.03, 70,013,
0., 1.119915,127
027,16,12,27,16,46, 0.,   9.3, 0.0, 0.0, 0.0, 0.0,2218,10,  7.9, 4, 1,6.03, 70,013,
0., 1.119915,127
028,16,12,27,16,56, 5.,   9.3, 0.0,40.0,20.0, 0.0,2218,10,  7.6, 4, 1,6.03, 70,013,
.2799787, 1.351857,127
029,16,12,27,17,06, 1.,   9.3, 100, 0.0, 0.0, 0.0,2236,10,  7.3, 4, 1,6.03, 70,013,
.2799787, 1.351857,127
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031,16,12,27,17,23, 0.,   6.7, 0.0, 0.0, 0.0, 0.0,2218,10,  6.6, 4, 1,6.15, 00,013,
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APPENDIX H

STATIC COUNTING AND WIPE SAMPLE SCREENING MEASUREMENTS

TABLE H-1

SURFACE ACTIVITY STATIC COUNTING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

				Static Counting Results			Benchmark Threshold		
Wipe Sample	**Description**	**Area Type**	**Surface Type**	**Ludlum 43-90 Alpha Response (counts)**	**Ludlum 44-9 Beta/Gamma Response (counts)**	**Benchmark Surface ID[1]**	**Ludlum 43-90 Alpha Response (counts)**	**Ludlum 44-9 Beta/Gamma Response (counts)**	**Static Counting Result Exceeds Benchmark Threshold?**
House 1									
BDS-[redacted]W001	Field blank	-	-	-	-	-	-	-	-
BDS-[redacted]W002	[redacted], floor	High Occupancy	[redacted]	14	33	D	9.6	64.5	Yes
BDS-[redacted]W003	[redacted] wall	High Occupancy	drywall	3	28	J	12.9	45.1	No
BDS-[redacted]W004	[redacted], wall	High Occupancy	drywall	4	32	J	12.9	45.1	No
BDS-[redacted]W005	[redacted], wall	High Occupancy	drywall	3	29	J	12.9	45.1	No
BDS-[redacted]W006	[redacted], wall	High Occupancy	[redacted]	4	27	F	16.5	54.1	No
BDS-[redacted]W007	[redacted], wall	High Occupancy	drywall	3	31	J	12.9	45.1	No
BDS-[redacted]W008	[redacted] floor	High Occupancy	[redacted]	11	55	D	9.6	64.5	Yes
BDS-[redacted]W009	[redacted] floor	High Occupancy	tile	21	82	L	21.5	118.4	No
BDS-[redacted]W010	[redacted] wall	High Occupancy	drywall	8	45	J	12.9	45.1	No
BDS-[redacted]W011	Field blank	-	-	-	-	-	-	-	-
BDS-[redacted]W012	[redacted], half wall	High Occupancy	[redacted]	9	64	F	16.5	54.1	Yes
BDS-[redacted]W013	[redacted], wall	High Occupancy	drywall	2	49	J	12.9	45.1	Yes
BDS-[redacted]W014	[redacted] wall	High Occupancy	tile	13	96	L	21.5	118.4	No
BDS-[redacted]W015	[redacted], floor	Low Occupancy	[redacted]	14	39	D	9.6	64.5	Yes
BDS-[redacted]W016	[redacted] wall	Low Occupancy	drywall	7	33	J	12.9	45.1	No
BDS-[redacted]W017	[redacted], wall	Low Occupancy	drywall	3	37	J	12.9	45.1	No
BDS-[redacted]W018	[redacted], wall	Low Occupancy	drywall	4	27	J	12.9	45.1	No
BDS-[redacted]W019	[redacted] wall	High Occupancy	drywall	5	38	J	12.9	45.1	No
BDS-[redacted]W020	[redacted] wall	High Occupancy	drywall	3	40	J	12.9	45.1	No
BDS-[redacted]W021	Field blank	-	-	-	-	-	-	-	-
BDS-[redacted]W022	[redacted] wall	High Occupancy	drywall	1	35	J	12.9	45.1	No
BDS-[redacted]W023	[redacted] wall	High Occupancy	drywall	4	41	J	12.9	45.1	No
BDS-[redacted]W024	[redacted], floor	High Occupancy	[redacted]	4	41	K	9.4	62.6	No
BDS-[redacted]W025	[redacted]	High Occupancy	[redacted]	1	43	G	19.8	74.4	No
BDS-[redacted]W026	[redacted] wall	Low Occupancy	drywall	1	29	J	12.9	45.1	No
BDS-[redacted]W027	[redacted] floor	Low Occupancy	tile	5	82	I	12.9	109.1	No
BDS-[redacted]W028	[redacted] wall	Low Occupancy	drywall	2	35	J	12.9	45.1	No
BDS-[redacted]W029	[redacted] wall	Low Occupancy	drywall	5	36	J	12.9	45.1	No
BDS-[redacted]W030	[redacted] wall	Low Occupancy	drywall	0	41	J	12.9	45.1	No
BDS-[redacted]W031	[redacted] wall	High Occupancy	drywall	6	45	J	12.9	45.1	No
BDS-[redacted]W032	[redacted] wall	High Occupancy	drywall	1	38	J	12.9	45.1	No
BDS-[redacted]W033	[redacted] wall	High Occupancy	drywall	3	45	J	12.9	45.1	No
BDS-[redacted]W034	[redacted] wall	High Occupancy	drywall	2	38	J	12.9	45.1	No
BDS-[redacted]W035	[redacted] floor	High Occupancy	[redacted]	1	63	K	9.4	62.6	Yes
BDS-[redacted]W036	[redacted] entrance	Entrance	tile	13	97	L	21.5	118.4	No
BDS-[redacted]W037	[redacted], wall	Low Occupancy	drywall	7	33	J	12.9	45.1	No
BDS-[redacted]W038	[redacted] floor	Low Occupancy	[redacted]	3	37	K	9.4	62.6	No
BDS-[redacted]W039	[redacted] floor	High Occupancy	[redacted]	2	33	K	9.4	62.6	No
BDS-[redacted]W040	[redacted], floor	High Occupancy	[redacted]	10	56	D	9.6	64.5	Yes
BDS-[redacted]W041	[redacted], floor	Low Occupancy	tile	8	83	H	17.1	132.9	No
BDS-[redacted]W042	[redacted] wall	High Occupancy	drywall	10	39	J	12.9	45.1	No
BDS-[redacted]W043	[redacted], floor	High Occupancy	carpet	3	37	K	9.4	62.6	No
BDS-[redacted]W044	[redacted] wall	Low Occupancy	drywall	7	43	J	12.9	45.1	No
BDS-[redacted]W045	[redacted] wall	High Occupancy	drywall	19	49	J	12.9	45.1	Yes
BDS-[redacted]W046	[redacted] wall	Low Occupancy	drywall	8	37	J	12.9	45.1	No
BDS-[redacted]W047	[redacted] wall	Low Occupancy	drywall	8	37	J	12.9	45.1	No
BDS-[redacted]W048	[redacted], floor	Entrance	tile	8	82	L	21.5	118.4	No
BDS-[redacted]W049	[redacted] wall	High Occupancy	drywall	3	27	J	12.9	45.1	No
BDS-[redacted]W050	[redacted] wall	High Occupancy	drywall	15	42	J	12.9	45.1	Yes
BDS-[redacted]W051	[redacted] floor	Low Occupancy	concrete	4	56	A	6.5	57.8	No
BDS-[redacted]W052	[redacted] wall	Low Occupancy	concrete	11	29	B	22.5	71.6	No
BDS-[redacted]W053	[redacted] wall	Low Occupancy	concrete	6	34	B	22.5	71.6	No
BDS-[redacted]W054	[redacted] wall	Low Occupancy	concrete	4	29	B	22.5	71.6	No
BDS-[redacted]W055	[redacted] wall	Low Occupancy	concrete	4	54	B	22.5	71.6	No
BDS-[redacted]W056	[redacted], floor	High Occupancy	vinyl	8	49	E	12.9	54.4	No
BDS-[redacted]W057	[redacted], wall	High Occupancy	drywall	8	35	J	12.9	45.1	No
BDS-[redacted]W058	[redacted] wall	High Occupancy	drywall	10	33	J	12.9	45.1	No
BDS-[redacted]W059	[redacted] wall	High Occupancy	drywall	7	27	J	12.9	45.1	No
BDS-[redacted]W060	[redacted] wall	High Occupancy	drywall	10	26	J	12.9	45.1	No
BDS-[redacted]W061	[redacted] floor	High Occupancy	carpet	7	62	D	9.6	64.5	No
BDS-[redacted]W062	[redacted] wall	High Occupancy	drywall	12	34	J	12.9	45.1	No
BDS-[redacted]W063	[redacted] wall	High Occupancy	[redacted]	11	29	F	16.5	54.1	No
BDS-[redacted]W064	[redacted] wall	High Occupancy	drywall	3	41	J	12.9	45.1	No
BDS-[redacted]W065	[redacted] wall	High Occupancy	drywall	14	45	J	12.9	45.1	Yes
BDS-[redacted]W066	[redacted] wall	Low Occupancy	[redacted]	9	43	F	16.5	54.1	No
BDS-[redacted]W067	[redacted], floor	Low Occupancy	concrete	8	55	A	6.5	57.8	Yes

TABLE H-1

SURFACE ACTIVITY STATIC COUNTING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

				Static Counting Results			Benchmark Threshold		
Wipe Sample	**Description**	**Area Type**	**Surface Type**	**Ludlum 43-90 Alpha Response (counts)**	**Ludlum 44-9 Beta/Gamma Response (counts)**	**Benchmark Surface ID[1]**	**Ludlum 43-90 Alpha Response (counts)**	**Ludlum 44-9 Beta/Gamma Response (counts)**	**Static Counting Result Exceeds Benchmark Threshold?**
BDS-[redacted]W068	[redacted] wall	Low Occupancy	[redacted]	10	52	F	16.5	54.1	No
BDS-[redacted]W069	[redacted] wall	Low Occupancy	[redacted]	6	43	F	16.5	54.1	No
BDS-[redacted]W070	[redacted] door	Low Occupancy	[redacted] door	4	43	F	16.5	54.1	No
BDS-[redacted]W071	[redacted] wall	Low Occupancy	drywall	7	45	J	12.9	45.1	No
BDS-[redacted]W072	[redacted] wall	Low Occupancy	drywall	6	35	J	12.9	45.1	No
BDS-[redacted]W073	[redacted] wall	Low Occupancy	drywall	3	44	J	12.9	45.1	No
BDS-[redacted]W074	[redacted] entrance	Entrance	concrete	3	40	A	6.5	57.8	No
House 2									
BDS-[redacted]W001	Field blank	-	-	-	-	-	-	-	-
BDS-[redacted]W002	[redacted]	High Occupancy	[redacted]	8	11	M	14.8	156.3	No
BDS-[redacted]W003	[redacted]	High Occupancy	[redacted]	13	122	M	14.8	156.3	No
BDS-[redacted]W004	[redacted] entrance	Entrance	[redacted]	9	38	O	13.4	82	No
BDS-[redacted]W005	[redacted] entrance	Entrance	[redacted]	5	44	O	13.4	82	No
BDS-[redacted]W006	[redacted] entrance, floor	Entrance	[redacted]	4	39	O	13.4	82	No
BDS-[redacted]W007	[redacted] entrance, floor	Entrance	[redacted]	4	47	O	13.4	82	No
BDS-[redacted]W008	[redacted]	High Occupancy	[redacted]	12	88	R	11.9	110.8	Yes
BDS-[redacted]W009	[redacted] wall	High Occupancy	[redacted]	7	76	R	11.9	110.8	No
BDS-[redacted]W010	[redacted] floor	High Occupancy	[redacted]	3	43	O	13.4	82	No
BDS-[redacted]W011	Field blank	Not applicable (NA)	-	-	-	-	-	-	-
BDS-[redacted]W012	[redacted] wall	High Occupancy	drywall	6	25	P	13.6	63.4	No
BDS-[redacted]W013	[redacted], floor	High Occupancy	[redacted]	6	38	O	13.4	82	No
BDS-[redacted]W014	[redacted] wall	High Occupancy	drywall	2	35	P	13.6	63.4	No
BDS-[redacted]W015	[redacted] wall	High Occupancy	drywall	4	47	P	13.6	63.4	No
BDS-[redacted]W016	[redacted] wall	High Occupancy	drywall	3	23	P	13.6	63.4	No
BDS-[redacted]W017	[redacted] wall	High Occupancy	drywall	11	41	P	13.6	63.4	No
BDS-[redacted]W018	[redacted], floor	Low Occupancy	tile	9	90	Q	29.4	118.4	No
BDS-[redacted]W019	[redacted] t wall	Low Occupancy	drywall	5	28	P	13.6	63.4	No
BDS-[redacted]W020	[redacted] wall	Low Occupancy	drywall	6	35	P	13.6	63.4	No
BDS-[redacted]W021	Field blank	-	-	-	-	-	-	-	-
BDS-[redacted]W022	[redacted] wall	Low Occupancy	drywall	9	40	P	13.6	63.4	No
BDS-[redacted]W023	[redacted] floor	Low Occupancy	[redacted]	5	30	O	13.4	82	No
BDS-[redacted]W024	[redacted]	Low Occupancy	[redacted]	5	34	O	13.4	82	No
BDS-[redacted]W025	[redacted] floor	Low Occupancy	[redacted]	3	37	O	13.4	82	No
BDS-[redacted]W026	[redacted] wall	Low Occupancy	drywall	5	28	P	13.6	63.4	No
BDS-[redacted]W027	[redacted] wall	Low Occupancy	drywall	3	35	P	13.6	63.4	No
BDS-[redacted]W028	[redacted] wall	Low Occupancy	drywall	5	24	P	13.6	63.4	No
BDS-[redacted]W029	[redacted] wall	High Occupancy	drywall	6	35	P	13.6	63.4	No
BDS-[redacted]W030	[redacted] wall	High Occupancy	drywall	3	46	P	13.6	63.4	No
BDS-[redacted]W031	Field blank	NA	-	-	-	-	-	-	-
BDS-[redacted]W032	[redacted] wall	High Occupancy	drywall	3	28	P	13.6	63.4	No
BDS-[redacted]W033	[redacted] wall	High Occupancy	drywall	1	46	P	13.6	63.4	No
BDS-[redacted]W034	[redacted], floor	High Occupancy	[redacted]	4	55	O	13.4	82	No
BDS-[redacted]W035	[redacted] wall	High Occupancy	drywall	7	32	P	13.6	63.4	No
BDS-[redacted]W036	[redacted] wall	High Occupancy	drywall	3	41	P	13.6	63.4	No
BDS-[redacted]W037	[redacted] wall	High Occupancy	drywall	4	46	P	13.6	63.4	No
BDS-[redacted]W038	[redacted] wall	High Occupancy	drywall	4	39	P	13.6	63.4	No
BDS-[redacted]W039	[redacted] floor	High Occupancy	[redacted]	3	52	O	13.4	82	No
BDS-[redacted]W040	[redacted] wall	High Occupancy	drywall	5	48	P	13.6	63.4	No
BDS-[redacted]W041	Field blank	-	-	-	-	-	-	-	-
BDS-[redacted]W042	[redacted] wall	High Occupancy	drywall	1	34	P	13.6	63.4	No
BDS-[redacted]W043	[redacted] floor	High Occupancy	[redacted]	5	47	O	13.4	82	No
BDS-[redacted]W044	[redacted] wall	High Occupancy	drywall	5	27	P	13.6	63.4	No
BDS-[redacted]W045	[redacted] wall	High Occupancy	drywall	2	41	P	13.6	63.4	No
BDS-[redacted]W046	[redacted], floor	Low Occupancy	[redacted]	4	41	O	13.4	82	No
BDS-[redacted]W047	[redacted] wall	Low Occupancy	drywall	4	38	P	13.6	63.4	No
BDS-[redacted]W048	[redacted], floor	Low Occupancy	tile	14	102	Q	29.4	118.4	No
BDS-[redacted]W049	[redacted] wall	Low Occupancy	drywall	1	46	P	13.6	63.4	No
BDS-[redacted]W050	[redacted] wall	Low Occupancy	[redacted]	2	40	R	11.9	110.8	No
BDS-[redacted]W051	Field blank	-	-	-	-	-	-	-	-
BDS-[redacted]W052	[redacted] wall	Low Occupancy	drywall	1	42	P	13.6	63.4	No
BDS-[redacted]W053	[redacted] wall	Low Occupancy	concrete	6	58	N	14.8	105.6	No
BDS-[redacted]W054	[redacted] wall	Low Occupancy	concrete	11	40	N	14.8	105.6	No
BDS-[redacted]W055	[redacted] floor	Entrance	concrete	3	59	N	14.8	105.6	No
BDS-[redacted]W056	[redacted] wall	Low Occupancy	concrete	9	37	N	14.8	105.6	No
BDS-[redacted]W057	[redacted] wall	Low Occupancy	concrete	10	33	N	14.8	105.6	No
BDS-[redacted]W058	[redacted] wall	Low Occupancy	plastic [redacted]	9	30	P	13.6	63.4	No
BDS-[redacted]W059	[redacted]	Low Occupancy	concrete	6	51	N	14.8	105.6	No
BDS-[redacted]W060	[redacted] floor	Low Occupancy	concrete	9	52	N	14.8	105.6	No

TABLE H-1

SURFACE ACTIVITY STATIC COUNTING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

				Static Counting Results			Benchmark Threshold		
Wipe Sample	**Description**	**Area Type**	**Surface Type**	**Ludlum 43-90 Alpha Response (counts)**	**Ludlum 44-9 Beta/Gamma Response (counts)**	**Benchmark Surface ID[1]**	**Ludlum 43-90 Alpha Response (counts)**	**Ludlum 44-9 Beta/Gamma Response (counts)**	**Static Counting Result Exceeds Benchmark Threshold?**
BDS-[redacted]W061	Field blank	NA	-	-	-	-	-	-	-
BDS-[redacted]W062	[redacted] wall	Low Occupancy	concrete	5	69	N	14.8	105.6	No
BDS-[redacted]W063	[redacted] wall	Low Occupancy	concrete	7	53	N	14.8	105.6	No
BDS-[redacted]W064	[redacted] wall	Low Occupancy	concrete	2	45	N	14.8	105.6	No
BDS-[redacted]W065	[redacted] wall	Low Occupancy	concrete	4	52	N	14.8	105.6	No

Notes

[1] Benchmark thresholds determined for interior surfaces are listed below. Surfaces were measured by use of Ludlum Model 43-90 zinc sulfide (ZnS) scintillation detectors (for alpha activity) and Ludlum Model 44-9 Geiger Muller detectors (for beta and gamma activities). These measurements are recorded on field sheets included in Appendix C. By use of these measurements, benchmark gross alpha and beta activities from each surface were determined as the 75th percentile plus 1.5 times the interquartile range (IQR) of the 10 static measurements recorded from the surface.

Benchmark surfaces and benchmark thresholds.

		Benchmark Threshold	
Benchmark Surface ID	**Surface Description**	**Ludlum 43-90 Alpha Response (counts)**	**Ludlum 44-9 Beta/ Gamma Response (counts)**
House 1			
A	Concrete [redacted] slab and [redacted] concrete slab	6.5	57.8
B	Concrete slab wall, painted and unpainted	22.5	71.6
C	Resilient flooring (vinyl or linoleum) in [redacted]	15.1	58.1
D	[redacted]	9.6	64.5
E	Resilient flooring (vinyl or linoleum) [redacted]	12.9	54.4
F	[redacted] wall	16.5	54.1
G	Laminate [redacted]	19.8	74.4
H	[redacted] ceramic wall and floor tile	17.1	132.9
I	[redacted] ceramic wall and floor tile	12.9	109.1
J	Drywall	12.9	45.1
K	[redacted]	9.4	62.6
L	[redacted] floor ceramic tile	21.5	118.4
House 2			
M	[redacted]	14.8	156.3
N	Concrete [redacted] floors and walls	14.8	105.6
O	[redacted] flooring	13.4	82.0
P	Drywall	13.6	63.4
Q	Tile, bathroom floor and walls	29.4	118.4
R	[redacted]	11.9	110.8

TABLE H-2

WIPE SAMPLE COUNTING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample Information				Counting Results															Results in Units of dpm/cm^2				Screening Results in Units of pCi/cm^2			
Wipe Sample	Description	Area Type	Wipe Area (cm^2)	Date Counted	Time Counted	Ludlum Detector Model	CERTS #	Counted by	Counting Time (minutes)	α Counts	β Counts	Instrument Background (cpm α)	α Efficiency (cpm/dpm)	MDA (net dpm α)	Wipe Activity (net dpm α)	Submitted for Laboratory Analysis?	Gross Counting Rate (cpm α)	Counting Uncertainty [1 sigma] (net cpm α)	Removed Surface Activity (dpm α /cm^2)	Result Qualifier	Counting Uncertainty (dpm α/cm^2)	MDA (dpm α/cm^2)	Removed Surface Activity (pCi α /cm^2)	Result Qualifier	Counting Uncertainty (pCi α/cm^2)	MDA (pCi α/cm^2)
House 1																										
BDS-[redacted]W001	Field blank	NA	NA	1/5/2017	12:12	3030	643	RM	5	3	50	0.20	0.26	5.7	1.5	yes	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W002	[redacted] floor	High Occupancy	200	1/4/2017	15:44	3030	643	RM	5	5	59	0.20	0.26	5.7	3.1	yes	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W003	[redacted] wall	High Occupancy	200	1/4/2017	15:49	3030	643	RM	5	3	58	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W004	[redacted] wall	High Occupancy	200	1/4/2017	15:55	3030	643	RM	5	1	65	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W005	[redacted] wall	High Occupancy	200	1/4/2017	16:00	3030	643	RM	5	2	75	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W006	[redacted] wall	High Occupancy	200	1/4/2017	16:07	3030	643	RM	5	6	48	0.20	0.26	5.7	3.8	yes	1.20	0.529	0.0192	U	0.0102	0.028	8.66E-03	U	4.58E-03	1.28E-02
BDS-[redacted]W007	[redacted], wall	High Occupancy	200	1/4/2017	16:13	3030	643	RM	5	2	59	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W008	[redacted], floor	High Occupancy	200	1/5/2017	10:33	3030	643	RM	5	0	63	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W009	[redacted], floor	High Occupancy	200	1/5/2017	10:40	3030	643	RM	5	3	56	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W010	[redacted], wall	High Occupancy	200	1/5/2017	10:47	3030	643	RM	5	0	47	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W011	field blank	NA	NA	1/5/2017	10:52	3030	643	RM	5	2	75	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W012	[redacted] wall	High Occupancy	200	1/5/2017	10:58	3030	643	RM	5	0	55	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W013	[redacted], wall	High Occupancy	200	1/5/2017	11:03	3030	643	RM	5	2	67	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W014	[redacted] wall	High Occupancy	200	1/5/2017	11:08	3030	643	RM	5	4	69	0.20	0.26	5.7	2.3	yes	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W015	[redacted], floor	Low Occupancy	200	1/5/2017	11:14	3030	643	RM	5	5	76	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W016	[redacted], wall	Low Occupancy	200	1/5/2017	11:20	3030	643	RM	5	2	65	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W017	[redacted], wall	Low Occupancy	200	1/5/2017	11:25	3030	643	RM	5	5	59	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W018	[redacted], wall	Low Occupancy	200	1/5/2017	11:31	3030	643	RM	5	2	64	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W019	[redacted], wall	High Occupancy	200	1/5/2017	11:36	3030	643	RM	5	4	54	0.20	0.26	5.7	2.3	yes	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W020	[redacted] wall	High Occupancy	200	1/5/2017	11:42	3030	643	RM	5	1	54	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W021	field blank	NA	NA	1/5/2017	11:49	3030	643	RM	5	4	64	0.20	0.26	5.7	2.3	yes	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W022	[redacted] wall	High Occupancy	200	1/5/2017	11:55	3030	643	RM	5	0	65	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W023	[redacted] wall	High Occupancy	200	1/5/2017	12:00	3030	643	RM	5	3	47	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W024	[redacted] floor	High Occupancy	200	1/5/2017	12:06	3030	643	RM	5	1	49	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W025	[redacted]	High Occupancy	200	1/4/2017	9:34	3030	643	RM	5	1	62	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W026	[redacted] wall	Low Occupancy	200	1/4/2017	9:43	3030	643	RM	5	0	67	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W027	[redacted], floor	Low Occupancy	200	1/4/2017	9:48	3030	643	RM	5	5	57	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W028	[redacted] wall	Low Occupancy	200	1/4/2017	9:57	3030	643	RM	5	4	61	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W029	[redacted] wall	Low Occupancy	200	1/4/2017	10:02	3030	643	RM	5	0	59	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W030	[redacted] wall	Low Occupancy	200	1/4/2017	10:07	3030	643	RM	5	0	70	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W031	[redacted] wall	High Occupancy	200	1/4/2017	10:13	3030	643	RM	5	1	47	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W032	[redacted] wall	High Occupancy	200	1/4/2017	10:19	3030	643	RM	5	2	66	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W033	[redacted] wall	High Occupancy	200	1/4/2017	10:24	3030	643	RM	5	2	54	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W034	[redacted] wall	High Occupancy	200	1/4/2017	10:31	3030	643	RM	5	3	57	0.20	0.26	5.7	1.5	yes	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W035	[redacted], floor	High Occupancy	200	1/4/2017	10:36	3030	643	RM	5	0	50	0.20	0.26	5.7	-0.8	no	0.00	0.200	-0.0038	U	0.0038	0.028	-1.73E-03	U	1.73E-03	1.28E-02
BDS-[redacted]W036	[redacted] entrance	Entrance	200	1/4/2017	10:41	3030	643	RM	5	1	55	0.20	0.26	5.7	0.0	yes	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W037	[redacted], wall	Low Occupancy	200	1/4/2017	10:47	3030	643	RM	5	3	63	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W038	[redacted], floor	Low Occupancy	200	1/4/2017	10:52	3030	643	RM	5	2	54	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W039	[redacted] floor	High Occupancy	200	1/4/2017	10:59	3030	643	RM	5	5	67	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W040	[redacted], floor	High Occupancy	200	1/4/2017	11:04	3030	643	RM	5	2	57	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W041	[redacted], floor	Low Occupancy	200	1/4/2017	11:10	3030	643	RM	5	4	54	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W042	[redacted] wall	High Occupancy	200	1/4/2017	11:16	3030	643	RM	5	2	64	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W043	[redacted] floor	High Occupancy	200	1/4/2017	11:21	3030	643	RM	5	4	52	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W044	[redacted] wall	Low Occupancy	200	1/4/2017	12:08	3030	643	RM	5	4	67	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W045	[redacted] wall	High Occupancy	200	1/4/2017	12:16	3030	643	RM	5	1	48	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W046	[redacted] wall	Low Occupancy	200	1/4/2017	12:21	3030	643	RM	5	5	59	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W047	[redacted] wall	Low Occupancy	200	1/4/2017	12:27	3030	643	RM	5	3	60	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W048	[redacted], floor	Entrance	200	1/4/2017	12:32	3030	643	RM	5	3	61	0.20	0.26	5.7	1.5	yes	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W049	[redacted] wall	High Occupancy	200	1/4/2017	12:51	3030	643	RM	5	5	72	0.20	0.26	5.7	3.1	yes	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W050	[redacted] wall	High Occupancy	200	1/4/2017	12:57	3030	643	RM	5	3	51	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W051	[redacted] floor	Low Occupancy	200	1/4/2017	13:03	3030	643	RM	5	5	55	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W052	[redacted] wall	Low Occupancy	200	1/4/2017	13:09	3030	643	RM	5	9	55	0.20	0.26	5.7	6.2	yes	1.80	0.632	0.0308		0.0122	0.028	1.39E-02		5.48E-03	1.28E-02
BDS-[redacted]W053	[redacted] wall	Low Occupancy	200	1/4/2017	13:17	3030	643	RM	5	1	59	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W054	[redacted] wall	Low Occupancy	200	1/4/2017	13:22	3030	643	RM	5	3	57	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W055	[redacted], wall	Low Occupancy	200	1/4/2017	13:28	3030	643	RM	5	5	57	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W056	[redacted], floor	High Occupancy	200	1/4/2017	13:33	3030	643	RM	5	2	63	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W057	[redacted], wall	High Occupancy	200	1/4/2017	13:39	3030	643	RM	5	2	54	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W058	[redacted] wall	High Occupancy	200	1/4/2017	13:44	3030	643	RM	5	4	54	0.20	0.26	5.7	2.3	yes	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W059	[redacted] wall	High Occupancy	200	1/4/2017	13:50	3030	643	RM	5	3	40	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W060	[redacted] wall	High Occupancy	200	1/4/2017	13:57	3030	643	RM	5	4	42	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W061	[redacted] floor	High Occupancy	200	1/4/2017	14:10	3030	643	RM	5	6	72	0.20	0.26	5.7	3.8	yes	1.20	0.529	0.0192	U	0.0102	0.028	8.66E-03	U	4.58E-03	1.28E-02
BDS-[redacted]W062	[redacted] wall	High Occupancy	200	1/4/2017	14:16	3030	643	RM	5	2	54	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W063	[redacted] wall	High Occupancy	200	1/4/2017	14:21	3030	643	RM	5	1	62	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W064	[redacted] wall	High Occupancy	200	1/4/2017	14:26	3030	643	RM	5	2	52	0.20	0.26	5.7	0.8	no	0.40	0.346	0.0038	U	0.0067	0.028	1.73E-03	U	3.00E-03	1.28E-02
BDS-[redacted]W065	[redacted] wall	High Occupancy	200	1/4/2017	14:35	3030	643	RM	5	1	44	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W066	[redacted] wall	Low Occupancy	200	1/4/2017	14:39	3030	643	RM	5	3	55	0.20	0.26	5.7	1.5	no	0.60	0.400	0.0077	U	0.0077	0.028	3.46E-03	U	3.46E-03	1.28E-02
BDS-[redacted]W067	[redacted], floor	Low Occupancy	200	1/4/2017	14:44	3030	643	RM	5	6	59	0.20	0.26	5.7	3.8	no	1.20	0.529	0.0192	U	0.0102	0.028	8.66E-03	U	4.58E-03	1.28E-02
BDS-[redacted]W068	[redacted] wall	Low Occupancy	200	1/4/2017	14:50	3030	643	RM	5	5	75	0.20	0.26	5.7	3.1	no	1.00	0.490	0.0154	U	0.0094	0.028	6.93E-03	U	4.24E-03	1.28E-02
BDS-[redacted]W069	[redacted] wall	Low Occupancy	200	1/4/2017	14:56	3030	643	RM	5	4	55	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02

TABLE H-2

WIPE SAMPLE COUNTING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample Information				Counting Results															Results in Units of dpm/cm^2				Screening Results in Units of pCi/cm^2			
Wipe Sample	Description	Area Type	Wipe Area (cm^2)	Date Counted	Time Counted	Ludlum Detector Model	CERTS #	Counted by	Counting Time (minutes)	α Counts	β Counts	Instrument Background (cpm α)	α Efficiency (cpm/dpm)	MDA (net dpm α)	Wipe Activity (net dpm α)	Submitted for Laboratory Analysis?	Gross Counting Rate (cpm α)	Counting Uncertainty [1 sigma] (net cpm α)	Removed Surface Activity (dpm α /cm^2)	Result Qualifier	Counting Uncertainty (dpm α/cm^2)	MDA (dpm α/cm^2)	Removed Surface Activity (pCi α /cm^2)	Result Qualifier	Counting Uncertainty (pCi α/cm^2)	MDA (pCi α/cm^2)
BDS-[redacted]W070	[redacted] door	Low Occupancy	200	1/4/2017	15:06	3030	643	RM	5	1	47	0.20	0.26	5.7	0.0	no	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
BDS-[redacted]W071	[redacted] wall	Low Occupancy	200	1/4/2017	15:11	3030	643	RM	5	4	60	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W072	[redacted] wall	Low Occupancy	200	1/4/2017	15:17	3030	643	RM	5	4	48	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W073	[redacted] wall	Low Occupancy	200	1/4/2017	15:26	3030	643	RM	5	4	61	0.20	0.26	5.7	2.3	no	0.80	0.447	0.0115	U	0.0086	0.028	5.20E-03	U	3.87E-03	1.28E-02
BDS-[redacted]W074	[redacted] entrance	Entrance	200	1/4/2017	15:38	3030	643	RM	5	1	69	0.20	0.26	5.7	0.0	yes	0.20	0.283	0.0000	U	0.0054	0.028	0.00E+00	U	2.45E-03	1.28E-02
House 2																										
BDS-[redacted]W001	field blank	NA	NA	1/5/2017	12:17	3030	642	RM	5	3	118	0.40	0.14	13.0	1.4	yes	0.60	0.447	0.0070	U	0.0157	0.0650	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W002	[redacted]	High Occupancy	200	1/4/2017	11:11	3030	642	CH	5	1	99	0.40	0.14	13.0	-1.4	no	0.20	0.346	-0.0070	U	0.0121	0.065	-3.15E-03	U	5.46E-03	2.93E-02
BDS-[redacted]W003	[redacted]	High Occupancy	200	1/4/2017	11:16	3030	642	CH	5	5	94	0.40	0.14	13.0	4.2	yes	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W004	[redacted]	Entrance	200	1/4/2017	12:10	3030	642	CH	5	2	109	0.40	0.14	13.0	0.0	yes	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W005	[redacted] entrance	Entrance	200	1/4/2017	11:21	3030	642	CH	5	2	115	0.40	0.14	13.0	0.0	yes	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W006	[redacted] entrance, floor	Entrance	200	1/4/2017	12:00	3030	642	CH	5	13	121	0.40	0.14	13.0	15.4	yes	2.60	0.775	0.0770		0.0271	0.065	3.47E-02		1.22E-02	2.93E-02
BDS-[redacted]W007	[redacted] entrance, floor	Entrance	200	1/4/2017	12:05	3030	642	CH	5	2	103	0.40	0.14	13.0	0.0	yes	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W008	[redacted]	High Occupancy	200	1/4/2017	10:54	3030	642	CH	5	3	115	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W009	[redacted] wall	High Occupancy	200	1/4/2017	10:47	3030	642	CH	5	5	92	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W010	[redacted], floor	High Occupancy	200	1/4/2017	10:42	3030	642	CH	5	8	127	0.40	0.14	13.0	8.4	yes	1.60	0.632	0.0420	U	0.0221	0.065	1.89E-02	U	9.97E-03	2.93E-02
BDS-[redacted]W011	field blank	NA	NA	1/5/2017	12:26	3030	642	RM	5	4	114	0.40	0.14	13.0	2.8	no	0.80	0.490	0.0140	U	0.0172	0.065	6.31E-03	U	7.73E-03	2.93E-02
BDS-[redacted]W012	[redacted] wall	High Occupancy	200	1/4/2017	10:58	3030	642	CH	5	4	110	0.40	0.14	13.0	2.8	no	0.80	0.490	0.0140	U	0.0172	0.065	6.31E-03	U	7.73E-03	2.93E-02
BDS-[redacted]W013	[redacted], floor	High Occupancy	200	1/4/2017	12:16	3030	642	CH	5	5	117	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W014	[redacted] wall	High Occupancy	200	1/4/2017	11:03	3030	642	CH	5	3	123	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W015	[redacted] wall	High Occupancy	200	1/4/2017	12:43	3030	642	CH	5	4	96	0.40	0.14	13.0	2.8	no	0.80	0.490	0.0140	U	0.0172	0.065	6.31E-03	U	7.73E-03	2.93E-02
BDS-[redacted]W016	[redacted] wall	High Occupancy	200	1/4/2017	12:37	3030	642	CH	5	7	98	0.40	0.14	13.0	7.0	yes	1.40	0.600	0.0350	U	0.0210	0.065	1.58E-02	U	9.46E-03	2.93E-02
BDS-[redacted]W017	[redacted]t wall	High Occupancy	200	1/4/2017	12:22	3030	642	CH	5	2	109	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W018	[redacted], floor	Low Occupancy	200	1/4/2017	12:55	3030	642	CH	5	6	89	0.40	0.14	13.0	5.6	no	1.20	0.566	0.0280	U	0.0198	0.065	1.26E-02	U	8.92E-03	2.93E-02
BDS-[redacted]W019	[redacted] wall	Low Occupancy	200	1/4/2017	13:00	3030	642	CH	5	5	122	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W020	[redacted] wall	Low Occupancy	200	1/4/2017	13:06	3030	642	CH	5	6	124	0.40	0.14	13.0	5.6	no	1.20	0.566	0.0280	U	0.0198	0.065	1.26E-02	U	8.92E-03	2.93E-02
BDS-[redacted]W021	field blank	NA	NA	1/5/2017	12:27	3030	642	RM	1	1	28	0.40	0.14	34.9	4.2	no	1.00	1.039	0.0210	U	0.0364	0.175	9.46E-03	U	1.64E-02	7.87E-02
BDS-[redacted]W022	[redacted] wall	Low Occupancy	200	1/4/2017	12:48	3030	642	CH	5	2	105	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W023	[redacted], floor	Low Occupancy	200	1/4/2017	13:12	3030	642	CH	5	7	131	0.40	0.14	13.0	7.0	no	1.40	0.600	0.0350	U	0.0210	0.065	1.58E-02	U	9.46E-03	2.93E-02
BDS-[redacted]W024	[redacted]	Low Occupancy	200	1/4/2017	13:17	3030	642	CH	5	8	119	0.40	0.14	13.0	8.4	yes	1.60	0.632	0.0420	U	0.0221	0.065	1.89E-02	U	9.97E-03	2.93E-02
BDS-[redacted]W025	[redacted], floor	Low Occupancy	200	1/4/2017	13:52	3030	642	CH	5	3	133	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W026	[redacted] wall	Low Occupancy	200	1/4/2017	13:45	3030	642	CH	5	2	109	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W027	[redacted] wall	Low Occupancy	200	1/4/2017	13:40	3030	642	CH	5	3	104	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W028	[redacted] wall	Low Occupancy	200	1/4/2017	13:34	3030	642	CH	5	5	95	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W029	[redacted] wall	High Occupancy	200	1/4/2017	15:09	3030	642	CH	5	6	104	0.40	0.14	13.0	5.6	no	1.20	0.566	0.0280	U	0.0198	0.065	1.26E-02	U	8.92E-03	2.93E-02
BDS-[redacted]W030	[redacted] wall	High Occupancy	200	1/4/2017	15:04	3030	642	CH	5	5	130	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W031	field blank	NA	NA	1/5/2017	12:28	3030	642	RM	1	0	16	0.40	0.14	34.9	-2.8	no	0.00	0.283	-0.0140	U	0.0099	0.175	-6.31E-03	U	4.46E-03	7.87E-02
BDS-[redacted]W032	[redacted] wall	High Occupancy	200	1/4/2017	15:15	3030	642	CH	5	2	108	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W033	[redacted] wall	High Occupancy	200	1/4/2017	15:20	3030	642	CH	5	3	113	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W034	[redacted], floor	High Occupancy	200	1/4/2017	15:26	3030	642	CH	5	7	121	0.40	0.14	13.0	7.0	yes	1.40	0.600	0.0350	U	0.0210	0.065	1.58E-02	U	9.46E-03	2.93E-02
BDS-[redacted]W035	[redacted] wall	High Occupancy	200	1/4/2017	15:53	3030	642	CH	5	3	122	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W036	[redacted] wall	High Occupancy	200	1/4/2017	15:58	3030	642	CH	5	6	105	0.40	0.14	13.0	5.6	yes	1.20	0.566	0.0280	U	0.0198	0.065	1.26E-02	U	8.92E-03	2.93E-02
BDS-[redacted]W037	[redacted] wall	High Occupancy	200	1/4/2017	16:04	3030	642	CH	5	3	106	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W038	[redacted] wall	High Occupancy	200	1/4/2017	16:09	3030	642	CH	5	5	104	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W039	[redacted] floor	High Occupancy	200	1/5/2017	12:03	3030	642	RM	5	2	103	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W040	[redacted] wall	High Occupancy	200	1/4/2017	14:36	3030	642	CH	5	2	96	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W041	field blank	NA	NA	1/5/2017	12:32	3030	642	RM	1	1	18	0.40	0.14	34.9	4.2	no	1.00	1.039	0.0210	U	0.0364	0.175	9.46E-03	U	1.64E-02	7.87E-02
BDS-[redacted]W042	[redacted] wall	High Occupancy	200	1/4/2017	14:58	3030	642	CH	5	5	124	0.40	0.14	13.0	4.2	yes	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W043	[redacted], floor	High Occupancy	200	1/4/2017	14:52	3030	642	CH	5	5	112	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W044	[redacted] wall	High Occupancy	200	1/4/2017	14:47	3030	642	CH	5	4	112	0.40	0.14	13.0	2.8	no	0.80	0.490	0.0140	U	0.0172	0.065	6.31E-03	U	7.73E-03	2.93E-02
BDS-[redacted]W045	[redacted] wall	High Occupancy	200	1/4/2017	14:41	3030	642	CH	5	1	91	0.40	0.14	13.0	-1.4	no	0.20	0.346	-0.0070	U	0.0121	0.065	-3.15E-03	U	5.46E-03	2.93E-02
BDS-[redacted]W046	[redacted], floor	Low Occupancy	200	1/4/2017	14:31	3030	642	CH	5	2	111	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W047	[redacted], wall	Low Occupancy	200	1/4/2017	14:25	3030	642	CH	5	1	107	0.40	0.14	13.0	-1.4	no	0.20	0.346	-0.0070	U	0.0121	0.065	-3.15E-03	U	5.46E-03	2.93E-02
BDS-[redacted]W048	[redacted] floor	Low Occupancy	200	1/4/2017	15:42	3030	642	CH	5	4	108	0.40	0.14	13.0	2.8	no	0.80	0.490	0.0140	U	0.0172	0.065	6.31E-03	U	7.73E-03	2.93E-02
BDS-[redacted]W049	[redacted] wall	Low Occupancy	200	1/4/2017	15:36	3030	642	CH	5	3	95	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W050	[redacted] wall	Low Occupancy	200	1/4/2017	15:31	3030	642	CH	5	3	112	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W051	field blank	NA	NA	1/5/2017	12:12	3030	642	RM	5	1	102	0.40	0.14	13.0	-1.4	no	0.20	0.346	-0.0070	U	0.0121	0.065	-3.15E-03	U	5.46E-03	2.93E-02
BDS-[redacted]W052	[redacted] wall	Low Occupancy	200	1/4/2017	15:47	3030	642	CH	5	2	85	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02
BDS-[redacted]W053	[redacted] wall	Low Occupancy	200	1/4/2017	13:22	3030	642	CH	5	7	101	0.40	0.14	13.0	7.0	no	1.40	0.600	0.0350	U	0.0210	0.065	1.58E-02	U	9.46E-03	2.93E-02
BDS-[redacted]W054	[redacted] wall	Low Occupancy	200	1/4/2017	10:36	3030	642	CH	5	7	114	0.40	0.14	13.0	7.0	no	1.40	0.600	0.0350	U	0.0210	0.065	1.58E-02	U	9.46E-03	2.93E-02
BDS-[redacted]W055	[redacted] floor	Entrance	200	1/4/2017	10:31	3030	642	CH	5	1	131	0.40	0.14	13.0	-1.4	yes	0.20	0.346	-0.0070	U	0.0121	0.065	-3.15E-03	U	5.46E-03	2.93E-02
BDS-[redacted]W056	[redacted] wall	Low Occupancy	200	1/4/2017	10:25	3030	642	CH	5	5	101	0.40	0.14	13.0	4.2	no	1.00	0.529	0.0210	U	0.0185	0.065	9.46E-03	U	8.34E-03	2.93E-02
BDS-[redacted]W057	[redacted] wall	Low Occupancy	200	1/4/2017	10:19	3030	642	CH	5	1	119	0.40	0.14	13.0	-1.4	no	0.20	0.346	-0.0070	U	0.0121	0.065	-3.15E-03	U	5.46E-03	2.93E-02
BDS-[redacted]W058	[redacted] wall	Low Occupancy	200	1/4/2017	10:13	3030	642	CH	5	3	105	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W059	[redacted] floor	Low Occupancy	200	1/4/2017	13:29	3030	642	CH	5	3	114	0.40	0.14	13.0	1.4	no	0.60	0.447	0.0070	U	0.0157	0.065	3.15E-03	U	7.05E-03	2.93E-02
BDS-[redacted]W060	[redacted] floor	Low Occupancy	200	1/4/2017	13:58	3030	642	CH	5	2	104	0.40	0.14	13.0	0.0	no	0.40	0.400	0.0000	U	0.0140	0.065	0.00E+00	U	6.31E-03	2.93E-02

TABLE H-2

WIPE SAMPLE COUNTING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

Sample Information				Counting Results														Results in Units of dpm/cm^2				Screening Results in Units of pCi/cm^2			
Wipe Sample	Description	Area Type	Wipe Area (cm^2)	Date Counted	Time Counted	Ludlum Detector Model	CERTS #	Counted by	Counting Time (minutes)	α Counts	β Counts	Instrument Background (cpm α)	α Efficiency (cpm/dpm)	MDA (net dpm α)	Wipe Activity (net dpm α)	Submitted for Laboratory Analysis?	Gross Counting Rate (cpm α)	Counting Uncertainty [1 sigma] (net cpm α)	Removed Surface Activity (dpm α /cm^2)	Result Qualifier	Counting Uncertainty (dpm α/cm^2)	MDA (dpm α/cm^2)	Removed Surface Activity (pCi α /cm^2)	Result Qualifier	Counting Uncertainty (pCi α/cm^2)	MDA (pCi α/cm^2)
BDS-[redacted]W061	field blank	NA	NA	1/5/2017	12:30	3030	642	RM	1	0	23	0.40	0.14	34.9	-2.8	yes	0.00	0.283	-0.0140	U	0.0099	0.175	-6.31E-03	U	4.46E-03	7.87E-02
BDS-[redacted]W062	[redacted] wall	Low Occupancy	200	1/4/2017	14:20	3030	642	CH	5	1	100	0.40	0.14	13.0	-1.4	no	0.20	0.346	-0.0070	U	0.0121	0.065	-3.15E-03	U	5.46E-03	2.93E-02
BDS-[redacted]W063	[redacted] wall	Low Occupancy	200	1/4/2017	14:14	3030	642	CH	5	0	83	0.40	0.14	13.0	-2.8	no	0.00	0.283	-0.0140	U	0.0099	0.065	-6.31E-03	U	4.46E-03	2.93E-02
BDS-[redacted]W064	[redacted] wall	Low Occupancy	200	1/4/2017	14:09	3030	642	CH	5	4	114	0.40	0.14	13.0	2.8	no	0.80	0.490	0.0140	U	0.0172	0.065	6.31E-03	U	7.73E-03	2.93E-02
BDS-[redacted]W065	[redacted] wall	Low Occupancy	200	1/4/2017	12:10	3030	642	CH	5	0	118	0.40	0.14	13.0	-2.8	no	0.00	0.283	-0.0140	U	0.0099	0.065	-6.31E-03	U	4.46E-03	2.93E-02

Notes

α	alpha	MDA	Minimum detectable activity
β	beta	NA	Not applicable
cpm	counts per minute	pCi/cm^2	picoCuries per square centimeter
dpm	disintegrations per minute	U	flag indicating net count was below the minimum detectable activity
dpm/cm^2	disintegrations per minute per 100 square centimeters		

APPENDIX I

ANALYTICAL DATA PACK AND CHAIN-OF-CUSTODY DOCUMENTS

HOUSE 1 ANALYTICAL LABORATORY REPORT

Gamma Spectroscopy

Case Narrative

TetraTech

Bridgeton Dust Site – 103X9025160104.003

Work Order Number: 1701082

1. The following report consists of analytical results and supporting documentation for seven soil samples received by ALS on 01/10/2017.

2. These samples were prepared according to the current revision of SOP 739. The samples were sealed in steel cans on 01/13/2017 and stored for at least 21 days to allow ^{222}Rn to approach secular equilibrium with its parent, ^{226}Ra. The degree of ingrowth achieved prior to analysis on 02/03/2017 is at least 97.8%. Conservatively assuming a radon emanation efficiency of approximately 50%, the effective radon progeny ingrowth for these samples would be greater than 98.9%.

3. The samples were analyzed for the presence of gamma emitting radionuclides according to the current revision of SOP 713. The analyses were completed on 02/06/2017

4. The results for these samples are reported on a “Dry Weight” basis in units of pCi/gram.

5. ALS has observed a reproducible low bias in ^{226}Ra results (about -30% for the geometry in question) when using a mixed gamma source for the calibration of HPGe detectors for solid samples. This bias is eliminated by calibration using a NIST traceable ^{226}Ra source in the same geometry and configuration as the samples.

6. The library used for calibration and analysis employs multiple peaks for the ^{226}Ra progeny, ^{214}Pb (352 and 295 keV) and ^{214}Bi (609 and 1120 keV). Using these peaks avoids the use of the problematic ^{226}Ra photopeak at 186 keV, which suffers from poorly resolvable interference from ^{235}U at the same energy. Final activity results for ^{226}Ra are calculated, using the uncertainty-weighted mean of the activities for the four photopeaks, by the Seeker gamma spectroscopy software assuming secular equilibrium.

7. ALS has found there to be a significant low bias to ^{214}Pb and ^{214}Bi results when using a mixed nuclide gamma source for efficiency calibrations. The magnitude of this bias has been determined to be approximately 32% for ^{214}Bi, and 23% for ^{214}Pb. Therefore, any reported results for ^{214}Pb and ^{214}Bi are flagged with a "J" qualifier, indicating the activity values to be an estimated value. Results are reported without further qualification.

8. Activity concentrations above the calculated MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Nuclides not meeting these requirements have been flagged with a "TI" qualifier.

9. In cases where there are no peaks found in the peak search routine, the software performs a net quantification. This indicates that nuclides are not detected or supported at any level above the reported MDC. Consequently, these nuclides are flagged with an "NQ" qualifier on the final reports. Please refer to the Technical Bulletin Addendum in section 5 of this report.

10. There are cases where the sample density is less than the associated calibration standard density. Cases that exceed the limit of +/- 15% of the density of the calibration standard are flagged with a 'G', denoting a significant density difference between the sample and calibration standard. Consequently, the results may be biased high for the flagged results in this work order. If requested, ALS can perform a transmission spike in order to estimate a magnitude of this bias. The results are reported without further qualification.

11. Technical considerations made in the creation of the gamma spectroscopy library used in this analysis are detailed in the document "Technical Comments Regarding Gamma Spectroscopy Libraries" found in Section 5.

12. No further problems were encountered with either the client samples or the associated quality control samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Joan Anderson — 2/9/17
Jean Anderson — Date
Radiochemistry Primary Data Reviewer

2/22/17
Radiochemistry Final Data Reviewer — Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701082
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]-W001	1701082-1		WIPE	27-Dec-16	15:35
BDS-[redacted]-W002	1701082-2		WIPE	27-Dec-16	15:37
BDS[redacted]-W006	1701082-3		WIPE	27-Dec-16	16:12
BDS[redacted]-W014	1701082-4		WIPE	27-Dec-16	16:56
BDS-[redacted]-W019	1701082-5		WIPE	27-Dec-16	17:28
BDS[redacted]-W021	1701082-6		WIPE	27-Dec-16	17:38
BDS[redacted]-W034	1701082-7		WIPE	28-Dec-16	10:25
BDS-[redacted]-W036	1701082-8		WIPE	28-Dec-16	11:12
BDS[redacted]-W048	1701082-9		WIPE	28-Dec-16	11:17
BDS-[redacted]-W049	1701082-10		WIPE	28-Dec-16	10:01
BDS[redacted]-W052	1701082-11		WIPE	28-Dec-16	12:38
BDS[redacted]-W058	1701082-12		WIPE	28-Dec-16	12:34
BDS[redacted]W061	1701082-13		WIPE	28-Dec-16	12:22
BDS-[redacted]-W074	1701082-14		WIPE	28-Dec-16	15:05
BDS[redacted]-SG001	1701082-15		SOIL	27-Dec-16	16:05
BDS[redacted]-SG002	1701082-16		SOIL	27-Dec-16	16:10
BDS[redacted]-SG003	1701082-17		SOIL	27-Dec-16	16:20
BDS-[redacted]-SG004	1701082-18		SOIL	27-Dec-16	16:27
BDS-[redacted]-SG005	1701082-19		SOIL	27-Dec-16	16:32
BDS[redacted]-SG006	1701082-20		SOIL	27-Dec-16	17:26
BDS[redacted]-SC007	1701082-21		SOIL	27-Dec-16	15:32
BDS[redacted]-BD01	1701082-22		FILTER	28-Dec-16	11:15
BDS-[redacted]-BD02	1701082-23		FILTER	28-Dec-16	16:00
BDS[redacted]FB	1701082-24		FILTER	28-Dec-16	12:00

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701082	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS	
A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS[redacted]W001	F	12/27/16	15:35	1	none		X	X			X						
2	BDS[redacted]W002	F	12/27/16	15:37	1	none		X	X			X						
3	BDS[redacted]W006	F	12/27/16	16:12	1	none		X	X			X						
4	BDS[redacted]W014	F	12/27/16	16:56	1	none		X	X			X						
5	BDS[redacted]W019	F	12/27/16	17:28	1	none		X	X			X						
6	BDS[redacted]W021	F	12/27/16	17:38	1	none		X	X			X						
7	BDS[redacted]W034	F	12/28/16	10:25	1	none		X	X			X						
8	BDS[redacted]W036	F	12/28/16	11:12	1	none		X	X			X						
9	BDS[redacted]W048	F	12/28/16	11:17	1	none		X	X			X						
10	BDS[redacted]W049	F	12/28/16	10:01	1	none		X	X			X						
11	BDS[redacted]W052	F	12/28/16	12:38	1	none		X	X			X						
12	BDS[redacted]W058	F	12/28/16	12:34	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua North Shea	1/10/17	10:10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701082	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
13	BDS-[redacted]W061	F	12/28/16	12:22	1	none		X	X			X						
14	BDS-[redacted]W074	F	12/28/16	15:05	1	none		X	X			X						
15	BDS-[redacted]SG001	S	12/27/16	16:05	1	none		X	X	X	X							
16	BDS-[redacted]SG002	S	12/27/16	16:10	1	none		X	X	X	X							
17	BDS-[redacted]SG003	S	12/27/16	16:20	1	none		X	X	X	X							
18	BDS-[redacted]SG004	S	12/27/16	16:27	1	none		X	X	X	X							
19	BDS-[redacted]SG005	S	12/27/16	16:32	1	none		X	X	X	X							
20	BDS-[redacted]SG006	S	12/27/16	17:26	1	none		X	X	X	X							
21	BDS-[redacted]SC007	S	12/27/16	15:32	1	none		X	X	X	X							
22	BDS-[redacted]BD01	F	12/28/16	11:15	3	none		X	X			X						
23	BDS-[redacted]BD02	F	12/28/16	16:00	2	none		X	X			X						
24	BDS-[redacted]FB	F	12/28/16	12:00	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nathan Swan	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 1701082

Project Manager: JE/MH Initials: JWS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?		YES	NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are Custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5. Are the COC and bottle labels complete and legible?		YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		YES	NO
12. Are all samples within holding times for the requested analyses?		YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A	YES	NO
16. Were the samples shipped on ice?		YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: JE 1/10/17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701082

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Due to the nature of gamma spectroscopy data, a summary report is not provided.

Please refer to the individual sample results in Section 4.

Section 3

QC RESULTS SUMMARY ❸

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	0.04 +/- 0.25	0.48		NA	U
14391-76-5	Ag-110m	-0.049 +/- 0.064	0.140		NA	U
14682-66-7	Al-26	-0.12 +/- 0.10	0.25		NA	U
14596-10-2	Am-241	-0.09 +/- 0.41	0.80		NA	U
13966-02-4	Be-7	0.33 +/- 0.54	0.91		NA	U
14913-49-6	Bi-212	0.9 +/- 1.1	1.7		NA	U
14733-03-0	Bi-214	-0.07 +/- 0.18	0.34		NA	U,J
13982-30-4	Ce-139	0.006 +/- 0.036	0.066		NA	U
14762-78-8	Ce-144	0.12 +/- 0.28	0.49		NA	U
14093-03-9	Co-56	0.089 +/- 0.091	0.127		NA	U
13981-50-5	Co-57	0.005 +/- 0.033	0.061		NA	U
13981-38-9	Co-58	-0.023 +/- 0.059	0.127		NA	U
10198-40-0	Co-60	0.026 +/- 0.064	0.120		NA	U
14392-02-0	Cr-51	0.08 +/- 0.31	0.58		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13967-70-9	Cs-134	0.012 +/- 0.075	0.136		NA	U
10045-97-3	Cs-137	0.038 +/- 0.063	0.108	0.5	NA	U
14683-23-9	Eu-152	-0.08 +/- 0.48	0.96		NA	U
15585-10-1	Eu-154	-0.41 +/- 0.52	1.11		NA	U
14391-16-3	Eu-155	0.06 +/- 0.13	0.23		NA	U
14596-12-4	Fe-59	-0.01 +/- 0.15	0.30		NA	U
10043-66-0	I-131	0.031 +/- 0.060	0.103		NA	U
13966-00-2	K-40	0.3 +/- 1.1	2.0		NA	U
13966-31-9	Mn-54	0.015 +/- 0.073	0.135		NA	U
13966-32-0	Na-22	0.004 +/- 0.055	0.116		NA	U
14681-63-1	Nb-94	0.006 +/- 0.074	0.139		NA	U
13967-76-5	Nb-95	0.039 +/- 0.064	0.109		NA	U
15100-28-4	Pa-234m	24 +/- 14	15		NA	NQ
15092-94-1	Pb-212	-0.06 +/- 0.11	0.21		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB

Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15067-28-4	Pb-214	-0.06 +/- 0.15	0.28		NA	U,J
13967-48-1	Ru-106	-0.25 +/- 0.69	1.39		NA	U
14683-10-4	Sb-124	0.025 +/- 0.070	0.124		NA	U
14234-35-6	Sb-125	-0.02 +/- 0.16	0.31		NA	U
13967-63-0	Sc-46	-0.016 +/- 0.073	0.147		NA	U
15623-47-9	Th-227	0.11 +/- 0.32	0.56		NA	U
15065-10-8	Th-234	0.3 +/- 1.0	1.8		NA	U
14913-50-9	Tl-208	0 +/- 0.082	0.154		NA	U
15117-96-1	U-235	0.06 +/- 0.27	0.49		NA	U
13982-39-3	Zn-65	-0.02 +/- 0.15	0.31		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.07 +/- 0.18	0.36	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2ALCS

Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170163d01

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	463 +/- 54	3	468.6	98.8	85 - 115	P,M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2LCS

Library: ANALYTICAL.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170131d08

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14596-10-2	Am-241	421 +/- 49	2	462.7	91.0	85 - 115	P
10198-40-0	Co-60	192 +/- 23	1	200.9	95.4	85 - 115	P
10045-97-3	Cs-137	170 +/- 20	1	176.7	96.4	85 - 115	P,M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.

Data Package ID: *GSS1701082-1*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS[redacted]SG001
Lab ID: 1701082-15
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 165 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170127d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.21 +/- 0.48	0.70		NA	G,TI
14391-76-5	Ag-110m	0 +/- 0.10	0.20		NA	U,G
14682-66-7	Al-26	0.013 +/- 0.096	0.202		NA	U,G
14596-10-2	Am-241	0.02 +/- 0.17	0.30		NA	U,G
13966-02-4	Be-7	1.5 +/- 1.3	1.9		NA	U,G
14913-49-6	Bi-212	0 +/- 1.7	3.2		NA	U,G
14733-03-0	Bi-214	1.41 +/- 0.42	0.43		NA	G,J
13982-30-4	Ce-139	-0.011 +/- 0.068	0.127		NA	U,G
14762-78-8	Ce-144	-0.23 +/- 0.43	0.83		NA	U,G
14093-03-9	Co-56	0.17 +/- 0.28	0.48		NA	U,G
13981-50-5	Co-57	-0.006 +/- 0.052	0.096		NA	U,G
13981-38-9	Co-58	0.05 +/- 0.12	0.22		NA	U,G
10198-40-0	Co-60	0.08 +/- 0.11	0.19		NA	U,G
14392-02-0	Cr-51	-0.7 +/- 1.7	3.3		NA	U,G
13967-70-9	Cs-134	-0.03 +/- 0.11	0.22		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG001
Lab ID: 1701082-15
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 165 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170127d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.17 +/- 0.13	0.20	0.5	NA	U,G
14683-23-9	Eu-152	-0.39 +/- 0.60	1.35		NA	U,G
15585-10-1	Eu-154	-0.27 +/- 0.64	1.33		NA	U,G
14391-16-3	Eu-155	0.10 +/- 0.24	0.41		NA	U,G
14596-12-4	Fe-59	0.05 +/- 0.37	0.70		NA	U,G
10043-66-0	I-131	-1.3 +/- 2.2	4.5		NA	U,G
13966-00-2	K-40	15.2 +/- 3.7	2.5		NA	G
13966-31-9	Mn-54	0.09 +/- 0.11	0.18		NA	U,G
13966-32-0	Na-22	0.04 +/- 0.14	0.26		NA	U,G
14681-63-1	Nb-94	0.11 +/- 0.11	0.17		NA	U,G
13967-76-5	Nb-95	-0.14 +/- 0.17	0.35		NA	U,G
15100-28-4	Pa-234m	10 +/- 21	37		NA	U,G
15092-94-1	Pb-212	1.02 +/- 0.29	0.33		NA	G
15067-28-4	Pb-214	0.90 +/- 0.26	0.35		NA	G,J
13967-48-1	Ru-106	-0.2 +/- 1.0	2.0		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG001
Lab ID: 1701082-15
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 165 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170127d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	0 +/- 0.17	0.31		NA	U,G
14234-35-6	Sb-125	0.20 +/- 0.27	0.44		NA	U,G
13967-63-0	Sc-46	-0.13 +/- 0.13	0.29		NA	U,G
15623-47-9	Th-227	0.15 +/- 0.48	0.83		NA	U,G
15065-10-8	Th-234	0.6 +/- 1.1	1.9		NA	U,G
14913-50-9	Tl-208	0.52 +/- 0.18	0.19		NA	G
15117-96-1	U-235	0.38 +/- 0.46	0.76		NA	U,G
13982-39-3	Zn-65	-0.09 +/- 0.29	0.58		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG001
Lab ID: 1701082-15
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 165 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170127d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.43 +/- 0.33	0.48	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG002
Lab ID: 1701082-16
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 104 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170172d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	0.79 +/- 0.88	1.40		NA	U,G
14391-76-5	Ag-110m	-0.33 +/- 0.23	0.49		NA	U,G
14682-66-7	Al-26	-0.05 +/- 0.10	0.31		NA	U,G
14596-10-2	Am-241	-1.1 +/- 1.9	3.5		NA	U,G
13966-02-4	Be-7	2.2 +/- 2.5	4.0		NA	U,G
14913-49-6	Bi-212	1.0 +/- 2.8	5.0		NA	U,G
14733-03-0	Bi-214	1.53 +/- 0.66	0.86		NA	G,J
13982-30-4	Ce-139	0.05 +/- 0.15	0.26		NA	U,G
14762-78-8	Ce-144	0.79 +/- 0.94	1.52		NA	U,G
14093-03-9	Co-56	0.50 +/- 0.51	0.79		NA	U,G
13981-50-5	Co-57	-0.07 +/- 0.13	0.25		NA	U,G
13981-38-9	Co-58	-0.26 +/- 0.28	0.61		NA	U,G
10198-40-0	Co-60	0.01 +/- 0.23	0.45		NA	U,G
14392-02-0	Cr-51	1.8 +/- 3.5	5.9		NA	U,G
13967-70-9	Cs-134	-0.10 +/- 0.27	0.51		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG002
Lab ID: 1701082-16
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 104 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170172d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.17 +/- 0.23	0.38	0.5	NA	U,G
14683-23-9	Eu-152	0.44 +/- 0.93	1.67		NA	U,G
15585-10-1	Eu-154	0.3 +/- 1.4	2.5		NA	U,G
14391-16-3	Eu-155	-0.26 +/- 0.56	1.04		NA	U,G
14596-12-4	Fe-59	-0.13 +/- 0.66	1.35		NA	U,G
10043-66-0	I-131	0 +/- 5.9	10.7		NA	U,G
13966-00-2	K-40	20.4 +/- 5.9	5.2		NA	G
13966-31-9	Mn-54	0.14 +/- 0.18	0.30		NA	U,G
13966-32-0	Na-22	-0.03 +/- 0.27	0.52		NA	U,G
14681-63-1	Nb-94	0.10 +/- 0.20	0.35		NA	U,G
13967-76-5	Nb-95	0.01 +/- 0.31	0.57		NA	U,G
15100-28-4	Pa-234m	26 +/- 38	63		NA	U,G
15092-94-1	Pb-212	1.42 +/- 0.45	0.54		NA	G
15067-28-4	Pb-214	1.79 +/- 0.49	0.64		NA	G,J
13967-48-1	Ru-106	-2.0 +/- 2.0	4.1		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG002
Lab ID: 1701082-16
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 104 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170172d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	0 +/- 0.25	0.47		NA	U,G
14234-35-6	Sb-125	-0.34 +/- 0.47	0.95		NA	U,G
13967-63-0	Sc-46	-0.16 +/- 0.25	0.54		NA	U,G
15623-47-9	Th-227	-0.6 +/- 1.3	2.5		NA	U,G
15065-10-8	Th-234	0.1 +/- 3.2	5.7		NA	U,G
14913-50-9	Tl-208	0.33 +/- 0.28	0.43		NA	U,G
15117-96-1	U-235	0.05 +/- 0.86	1.54		NA	U,G
13982-39-3	Zn-65	-0.62 +/- 0.61	1.29		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG002
Lab ID: 1701082-16
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 104 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170172d03A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	2.43 +/- 0.59	0.88	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG003
Lab ID: 1701082-17
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 161 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170136d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	0.95 +/- 0.46	0.79		NA	G,TI
14391-76-5	Ag-110m	-0.14 +/- 0.10	0.24		NA	U,G
14682-66-7	Al-26	0.025 +/- 0.089	0.179		NA	U,G
14596-10-2	Am-241	0.39 +/- 0.84	1.43		NA	U,G
13966-02-4	Be-7	1.0 +/- 1.3	2.1		NA	U,G
14913-49-6	Bi-212	2.3 +/- 2.0	3.0		NA	U,G
14733-03-0	Bi-214	1.09 +/- 0.40	0.49		NA	G,J
13982-30-4	Ce-139	-0.044 +/- 0.081	0.155		NA	U,G
14762-78-8	Ce-144	-0.28 +/- 0.57	1.06		NA	U,G
14093-03-9	Co-56	0.08 +/- 0.36	0.66		NA	U,G
13981-50-5	Co-57	0.034 +/- 0.065	0.111		NA	U,G
13981-38-9	Co-58	-0.10 +/- 0.17	0.34		NA	U,G
10198-40-0	Co-60	0.065 +/- 0.097	0.163		NA	U,G
14392-02-0	Cr-51	-0.3 +/- 1.6	3.1		NA	U,G
13967-70-9	Cs-134	0.05 +/- 0.15	0.25		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG003
Lab ID: 1701082-17
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 161 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170136d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.04 +/- 0.11	0.19	0.5	NA	U,G
14683-23-9	Eu-152	0.21 +/- 0.66	1.20		NA	U,G
15585-10-1	Eu-154	0.21 +/- 0.68	1.22		NA	U,G
14391-16-3	Eu-155	0.16 +/- 0.26	0.43		NA	U,G
14596-12-4	Fe-59	0.20 +/- 0.39	0.67		NA	U,G
10043-66-0	I-131	-0.4 +/- 2.5	4.6		NA	U,G
13966-00-2	K-40	11.8 +/- 3.3	2.8		NA	G
13966-31-9	Mn-54	0.07 +/- 0.15	0.26		NA	U,G
13966-32-0	Na-22	-0.13 +/- 0.15	0.32		NA	U,G
14681-63-1	Nb-94	-0.02 +/- 0.10	0.20		NA	U,G
13967-76-5	Nb-95	-0.08 +/- 0.16	0.32		NA	U,G
15100-28-4	Pa-234m	13 +/- 19	32		NA	U,G
15092-94-1	Pb-212	1.25 +/- 0.32	0.32		NA	G
15067-28-4	Pb-214	1.25 +/- 0.33	0.37		NA	G,J
13967-48-1	Ru-106	0.2 +/- 1.0	1.8		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG003
Lab ID: 1701082-17
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 161 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170136d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	0.09 +/- 0.14	0.23		NA	U,G
14234-35-6	Sb-125	-0.09 +/- 0.27	0.52		NA	U,G
13967-63-0	Sc-46	-0.01 +/- 0.12	0.25		NA	U,G
15623-47-9	Th-227	-0.24 +/- 0.97	1.74		NA	U,G
15065-10-8	Th-234	1.1 +/- 2.2	3.7		NA	U,G
14913-50-9	Tl-208	0.27 +/- 0.16	0.22		NA	G
15117-96-1	U-235	0.25 +/- 0.49	0.82		NA	U,G
13982-39-3	Zn-65	-0.40 +/- 0.39	0.80		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG003
Lab ID: 1701082-17
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 161 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170136d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.57 +/- 0.36	0.47	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG004
Lab ID: 1701082-18
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 198 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170129d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	0.77 +/- 0.38	0.73		NA	TI
14391-76-5	Ag-110m	-0.017 +/- 0.096	0.185		NA	U
14682-66-7	Al-26	0.044 +/- 0.092	0.167		NA	U
14596-10-2	Am-241	0.08 +/- 0.13	0.22		NA	U
13966-02-4	Be-7	0.37 +/- 0.80	1.41		NA	U
14913-49-6	Bi-212	0.7 +/- 1.4	2.4		NA	U
14733-03-0	Bi-214	0.78 +/- 0.31	0.38		NA	J
13982-30-4	Ce-139	-0.093 +/- 0.060	0.126		NA	U
14762-78-8	Ce-144	0.44 +/- 0.40	0.63		NA	U
14093-03-9	Co-56	0.16 +/- 0.29	0.49		NA	U
13981-50-5	Co-57	-0.008 +/- 0.053	0.096		NA	U
13981-38-9	Co-58	-0.09 +/- 0.11	0.24		NA	U
10198-40-0	Co-60	-0.09 +/- 0.12	0.27		NA	U
14392-02-0	Cr-51	0.3 +/- 1.3	2.4		NA	U
13967-70-9	Cs-134	0.021 +/- 0.085	0.153		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG004
Lab ID: 1701082-18
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 198 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170129d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	-0.02 +/- 0.10	0.19	0.5	NA	U
14683-23-9	Eu-152	-0.51 +/- 0.55	1.25		NA	U
15585-10-1	Eu-154	0.17 +/- 0.47	0.85		NA	U
14391-16-3	Eu-155	0.22 +/- 0.19	0.28		NA	U
14596-12-4	Fe-59	-0.08 +/- 0.36	0.72		NA	U
10043-66-0	I-131	-0.7 +/- 1.9	3.6		NA	U
13966-00-2	K-40	13.7 +/- 3.3	2.1		NA	
13966-31-9	Mn-54	-0.04 +/- 0.10	0.20		NA	U
13966-32-0	Na-22	0.033 +/- 0.098	0.181		NA	U
14681-63-1	Nb-94	-0.031 +/- 0.084	0.167		NA	U
13967-76-5	Nb-95	-0.02 +/- 0.13	0.25		NA	U
15100-28-4	Pa-234m	3 +/- 14	27		NA	U
15092-94-1	Pb-212	0.99 +/- 0.25	0.26		NA	
15067-28-4	Pb-214	1.05 +/- 0.26	0.30		NA	J
13967-48-1	Ru-106	0.22 +/- 0.80	1.44		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG004
Lab ID: 1701082-18
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 198 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170129d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	-0.02 +/- 0.13	0.25		NA	U
14234-35-6	Sb-125	0 +/- 0.19	0.35		NA	U
13967-63-0	Sc-46	-0.06 +/- 0.11	0.23		NA	U
15623-47-9	Th-227	0 +/- 0.42	0.77		NA	U
15065-10-8	Th-234	0.8 +/- 1.2	1.9		NA	U
14913-50-9	Tl-208	0.40 +/- 0.15	0.17		NA	
15117-96-1	U-235	-0.13 +/- 0.37	0.69		NA	U
13982-39-3	Zn-65	-0.23 +/- 0.24	0.54		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG004
Lab ID: 1701082-18
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 198 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170129d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.33 +/- 0.30	0.41	1	NA	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG005
Lab ID: 1701082-19
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 152 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170154d05

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.21 +/- 0.57	0.69		NA	G,TI
14391-76-5	Ag-110m	0.10 +/- 0.10	0.16		NA	U,G
14682-66-7	Al-26	-0.009 +/- 0.078	0.181		NA	U,G
14596-10-2	Am-241	0.3 +/- 2.2	3.9		NA	U,G
13966-02-4	Be-7	0.1 +/- 1.1	2.1		NA	U,G
14913-49-6	Bi-212	1.6 +/- 1.7	2.7		NA	U,G
14733-03-0	Bi-214	0.92 +/- 0.34	0.40		NA	G,J
13982-30-4	Ce-139	0.047 +/- 0.076	0.128		NA	U,G
14762-78-8	Ce-144	0.21 +/- 0.48	0.83		NA	U,G
14093-03-9	Co-56	0.05 +/- 0.24	0.45		NA	U,G
13981-50-5	Co-57	-0.078 +/- 0.068	0.138		NA	U,G
13981-38-9	Co-58	0.01 +/- 0.13	0.25		NA	U,G
10198-40-0	Co-60	0.06 +/- 0.12	0.22		NA	U,G
14392-02-0	Cr-51	1.0 +/- 1.5	2.6		NA	U,G
13967-70-9	Cs-134	-0.030 +/- 0.099	0.190		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG005
Lab ID: 1701082-19
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 152 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170154d05

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	-0.01 +/- 0.11	0.20	0.5	NA	U,G
14683-23-9	Eu-152	0.31 +/- 0.54	0.93		NA	U,G
15585-10-1	Eu-154	0.30 +/- 0.63	1.11		NA	U,G
14391-16-3	Eu-155	-0.03 +/- 0.32	0.58		NA	U,G
14596-12-4	Fe-59	0.22 +/- 0.34	0.58		NA	U,G
10043-66-0	I-131	0 +/- 2.8	5.2		NA	U,G
13966-00-2	K-40	8.1 +/- 2.7	2.6		NA	G
13966-31-9	Mn-54	-0.03 +/- 0.10	0.21		NA	U,G
13966-32-0	Na-22	-0.01 +/- 0.12	0.24		NA	U,G
14681-63-1	Nb-94	-0.006 +/- 0.093	0.176		NA	U,G
13967-76-5	Nb-95	0.02 +/- 0.15	0.28		NA	U,G
15100-28-4	Pa-234m	-8 +/- 19	39		NA	U,G
15092-94-1	Pb-212	0.87 +/- 0.26	0.29		NA	G
15067-28-4	Pb-214	0.82 +/- 0.26	0.40		NA	G,J
13967-48-1	Ru-106	-0.32 +/- 0.84	1.68		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG005
Lab ID: 1701082-19
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 152 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170154d05

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	-0.11 +/- 0.15	0.31		NA	U,G
14234-35-6	Sb-125	0.20 +/- 0.24	0.40		NA	U,G
13967-63-0	Sc-46	0.01 +/- 0.15	0.27		NA	U,G
15623-47-9	Th-227	-0.09 +/- 0.49	0.91		NA	U,G
15065-10-8	Th-234	2.1 +/- 1.7	2.7		NA	U,G
14913-50-9	Tl-208	0.24 +/- 0.12	0.15		NA	G
15117-96-1	U-235	-0.08 +/- 0.48	0.88		NA	U,G
13982-39-3	Zn-65	-0.18 +/- 0.36	0.71		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG005
Lab ID: 1701082-19
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 152 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170154d05A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.23 +/- 0.31	0.56	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG006
Lab ID: 1701082-20
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 150 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170137d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.26 +/- 0.50	0.85		NA	G,TI
14391-76-5	Ag-110m	-0.13 +/- 0.13	0.28		NA	U,G
14682-66-7	Al-26	-0.01 +/- 0.12	0.25		NA	U,G
14596-10-2	Am-241	-0.25 +/- 0.86	1.61		NA	U,G
13966-02-4	Be-7	0.4 +/- 1.3	2.4		NA	U,G
14913-49-6	Bi-212	0.5 +/- 2.1	3.8		NA	U,G
14733-03-0	Bi-214	0.96 +/- 0.39	0.47		NA	G,J
13982-30-4	Ce-139	0.073 +/- 0.083	0.133		NA	U,G
14762-78-8	Ce-144	-0.11 +/- 0.57	1.04		NA	U,G
14093-03-9	Co-56	0.14 +/- 0.36	0.63		NA	U,G
13981-50-5	Co-57	-0.030 +/- 0.064	0.123		NA	U,G
13981-38-9	Co-58	0.10 +/- 0.19	0.32		NA	U,G
10198-40-0	Co-60	-0.18 +/- 0.17	0.38		NA	U,G
14392-02-0	Cr-51	-0.6 +/- 1.9	3.7		NA	U,G
13967-70-9	Cs-134	0.07 +/- 0.12	0.20		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG006
Lab ID: 1701082-20
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 150 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170137d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.07 +/- 0.13	0.23	0.5	NA	U,G
14683-23-9	Eu-152	0.58 +/- 0.73	1.17		NA	U,G
15585-10-1	Eu-154	0.44 +/- 0.80	1.37		NA	U,G
14391-16-3	Eu-155	0.23 +/- 0.29	0.48		NA	U,G
14596-12-4	Fe-59	-0.16 +/- 0.40	0.84		NA	U,G
10043-66-0	I-131	1.4 +/- 2.6	4.5		NA	U,G
13966-00-2	K-40	9.6 +/- 3.2	3.5		NA	G
13966-31-9	Mn-54	0.06 +/- 0.13	0.23		NA	U,G
13966-32-0	Na-22	-0.07 +/- 0.14	0.30		NA	U,G
14681-63-1	Nb-94	-0.02 +/- 0.14	0.26		NA	U,G
13967-76-5	Nb-95	-0.16 +/- 0.20	0.41		NA	U,G
15100-28-4	Pa-234m	1 +/- 26	49		NA	U,G
15092-94-1	Pb-212	1.12 +/- 0.34	0.40		NA	G
15067-28-4	Pb-214	1.08 +/- 0.31	0.36		NA	G,J
13967-48-1	Ru-106	0.5 +/- 1.1	2.0		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG006
Lab ID: 1701082-20
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 150 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170137d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	0.07 +/- 0.18	0.31		NA	U,G
14234-35-6	Sb-125	-0.09 +/- 0.26	0.52		NA	U,G
13967-63-0	Sc-46	-0.05 +/- 0.17	0.33		NA	U,G
15623-47-9	Th-227	0.59 +/- 0.98	1.55		NA	U,G
15065-10-8	Th-234	-0.5 +/- 1.7	3.1		NA	U,G
14913-50-9	Tl-208	0.48 +/- 0.19	0.23		NA	G
15117-96-1	U-235	0.39 +/- 0.49	0.81		NA	U,G
13982-39-3	Zn-65	-0.25 +/- 0.40	0.80		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG006
Lab ID: 1701082-20
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 150 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170137d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.37 +/- 0.33	0.46	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SC007
Lab ID: 1701082-21
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 164 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170130d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.08 +/- 0.44	0.68		NA	G,TI
14391-76-5	Ag-110m	0.041 +/- 0.092	0.163		NA	U,G
14682-66-7	Al-26	-0.03 +/- 0.12	0.26		NA	U,G
14596-10-2	Am-241	0.14 +/- 0.16	0.27		NA	U,G
13966-02-4	Be-7	-0.1 +/- 1.3	2.4		NA	U,G
14913-49-6	Bi-212	0.3 +/- 1.8	3.3		NA	U,G
14733-03-0	Bi-214	1.12 +/- 0.41	0.49		NA	G,J
13982-30-4	Ce-139	-0.030 +/- 0.066	0.128		NA	U,G
14762-78-8	Ce-144	0.10 +/- 0.48	0.84		NA	U,G
14093-03-9	Co-56	-0.02 +/- 0.33	0.63		NA	U,G
13981-50-5	Co-57	-0.010 +/- 0.052	0.097		NA	U,G
13981-38-9	Co-58	0.09 +/- 0.15	0.26		NA	U,G
10198-40-0	Co-60	-0.02 +/- 0.12	0.25		NA	U,G
14392-02-0	Cr-51	-1.2 +/- 1.6	3.2		NA	U,G
13967-70-9	Cs-134	-0.017 +/- 0.093	0.181		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SC007
Lab ID: 1701082-21
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 164 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170130d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.03 +/- 0.10	0.18	0.5	NA	U,G
14683-23-9	Eu-152	0.31 +/- 0.49	0.84		NA	U,G
15585-10-1	Eu-154	0 +/- 0.51	1.03		NA	U,G
14391-16-3	Eu-155	0.14 +/- 0.22	0.37		NA	U,G
14596-12-4	Fe-59	0.18 +/- 0.38	0.67		NA	U,G
10043-66-0	I-131	-1.7 +/- 2.5	4.9		NA	U,G
13966-00-2	K-40	15.1 +/- 3.7	2.3		NA	G
13966-31-9	Mn-54	0.06 +/- 0.12	0.21		NA	U,G
13966-32-0	Na-22	-0.05 +/- 0.12	0.25		NA	U,G
14681-63-1	Nb-94	0.05 +/- 0.10	0.17		NA	U,G
13967-76-5	Nb-95	0.02 +/- 0.18	0.33		NA	U,G
15100-28-4	Pa-234m	0 +/- 15	31		NA	U,G
15092-94-1	Pb-212	1.07 +/- 0.29	0.30		NA	G
15067-28-4	Pb-214	1.10 +/- 0.28	0.38		NA	G,J
13967-48-1	Ru-106	1.1 +/- 1.0	1.6		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SC007
Lab ID: 1701082-21
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 164 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170130d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	-0.13 +/- 0.14	0.30		NA	U,G
14234-35-6	Sb-125	0.06 +/- 0.29	0.51		NA	U,G
13967-63-0	Sc-46	0 +/- 0.14	0.28		NA	U,G
15623-47-9	Th-227	0.28 +/- 0.50	0.85		NA	U,G
15065-10-8	Th-234	1.4 +/- 1.4	2.2		NA	U,G
14913-50-9	Tl-208	0.32 +/- 0.17	0.23		NA	G
15117-96-1	U-235	-0.05 +/- 0.42	0.78		NA	U,G
13982-39-3	Zn-65	-0.19 +/- 0.33	0.67		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701082-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SC007
Lab ID: 1701082-21
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 164 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170130d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.53 +/- 0.35	0.52	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701082-1*

Isotopic Thorium

Case Narrative

TetraTech

Bridgeton Dust Site – 103X9025160104.003

Work Order Number: 1701082

1. This report consists of the analytical results and supporting documentation for three filter samples, seven soil samples, and 14 wipe samples received by ALS on 01/10/2017.

2. The soil samples were prepared according to the current revisions of SOP 773, SOP 777, and SOP 736. The filter and wipe samples were prepared according to the current revisions of SOP 776 and SOP 777.

3. The samples were analyzed for the presence of isotopic thorium according to the current revision of SOP 714. The analyses were completed on 02/05/2017.

4. The isotopic analysis results for the soil samples are reported on a 'Dry Weight' basis in units of pCi/gram. The analysis results for the filter samples are reported on an 'As Received' basis in units of pCi/gram. The analysis results for the wipe samples are reported on an 'As Received' basis in pC/sample.

5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate in batch AS170201-2.

6. ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.

7. The requested MDC for Th-228 and/or Th-230 was not met for samples 1701082-1 through -14, -22, -23, and -24. The samples were counted for a maximum count time of 1000 minute. These samples are identified with an "M" or "M3" flag on the final reports. The reported activity identified with an "M3" qualifier exceeds the achieved MDC.

8. In typical Thorium analyses the ^{229}Th tracer, added to monitor chemical losses during the separation process, tails into the ^{230}Th region-of-interest. ALS has determined that, on average, 2.37% of the counts in the ^{230}Th region of interest are attributable to this ^{229}Th "tailing" effect. Consequently, 2.37% of the ^{229}Th counts are systematically subtracted from the ^{230}Th net counts and are attributed to the ^{230}Th background counts for that analysis. In this analysis, samples 1701082-1, -2, -3, and -14 exhibited satisfactory peak resolution for the ^{229}Th peak, resulting in a less pronounced "tailing" effect that is routinely observed in an isotopic thorium determination. Because of the observed peak resolution in this analysis, the systematic subtraction of 2.37% of the tracer counts from the ^{230}Th region of interest resulted in a negative net sample activity. The magnitude of this negative activity is greater than the associated 2-sigma total propagated uncertainty for these sample analyses, suggesting a low bias in the reported net results. The analyst's review of the spectral data shows no activity in the ^{230}Th region of interest. The data quality is not believed to be significantly affected, and the results are submitted without further qualification. Refer to the report detailing the ^{229}Th contribution to the ^{230}Th region-of-interest in Section 9 of this report.

9. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen — 2/9/17
Radiochemistry Primary Data Reviewer — Date

Radiochemistry Final Data Reviewer — 2/22/17
Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701082
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701082-1		WIPE	27-Dec-16	15:35
BDS-[redacted]W002	1701082-2		WIPE	27-Dec-16	15:37
BDS-[redacted]W006	1701082-3		WIPE	27-Dec-16	16:12
BDS-[redacted]W014	1701082-4		WIPE	27-Dec-16	16:56
BDS-[redacted]W019	1701082-5		WIPE	27-Dec-16	17:28
BDS-[redacted]W021	1701082-6		WIPE	27-Dec-16	17:38
BDS-[redacted]W034	1701082-7		WIPE	28-Dec-16	10:25
BDS-[redacted]W036	1701082-8		WIPE	28-Dec-16	11:12
BDS-[redacted]W048	1701082-9		WIPE	28-Dec-16	11:17
BDS-[redacted]W049	1701082-10		WIPE	28-Dec-16	10:01
BDS-[redacted]W052	1701082-11		WIPE	28-Dec-16	12:38
BDS-[redacted]W058	1701082-12		WIPE	28-Dec-16	12:34
BDS-[redacted]W061	1701082-13		WIPE	28-Dec-16	12:22
BDS-[redacted]W074	1701082-14		WIPE	28-Dec-16	15:05
BDS-[redacted]SG001	1701082-15		SOIL	27-Dec-16	16:05
BDS-[redacted]SG002	1701082-16		SOIL	27-Dec-16	16:10
BDS-[redacted]SG003	1701082-17		SOIL	27-Dec-16	16:20
BDS-[redacted]SG004	1701082-18		SOIL	27-Dec-16	16:27
BDS-[redacted]SG005	1701082-19		SOIL	27-Dec-16	16:32
BDS-[redacted]SG006	1701082-20		SOIL	27-Dec-16	17:26
BDS-[redacted]SC007	1701082-21		SOIL	27-Dec-16	15:32
BDS-[redacted]BD01	1701082-22		FILTER	28-Dec-16	11:15
BDS-[redacted]BD02	1701082-23		FILTER	28-Dec-16	16:00
BDS-[redacted]FB	1701082-24		FILTER	28-Dec-16	12:00

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER # 1701082

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS[redacted]W001	F	12/27/16	15:35	1	none		X	X			X						
2	BDS[redacted]W002	F	12/27/16	15:37	1	none		X	X			X						
3	BDS[redacted]W006	F	12/27/16	16:12	1	none		X	X			X						
4	BDS[redacted]W014	F	12/27/16	16:56	1	none		X	X			X						
5	BDS[redacted]W019	F	12/27/16	17:28	1	none		X	X			X						
6	BDS[redacted]W021	F	12/27/16	17:38	1	none		X	X			X						
7	BDS[redacted]W034	F	12/28/16	10:25	1	none		X	X			X						
8	BDS[redacted]W036	F	12/28/16	11:12	1	none		X	X			X						
9	BDS[redacted]W048	F	12/28/16	11:17	1	none		X	X			X						
10	BDS[redacted]W049	F	12/28/16	10:01	1	none		X	X			X						
11	BDS[redacted]W052	F	12/28/16	12:38	1	none		X	X			X						
12	BDS[redacted]W058	F	12/28/16	12:34	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua North Shea	1/10/17	10:10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701082	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
13	BDS[redacted]W061	F	12/28/16	12:22	1	none		X	X			X						
14	BDS[redacted]W074	F	12/28/16	15:05	1	none		X	X			X						
15	BDS[redacted]SG001	S	12/27/16	16:05	1	none		X	X	X	X							
16	BDS[redacted]SG002	S	12/27/16	16:10	1	none		X	X	X	X							
17	BDS[redacted]SG003	S	12/27/16	16:20	1	none		X	X	X	X							
18	BDS[redacted]SG004	S	12/27/16	16:27	1	none		X	X	X	X							
19	BDS[redacted]SG005	S	12/27/16	16:32	1	none		X	X	X	X							
20	BDS[redacted]SG006	S	12/27/16	17:26	1	none		X	X	X	X							
21	BDS[redacted]SC007	S	12/27/16	15:32	1	none		X	X	X	X							
22	BDS[redacted]BD01	F	12/28/16	11:15	3	none		X	X			X						
23	BDS[redacted]BD02	F	12/28/16	16:00	2	none		X	X			X						
24	BDS[redacted]FB	F	12/28/16	12:00	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nathan Swan	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 1701082

Project Manager: JE/MH Initials: JWS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?		YES	NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are Custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5. Are the COC and bottle labels complete and legible?		YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		YES	NO
12. Are all samples within holding times for the requested analyses?		YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A	YES	NO
16. Were the samples shipped on ice?		YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: JE 1/10/17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701082

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017
1:24:56 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-1	BDS[redacted]W001	Sample	Th-228	0.07 +/- 0.13	0.22	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-1	BDS[redacted]W001	Sample	Th-230	-0.19 +/- 0.15	0.29	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-1	BDS[redacted]W001	Sample	Th-232	0.031 +/- 0.044	0.071	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-2	BDS[redacted]W002	Sample	Th-228	0.04 +/- 0.11	0.20	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-2	BDS[redacted]W002	Sample	Th-230	-0.20 +/- 0.15	0.29	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-2	BDS[redacted]W002	Sample	Th-232	0.015 +/- 0.037	0.055	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-3	BDS[redacted]W006	Sample	Th-228	0.03 +/- 0.13	0.23	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-3	BDS[redacted]W006	Sample	Th-230	-0.17 +/- 0.16	0.31	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-3	BDS[redacted]W006	Sample	Th-232	0.024 +/- 0.043	0.075	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017 1:24:57 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-4	BDS[redacted]W014	Sample	Th-228	-0.07 +/- 0.12	0.23	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-4	BDS[redacted]W014	Sample	Th-230	-0.05 +/- 0.15	0.28	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-4	BDS[redacted]W014	Sample	Th-232	0.007 +/- 0.037	0.055	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-5	BDS[redacted]W019	Sample	Th-228	0.02 +/- 0.13	0.24	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-5	BDS[redacted]W019	Sample	Th-230	-0.10 +/- 0.16	0.29	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-5	BDS[redacted]W019	Sample	Th-232	0 +/- 0.045	0.096	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-6	BDS[redacted]W021	Sample	Th-228	0 +/- 0.12	0.23	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-6	BDS[redacted]W021	Sample	Th-230	-0.10 +/- 0.15	0.29	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-6	BDS[redacted]W021	Sample	Th-232	0.008 +/- 0.038	0.072	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
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Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
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Abbreviations:

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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017 1:24:57 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-7	BDS[redacted]W034	Sample	Th-228	-0.05 +/- 0.11	0.21	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-7	BDS[redacted]W034	Sample	Th-230	0.03 +/- 0.16	0.28	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-7	BDS[redacted]W034	Sample	Th-232	0.007 +/- 0.038	0.078	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-8	BDS[redacted]W036	Sample	Th-228	0.05 +/- 0.12	0.21	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-8	BDS[redacted]W036	Sample	Th-230	-0.14 +/- 0.15	0.29	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-8	BDS[redacted]W036	Sample	Th-232	0.015 +/- 0.037	0.070	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-9	BDS[redacted]W048	Sample	Th-228	-0.007 +/- 0.099	0.183	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-9	BDS[redacted]W048	Sample	Th-230	0.04 +/- 0.16	0.27	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-9	BDS[redacted]W048	Sample	Th-232	0 +/- 0.034	0.074	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

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Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017 1:24:57 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-10	BDS[redacted]W049	Sample	Th-228	0 +/- 0.095	0.176	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-10	BDS[redacted]W049	Sample	Th-230	-0.01 +/- 0.16	0.28	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-10	BDS[redacted]W049	Sample	Th-232	0.020 +/- 0.033	0.049	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-11	BDS[redacted]W052	Sample	Th-228	-0.02 +/- 0.11	0.20	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-11	BDS[redacted]W052	Sample	Th-230	-0.03 +/- 0.15	0.28	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-11	BDS[redacted]W052	Sample	Th-232	0.044 +/- 0.037	0.020	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	LT
1701082-12	BDS[redacted]W058	Sample	Th-228	-0.04 +/- 0.11	0.22	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-12	BDS[redacted]W058	Sample	Th-230	-0.08 +/- 0.15	0.27	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-12	BDS[redacted]W058	Sample	Th-232	0.014 +/- 0.035	0.052	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
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Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
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Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017 1:24:57 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-13	BDS[redacted]W061	Sample	Th-228	0.019 +/- 0.085	0.153	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-13	BDS[redacted]W061	Sample	Th-230	0.10 +/- 0.15	0.26	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-13	BDS[redacted]W061	Sample	Th-232	0.025 +/- 0.031	0.017	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	LT
1701082-14	BDS[redacted]W074	Sample	Th-228	0.055 +/- 0.088	0.148	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-14	BDS[redacted]W074	Sample	Th-230	-0.22 +/- 0.15	0.29	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U,M
1701082-14	BDS[redacted]W074	Sample	Th-232	0.023 +/- 0.050	0.091	NA	pCi/sample	WIPE	AS170201-2	2/5/2017	U
1701082-15	BDS[redacted]SG001	Sample	Th-228	1.12 +/- 0.21	0.07	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-15	BDS[redacted]SG001	Sample	Th-230	1.14 +/- 0.21	0.09	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-15	BDS[redacted]SG001	Sample	Th-232	1.08 +/- 0.20	0.03	NA	pCi/g	SOIL	AS170131-5	2/3/2017	

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

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Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017
1:24:57 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-16	BDS[redacted] SG002	Sample	Th-228	1.06 +/- 0.18	0.03	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-16	BDS[redacted] SG002	Sample	Th-230	1.01 +/- 0.18	0.07	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-16	BDS[redacted] SG002	Sample	Th-232	0.97 +/- 0.17	0.02	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-17	BDS[redacted] SG003	Sample	Th-228	1.04 +/- 0.19	0.04	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-17	BDS[redacted] SG003	Sample	Th-230	1.01 +/- 0.19	0.08	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-17	BDS[redacted] SG003	Sample	Th-232	0.93 +/- 0.17	0.02	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-18	BDS[redacted] SG004	Sample	Th-228	1.02 +/- 0.18	0.03	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-18	BDS[redacted] SG004	Sample	Th-230	0.98 +/- 0.18	0.07	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701082-18	BDS[redacted] SG004	Sample	Th-232	0.97 +/- 0.17	0.02	NA	pCi/g	SOIL	AS170131-5	2/3/2017	

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

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M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017
1:24:57 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-19	BDS[redacted] SG005	Sample	Th-228	0.96 +/- 0.18	0.06	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-19	BDS[redacted] SG005	Sample	Th-230	0.89 +/- 0.17	0.08	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-19	BDS[redacted] SG005	Sample	Th-232	0.86 +/- 0.16	0.02	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-20	BDS[redacted] SG006	Sample	Th-228	1.03 +/- 0.18	0.05	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-20	BDS[redacted] SG006	Sample	Th-230	1.17 +/- 0.20	0.07	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-20	BDS[redacted] SG006	Sample	Th-232	1.06 +/- 0.18	0.01	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-21	BDS[redacted] SC007	Sample	Th-228	1.03 +/- 0.20	0.08	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-21	BDS[redacted] SC007	Sample	Th-230	1.10 +/- 0.20	0.08	NA	pCi/g	SOIL	AS170131-5	2/5/2017	
1701082-21	BDS[redacted] SC007	Sample	Th-232	1.06 +/- 0.19	0.03	NA	pCi/g	SOIL	AS170131-5	2/5/2017	

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Wednesday, February 08, 2017
1:24:57 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-22	BDS[redacted]BD01	Sample	Th-228	0.281 +/- 0.087	0.072	NA	pCi/g	FILTER	AS170201-2	2/5/2017	
1701082-22	BDS[redacted]BD01	Sample	Th-230	0.27 +/- 0.10	0.13	NA	pCi/g	FILTER	AS170201-2	2/5/2017	M3
1701082-22	BDS[redacted]BD01	Sample	Th-232	0.182 +/- 0.059	0.026	NA	pCi/g	FILTER	AS170201-2	2/5/2017	
1701082-23	BDS[redacted]BD02	Sample	Th-228	0.26 +/- 0.10	0.11	NA	pCi/g	FILTER	AS170201-2	2/5/2017	M3
1701082-23	BDS[redacted]BD02	Sample	Th-230	0.21 +/- 0.13	0.19	NA	pCi/g	FILTER	AS170201-2	2/5/2017	M3
1701082-23	BDS[redacted]BD02	Sample	Th-232	0.214 +/- 0.078	0.050	NA	pCi/g	FILTER	AS170201-2	2/5/2017	
1701082-24	BDS[redacted]FB	Sample	Th-228	0 +/- 0.094	0.177	NA	pCi/g	FILTER	AS170201-2	2/5/2017	U,M
1701082-24	BDS[redacted]FB	Sample	Th-230	0.04 +/- 0.17	0.30	NA	pCi/g	FILTER	AS170201-2	2/5/2017	U,M
1701082-24	BDS[redacted]FB	Sample	Th-232	0.016 +/- 0.039	0.074	NA	pCi/g	FILTER	AS170201-2	2/5/2017	U

Comments:

Data Package ID: *TH1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

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BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-5MB

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.002 +/- 0.012	0.022	0.1	NA	U
14269-63-7	Th-230	-0.018 +/- 0.018	0.035	0.1	NA	U
7440-29-1	Th-232	0.0028 +/- 0.0055	0.0099	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.87	pCi/g	84.7	30 - 110 %	

Comments:

Qualifiers/Flags:
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Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-2MB

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-1
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.0020 +/- 0.0088	0.0179	0.1	NA	U
14269-63-7	Th-230	-0.004 +/- 0.020	0.036	0.1	NA	U
7440-29-1	Th-232	0.0010 +/- 0.0052	0.0106	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.52	pCi/g	68.7	30 - 110 %	

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
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MDC - Sample specific Minimum Detectable Concentration
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B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-2MB

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.004 +/- 0.018	0.036	0.1	NA	U
14269-63-7	Th-230	-0.008 +/- 0.040	0.072	0.1	NA	U
7440-29-1	Th-232	0.002 +/- 0.010	0.021	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.417	3.03	pCi/sample	68.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *TH1701082-2*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-5LCS

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	2.37 +/- 0.38	0.04	2.464	96.3	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.57	pCi/g	71.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-2LCS

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-1
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	2.59 +/- 0.41	0.04	2.464	105	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.62	pCi/g	73.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-2LCS

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	5.18 +/- 0.82	0.07	4.929	105	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.417	3.24	pCi/sample	73.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701082-2*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-2LCSD

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-1
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	2.45 +/- 0.39	0.04	2.464	99.5	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.54	pCi/g	69.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-2LCSD

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	4.90 +/- 0.78	0.07	4.929	99.5	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.417	3.09	pCi/sample	69.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701082-2*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-2LCSD

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-1
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14269-63-7	Th-230	2.59 +/- 0.41	0.04	P	2.45 +/- 0.39	0.04	P	0.246	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-2LCSD

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14269-63-7	Th-230	5.18 +/- 0.82	0.07	P	4.90 +/- 0.78	0.07	P	0.246	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *TH1701082-2*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W001
Lab ID: 1701082-1

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.07 +/- 0.13	0.22	0.1	NA	U,M
14269-63-7	Th-230	-0.19 +/- 0.15	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.031 +/- 0.044	0.071	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.7	pCi/sample	77.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W002
Lab ID: 1701082-2

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.04 +/- 0.11	0.20	0.1	NA	U,M
14269-63-7	Th-230	-0.20 +/- 0.15	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.015 +/- 0.037	0.055	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.4	pCi/sample	81.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W006
Lab ID: 1701082-3

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.03 +/- 0.13	0.23	0.1	NA	U,M
14269-63-7	Th-230	-0.17 +/- 0.16	0.31	0.1	NA	U,M
7440-29-1	Th-232	0.024 +/- 0.043	0.075	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	12.8	pCi/sample	72.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W014
Lab ID: 1701082-4

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.07 +/- 0.12	0.23	0.1	NA	U,M
14269-63-7	Th-230	-0.05 +/- 0.15	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.007 +/- 0.037	0.055	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.4	pCi/sample	81.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W019
Lab ID: 1701082-5

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.02 +/- 0.13	0.24	0.1	NA	U,M
14269-63-7	Th-230	-0.10 +/- 0.16	0.29	0.1	NA	U,M
7440-29-1	Th-232	0 +/- 0.045	0.096	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.3	pCi/sample	75.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W021
Lab ID: 1701082-6

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0 +/- 0.12	0.23	0.1	NA	U,M
14269-63-7	Th-230	-0.10 +/- 0.15	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.008 +/- 0.038	0.072	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.6	pCi/sample	76.9	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W034
Lab ID: 1701082-7

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.05 +/- 0.11	0.21	0.1	NA	U,M
14269-63-7	Th-230	0.03 +/- 0.16	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.007 +/- 0.038	0.078	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.7	pCi/sample	83.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W036
Lab ID: 1701082-8

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.05 +/- 0.12	0.21	0.1	NA	U,M
14269-63-7	Th-230	-0.14 +/- 0.15	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.015 +/- 0.037	0.070	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.0	pCi/sample	79.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W048
Lab ID: 1701082-9

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.007 +/- 0.099	0.183	0.1	NA	U,M
14269-63-7	Th-230	0.04 +/- 0.16	0.27	0.1	NA	U,M
7440-29-1	Th-232	0 +/- 0.034	0.074	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.6	pCi/sample	82.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W049
Lab ID: 1701082-10

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0 +/- 0.095	0.176	0.1	NA	U,M
14269-63-7	Th-230	-0.01 +/- 0.16	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.020 +/- 0.033	0.049	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.6	pCi/sample	76.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W052
Lab ID: 1701082-11

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.02 +/- 0.11	0.20	0.1	NA	U,M
14269-63-7	Th-230	-0.03 +/- 0.15	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.044 +/- 0.037	0.020	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	12.8	pCi/sample	72.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W058
Lab ID: 1701082-12

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.04 +/- 0.11	0.22	0.1	NA	U,M
14269-63-7	Th-230	-0.08 +/- 0.15	0.27	0.1	NA	U,M
7440-29-1	Th-232	0.014 +/- 0.035	0.052	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.8	pCi/sample	77.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W061
Lab ID: 1701082-13

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.019 +/- 0.085	0.153	0.1	NA	U,M
14269-63-7	Th-230	0.10 +/- 0.15	0.26	0.1	NA	U,M
7440-29-1	Th-232	0.025 +/- 0.031	0.017	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	16.0	pCi/sample	90.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W074
Lab ID: 1701082-14

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-2
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.055 +/- 0.088	0.148	0.1	NA	U,M
14269-63-7	Th-230	-0.22 +/- 0.15	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.023 +/- 0.050	0.091	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	12.5	pCi/sample	70.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG001
Lab ID: 1701082-15

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.12 +/- 0.21	0.07	0.1	NA	
14269-63-7	Th-230	1.14 +/- 0.21	0.09	0.1	NA	
7440-29-1	Th-232	1.08 +/- 0.20	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.403	2.31	pCi/g	52.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG002
Lab ID: 1701082-16

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.06 +/- 0.18	0.03	0.1	NA	
14269-63-7	Th-230	1.01 +/- 0.18	0.07	0.1	NA	
7440-29-1	Th-232	0.97 +/- 0.17	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.366	3.42	pCi/g	78.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG003
Lab ID: 1701082-17

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.04 +/- 0.19	0.04	0.1	NA	
14269-63-7	Th-230	1.01 +/- 0.19	0.08	0.1	NA	
7440-29-1	Th-232	0.93 +/- 0.17	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.410	2.79	pCi/g	63.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG004
Lab ID: 1701082-18

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.02 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.02 +/- 0.18	0.03	0.1	NA	
14269-63-7	Th-230	0.98 +/- 0.18	0.07	0.1	NA	
7440-29-1	Th-232	0.97 +/- 0.17	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.347	2.88	pCi/g	66.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG005
Lab ID: 1701082-19

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.02 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.96 +/- 0.18	0.06	0.1	NA	
14269-63-7	Th-230	0.89 +/- 0.17	0.08	0.1	NA	
7440-29-1	Th-232	0.86 +/- 0.16	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.344	3.16	pCi/g	72.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG006
Lab ID: 1701082-20

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.03 +/- 0.18	0.05	0.1	NA	
14269-63-7	Th-230	1.17 +/- 0.20	0.07	0.1	NA	
7440-29-1	Th-232	1.06 +/- 0.18	0.01	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.375	4.10	pCi/g	93.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SC007
Lab ID: 1701082-21

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.03 +/- 0.20	0.08	0.1	NA	
14269-63-7	Th-230	1.10 +/- 0.20	0.08	0.1	NA	
7440-29-1	Th-232	1.06 +/- 0.19	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.305	2.55	pCi/g	59.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]BD01
Lab ID: 1701082-22

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-1
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.593 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.281 +/- 0.087	0.072	0.1	NA	
14269-63-7	Th-230	0.27 +/- 0.10	0.13	0.1	NA	M3
7440-29-1	Th-232	0.182 +/- 0.059	0.026	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	7.449	4.94	pCi/g	66.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]BD02
Lab ID: 1701082-23

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-1
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.383 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.26 +/- 0.10	0.11	0.1	NA	M3
14269-63-7	Th-230	0.21 +/- 0.13	0.19	0.1	NA	M3
7440-29-1	Th-232	0.214 +/- 0.078	0.050	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	11.53	7.6	pCi/g	66.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]FB
Lab ID: 1701082-24

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-2
QCBatchID: AS170201-2-1
Run ID: AS170201-2TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0 +/- 0.094	0.177	0.1	NA	U,M
14269-63-7	Th-230	0.04 +/- 0.17	0.30	0.1	NA	U,M
7440-29-1	Th-232	0.016 +/- 0.039	0.074	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	11.8	pCi/g	66.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701082-1*

Isotopic Uranium

Case Narrative

TetraTech

Bridgeton Dust Site – 103X9025160104.003

Work Order Number: 1701082

1. This report consists of the analytical results and supporting documentation for three filter samples, seven soil samples, and fourteen wipe samples received by ALS on 01/10/2017.

2. The soil samples were prepared according to the current revisions of SOP 736, SOP 773, and SOP 778. The filter and wipe samples were prepared according to the current revisions of SOP 776 and SOP 778.

3. The samples were analyzed for the presence of isotopic uranium according to the current revision of SOP 714. The analyses were completed on 02/09/2017.

4. The isotopic analysis results for the soil samples are reported on a 'Dry Weight' basis in units of pCi/gram. The analysis results for the filter samples are reported on an 'As Received' basis in units of pCi/gram. The analysis results for the wipe samples are reported on an 'As Received' basis in pC/sample.

5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate for batch AS170201-4.

6. This analytical method quantifies U-235 alpha activity in a specific region of interest corresponding to emission energies between those of U-234 and U-238. A potential limitation of this method is that measurable amounts of U-234 in the sample may cause a small amount of characteristic activity in the U-235 region of interest due to poorly resolved alpha activity at the boundary between the two regions. To minimize the potential for a high bias in the U-235 analytical results, the U-235 region of interest has been narrowed and limited to a lower energy region. An 85.1% abundance correction has been made to the final U-235 results.

7. ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.

8. Uranium-238 and Uranium-234 activity is reported in method blanks AS170131-1MB and AS170201-4MB, respectively, above the minimum detectable concentration value, as indicated with a "B3" qualifier on the final reports. The measured blank activity is below the requested MDC. Results are acceptable according to the current revision of SOP 715, and are submitted without further qualification.

9. Sample 1701082-24 was originally prepared in batch AS170201-4 on 02/01/2017 and analyzed on 02/06/2017. This sample had poor spectral quality and was sent for a clean-up procedure per QASS #385166. The sample was re-analyzed on 02/09/2017. All QC criteria were met for the clean-up procedure. The results of this sample are reported from the clean-up batch analyzed on 02/09/2017 without further qualification.

10. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Jean Anderson — 2/10/17

Jean Anderson
Radiochemistry Primary Data Reviewer

Date

2/22/17

Radiochemistry Final Data Reviewer

Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701082
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701082-1		WIPE	27-Dec-16	15:35
BDS-[redacted]W002	1701082-2		WIPE	27-Dec-16	15:37
BDS-[redacted]W006	1701082-3		WIPE	27-Dec-16	16:12
BDS-[redacted]W014	1701082-4		WIPE	27-Dec-16	16:56
BDS-[redacted]W019	1701082-5		WIPE	27-Dec-16	17:28
BDS-[redacted]W021	1701082-6		WIPE	27-Dec-16	17:38
BDS-[redacted]W034	1701082-7		WIPE	28-Dec-16	10:25
BDS-[redacted]W036	1701082-8		WIPE	28-Dec-16	11:12
BDS-[redacted]W048	1701082-9		WIPE	28-Dec-16	11:17
BDS-[redacted]W049	1701082-10		WIPE	28-Dec-16	10:01
BDS-[redacted]W052	1701082-11		WIPE	28-Dec-16	12:38
BDS-[redacted]W058	1701082-12		WIPE	28-Dec-16	12:34
BDS-[redacted]W061	1701082-13		WIPE	28-Dec-16	12:22
BDS-[redacted]W074	1701082-14		WIPE	28-Dec-16	15:05
BDS-[redacted]SG001	1701082-15		SOIL	27-Dec-16	16:05
BDS-[redacted]SG002	1701082-16		SOIL	27-Dec-16	16:10
BDS-[redacted]SG003	1701082-17		SOIL	27-Dec-16	16:20
BDS-[redacted]SG004	1701082-18		SOIL	27-Dec-16	16:27
BDS-[redacted]SG005	1701082-19		SOIL	27-Dec-16	16:32
BDS-[redacted]SG006	1701082-20		SOIL	27-Dec-16	17:26
BDS-[redacted]SC007	1701082-21		SOIL	27-Dec-16	15:32
BDS-[redacted]BD01	1701082-22		FILTER	28-Dec-16	11:15
BDS-[redacted]BD02	1701082-23		FILTER	28-Dec-16	16:00
BDS-[redacted]FB	1701082-24		FILTER	28-Dec-16	12:00

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701082	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS	
A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS[redacted]W001	F	12/27/16	15:35	1	none		X	X			X						
2	BDS[redacted]W002	F	12/27/16	15:37	1	none		X	X			X						
3	BDS[redacted]W006	F	12/27/16	16:12	1	none		X	X			X						
4	BDS[redacted]W014	F	12/27/16	16:56	1	none		X	X			X						
5	BDS[redacted]W019	F	12/27/16	17:28	1	none		X	X			X						
6	BDS[redacted]W021	F	12/27/16	17:38	1	none		X	X			X						
7	BDS[redacted]W034	F	12/28/16	10:25	1	none		X	X			X						
8	BDS[redacted]W036	F	12/28/16	11:12	1	none		X	X			X						
9	BDS[redacted]W048	F	12/28/16	11:17	1	none		X	X			X						
10	BDS[redacted]W049	F	12/28/16	10:01	1	none		X	X			X						
11	BDS[redacted]W052	F	12/28/16	12:38	1	none		X	X			X						
12	BDS[redacted]W058	F	12/28/16	12:34	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua North Shea	1/10/17	10:10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701082	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
13	BDS[redacted]W061	F	12/28/16	12:22	1	none		X	X			X						
14	BDS[redacted]W074	F	12/28/16	15:05	1	none		X	X			X						
15	BDS[redacted]SG001	S	12/27/16	16:05	1	none		X	X	X	X							
16	BDS[redacted]SG002	S	12/27/16	16:10	1	none		X	X	X	X							
17	BDS[redacted]SG003	S	12/27/16	16:20	1	none		X	X	X	X							
18	BDS[redacted]SG004	S	12/27/16	16:27	1	none		X	X	X	X							
19	BDS[redacted]SG005	S	12/27/16	16:32	1	none		X	X	X	X							
20	BDS[redacted]SG006	S	12/27/16	17:26	1	none		X	X	X	X							
21	BDS[redacted]SC007	S	12/27/16	15:32	1	none		X	X	X	X							
22	BDS[redacted]BD01	F	12/28/16	11:15	3	none		X	X			X						
23	BDS[redacted]BD02	F	12/28/16	16:00	2	none		X	X			X						
24	BDS[redacted]FB	F	12/28/16	12:00	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nathan Swan	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 1701082

Project Manager: JE/MH Initials: JWS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?		YES	NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are Custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5. Are the COC and bottle labels complete and legible?		YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		YES	NO
12. Are all samples within holding times for the requested analyses?		YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A	YES	NO
16. Were the samples shipped on ice?		YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: JE 1/10/17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701082

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
11:22:16 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-1	BDS[redacted]W001	Sample	U-234	0.073 +/- 0.059	0.078	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-1	BDS[redacted]W001	Sample	U-235	0 +/- 0.042	0.063	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-1	BDS[redacted]W001	Sample	U-238	0.036 +/- 0.039	0.054	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-2	BDS[redacted]W002	Sample	U-234	0.056 +/- 0.054	0.081	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-2	BDS[redacted]W002	Sample	U-235	0 +/- 0.036	0.053	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-2	BDS[redacted]W002	Sample	U-238	0.012 +/- 0.035	0.066	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-3	BDS[redacted]W006	Sample	U-234	0.168 +/- 0.075	0.050	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	
1701082-3	BDS[redacted]W006	Sample	U-235	0.032 +/- 0.039	0.058	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-3	BDS[redacted]W006	Sample	U-238	0.020 +/- 0.033	0.018	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017 11:22:17 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-4	BDS[redacted]W014	Sample	U-234	0.095 +/- 0.062	0.073	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-4	BDS[redacted]W014	Sample	U-235	0.008 +/- 0.039	0.074	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-4	BDS[redacted]W014	Sample	U-238	0.007 +/- 0.041	0.082	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-5	BDS[redacted]W019	Sample	U-234	0.051 +/- 0.049	0.069	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-5	BDS[redacted]W019	Sample	U-235	0.015 +/- 0.037	0.020	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-5	BDS[redacted]W019	Sample	U-238	0.019 +/- 0.032	0.047	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-6	BDS[redacted]W021	Sample	U-234	0.062 +/- 0.047	0.058	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-6	BDS[redacted]W021	Sample	U-235	0.022 +/- 0.048	0.088	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-6	BDS[redacted]W021	Sample	U-238	0.025 +/- 0.043	0.074	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
11:22:17 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-7	BDS[redacted]W034	Sample	U-234	0.064 +/- 0.059	0.085	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-7	BDS[redacted]W034	Sample	U-235	0 +/- 0.041	0.089	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-7	BDS[redacted]W034	Sample	U-238	0.049 +/- 0.038	0.019	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-8	BDS[redacted]W036	Sample	U-234	0.129 +/- 0.066	0.060	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	
1701082-8	BDS[redacted]W036	Sample	U-235	0.023 +/- 0.037	0.020	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-8	BDS[redacted]W036	Sample	U-238	0.006 +/- 0.039	0.077	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-9	BDS[redacted]W048	Sample	U-234	0 +/- 0.036	0.076	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-9	BDS[redacted]W048	Sample	U-235	0.059 +/- 0.043	0.020	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-9	BDS[redacted]W048	Sample	U-238	0.006 +/- 0.038	0.076	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
11:22:17 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-10	BDS[redacted]W049	Sample	U-234	0.052 +/- 0.046	0.060	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-10	BDS[redacted]W049	Sample	U-235	0.023 +/- 0.037	0.021	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-10	BDS[redacted]W049	Sample	U-238	0.019 +/- 0.034	0.060	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-11	BDS[redacted]W052	Sample	U-234	0.114 +/- 0.060	0.056	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	
1701082-11	BDS[redacted]W052	Sample	U-235	0.021 +/- 0.035	0.052	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-11	BDS[redacted]W052	Sample	U-238	0.036 +/- 0.042	0.064	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-12	BDS[redacted]W058	Sample	U-234	0.075 +/- 0.056	0.061	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-12	BDS[redacted]W058	Sample	U-235	0.010 +/- 0.048	0.026	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-12	BDS[redacted]W058	Sample	U-238	0 +/- 0.047	0.100	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
11:22:17 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-13	BDS[redacted]W061	Sample	U-234	0.109 +/- 0.060	0.050	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	
1701082-13	BDS[redacted]W061	Sample	U-235	0.008 +/- 0.039	0.022	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-13	BDS[redacted]W061	Sample	U-238	0.034 +/- 0.036	0.050	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-14	BDS[redacted]W074	Sample	U-234	0.069 +/- 0.053	0.067	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-14	BDS[redacted]W074	Sample	U-235	0.029 +/- 0.036	0.020	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	LT
1701082-14	BDS[redacted]W074	Sample	U-238	0.037 +/- 0.040	0.058	NA	pCi/sample	WIPE	AS170201-4	2/6/2017	U
1701082-15	BDS[redacted]SG001	Sample	U-234	1.22 +/- 0.25	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-15	BDS[redacted]SG001	Sample	U-235	0.042 +/- 0.032	0.030	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701082-15	BDS[redacted]SG001	Sample	U-238	1.19 +/- 0.24	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
11:22:18 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-16	BDS[redacted] SG002	Sample	U-234	0.77 +/- 0.17	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-16	BDS[redacted] SG002	Sample	U-235	0.044 +/- 0.034	0.041	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701082-16	BDS[redacted] SG002	Sample	U-238	0.89 +/- 0.19	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-17	BDS[redacted] SG003	Sample	U-234	0.70 +/- 0.17	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-17	BDS[redacted] SG003	Sample	U-235	0.018 +/- 0.022	0.016	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701082-17	BDS[redacted] SG003	Sample	U-238	0.85 +/- 0.19	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-18	BDS[redacted] SG004	Sample	U-234	0.63 +/- 0.15	0.02	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-18	BDS[redacted] SG004	Sample	U-235	0.039 +/- 0.031	0.036	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701082-18	BDS[redacted] SG004	Sample	U-238	0.82 +/- 0.18	0.02	NA	pCi/g	SOIL	AS170131-1	2/6/2017	

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
11:22:18 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-19	BDS[redacted] SG005	Sample	U-234	0.78 +/- 0.17	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-19	BDS[redacted] SG005	Sample	U-235	0.048 +/- 0.033	0.014	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701082-19	BDS[redacted] SG005	Sample	U-238	0.65 +/- 0.15	0.02	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-20	BDS[redacted] SG006	Sample	U-234	0.89 +/- 0.20	0.01	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-20	BDS[redacted] SG006	Sample	U-235	0.040 +/- 0.033	0.033	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701082-20	BDS[redacted] SG006	Sample	U-238	0.80 +/- 0.18	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-21	BDS[redacted] SC007	Sample	U-234	0.75 +/- 0.16	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701082-21	BDS[redacted] SC007	Sample	U-235	0.011 +/- 0.018	0.032	NA	pCi/g	SOIL	AS170131-1	2/6/2017	U
1701082-21	BDS[redacted] SC007	Sample	U-238	0.75 +/- 0.16	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
11:22:18 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-22	BDS[redacted] BD01	Sample	U-234	0.267 +/- 0.068	0.025	NA	pCi/g	FILTER	AS170201-4	2/6/2017	
1701082-22	BDS[redacted] BD01	Sample	U-235	0.042 +/- 0.026	0.024	NA	pCi/g	FILTER	AS170201-4	2/6/2017	LT
1701082-22	BDS[redacted] BD01	Sample	U-238	0.248 +/- 0.066	0.029	NA	pCi/g	FILTER	AS170201-4	2/6/2017	
1701082-23	BDS[redacted] BD02	Sample	U-234	0.366 +/- 0.099	0.040	NA	pCi/g	FILTER	AS170201-4	2/6/2017	
1701082-23	BDS[redacted] BD02	Sample	U-235	0.005 +/- 0.025	0.038	NA	pCi/g	FILTER	AS170201-4	2/6/2017	U
1701082-23	BDS[redacted] BD02	Sample	U-238	0.231 +/- 0.078	0.057	NA	pCi/g	FILTER	AS170201-4	2/6/2017	
1701082-24	BDS[redacted] FB	Sample	U-234	0.155 +/- 0.076	0.072	NA	pCi/g	FILTER	AS170201-4	2/9/2017	
1701082-24	BDS[redacted] FB	Sample	U-235	0.040 +/- 0.042	0.058	NA	pCi/g	FILTER	AS170201-4	2/9/2017	U
1701082-24	BDS[redacted] FB	Sample	U-238	0.054 +/- 0.043	0.050	NA	pCi/g	FILTER	AS170201-4	2/9/2017	LT

Comments:

Data Package ID: *UR1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-1MB

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.010 +/- 0.010	0.012	0.1	NA	U
15117-96-1	U-235	-0.0010 +/- 0.0097	0.0146	0.1	NA	U
7440-61-1	U-238	0.0068 +/- 0.0084	0.0061	0.1	NA	B3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	1.94	pCi/g	82.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-4MB

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.025 +/- 0.015	0.015	0.1	NA	B3
15117-96-1	U-235	-0.0058 +/- 0.0095	0.0232	0.1	NA	U
7440-61-1	U-238	0.0016 +/- 0.0080	0.0152	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.692	4.51	pCi/sample	96.1	30 - 110 %	

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-4MB

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-1
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.0123 +/- 0.0074	0.0076	0.1	NA	B3
15117-96-1	U-235	-0.0029 +/- 0.0047	0.0116	0.1	NA	U
7440-61-1	U-238	0.0008 +/- 0.0040	0.0076	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	2.25	pCi/g	96.1	30 - 110 %	

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *UR1701082-2*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-1LCS

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	2.31 +/- 0.39	0.02	2.208	105	82 - 122	P
7440-61-1	U-238	2.33 +/- 0.40	0.02	2.292	102	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	2.16	pCi/g	92.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-4LCS

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	4.69 +/- 0.74	0	4.416	106	82 - 122	P
7440-61-1	U-238	4.83 +/- 0.76	0.02	4.585	105	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.692	4.14	pCi/sample	88.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-4LCS

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-1
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	2.35 +/- 0.37	0	2.208	106	82 - 122	P
7440-61-1	U-238	2.41 +/- 0.38	0.01	2.292	105	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	2.07	pCi/g	88.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701082-2*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-4LCSD

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	4.68 +/- 0.75	0.03	4.416	106	82 - 122	P
7440-61-1	U-238	4.91 +/- 0.79	0.02	4.585	107	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.692	3.12	pCi/sample	66.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-4LCSD

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-1
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	2.34 +/- 0.38	0.01	2.208	106	82 - 122	P
7440-61-1	U-238	2.45 +/- 0.39	0.01	2.292	107	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	1.56	pCi/g	66.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701082-2*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-4LCSD

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13966-29-5	U-234	4.69 +/- 0.74	0	P	4.68 +/- 0.75	0.03	P	0.0114	2.13
7440-61-1	U-238	4.83 +/- 0.76	0.02	P	4.91 +/- 0.79	0.02	P	0.0732	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-4LCSD

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 07-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-1
Run ID: AS170201-4UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13966-29-5	U-234	2.35 +/- 0.37	0	P	2.34 +/- 0.38	0.01	P	0.0114	2.13
7440-61-1	U-238	2.41 +/- 0.38	0.01	P	2.45 +/- 0.39	0.01	P	0.0732	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *UR1701082-2*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W001
Lab ID: 1701082-1

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.073 +/- 0.059	0.078	0.1	NA	U
15117-96-1	U-235	0 +/- 0.042	0.063	0.1	NA	U
7440-61-1	U-238	0.036 +/- 0.039	0.054	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	14.7	pCi/sample	78.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W002
Lab ID: 1701082-2

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.056 +/- 0.054	0.081	0.1	NA	U
15117-96-1	U-235	0 +/- 0.036	0.053	0.1	NA	U
7440-61-1	U-238	0.012 +/- 0.035	0.066	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.5	pCi/sample	82.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W006
Lab ID: 1701082-3

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.168 +/- 0.075	0.050	0.1	NA	
15117-96-1	U-235	0.032 +/- 0.039	0.058	0.1	NA	U
7440-61-1	U-238	0.020 +/- 0.033	0.018	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	14.9	pCi/sample	79.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W014
Lab ID: 1701082-4

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.095 +/- 0.062	0.073	0.1	NA	LT
15117-96-1	U-235	0.008 +/- 0.039	0.074	0.1	NA	U
7440-61-1	U-238	0.007 +/- 0.041	0.082	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.2	pCi/sample	81.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W019
Lab ID: 1701082-5

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.051 +/- 0.049	0.069	0.1	NA	U
15117-96-1	U-235	0.015 +/- 0.037	0.020	0.1	NA	U
7440-61-1	U-238	0.019 +/- 0.032	0.047	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.5	pCi/sample	88.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W021
Lab ID: 1701082-6

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.062 +/- 0.047	0.058	0.1	NA	LT
15117-96-1	U-235	0.022 +/- 0.048	0.088	0.1	NA	U
7440-61-1	U-238	0.025 +/- 0.043	0.074	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.2	pCi/sample	86.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W034
Lab ID: 1701082-7

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.064 +/- 0.059	0.085	0.1	NA	U
15117-96-1	U-235	0 +/- 0.041	0.089	0.1	NA	U
7440-61-1	U-238	0.049 +/- 0.038	0.019	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	14.9	pCi/sample	79.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W036
Lab ID: 1701082-8

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.129 +/- 0.066	0.060	0.1	NA	
15117-96-1	U-235	0.023 +/- 0.037	0.020	0.1	NA	LT
7440-61-1	U-238	0.006 +/- 0.039	0.077	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.8	pCi/sample	84.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W048
Lab ID: 1701082-9

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0 +/- 0.036	0.076	0.1	NA	U
15117-96-1	U-235	0.059 +/- 0.043	0.020	0.1	NA	LT
7440-61-1	U-238	0.006 +/- 0.038	0.076	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.9	pCi/sample	84.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W049
Lab ID: 1701082-10

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.052 +/- 0.046	0.060	0.1	NA	U
15117-96-1	U-235	0.023 +/- 0.037	0.021	0.1	NA	LT
7440-61-1	U-238	0.019 +/- 0.034	0.060	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.7	pCi/sample	83.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W052
Lab ID: 1701082-11

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.114 +/- 0.060	0.056	0.1	NA	
15117-96-1	U-235	0.021 +/- 0.035	0.052	0.1	NA	U
7440-61-1	U-238	0.036 +/- 0.042	0.064	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	17.4	pCi/sample	92.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W058
Lab ID: 1701082-12

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.075 +/- 0.056	0.061	0.1	NA	LT
15117-96-1	U-235	0.010 +/- 0.048	0.026	0.1	NA	U
7440-61-1	U-238	0 +/- 0.047	0.100	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	12.5	pCi/sample	66.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W061
Lab ID: 1701082-13

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.109 +/- 0.060	0.050	0.1	NA	
15117-96-1	U-235	0.008 +/- 0.039	0.022	0.1	NA	U
7440-61-1	U-238	0.034 +/- 0.036	0.050	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.7	pCi/sample	83.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W074
Lab ID: 1701082-14

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-2
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.069 +/- 0.053	0.067	0.1	NA	LT
15117-96-1	U-235	0.029 +/- 0.036	0.020	0.1	NA	LT
7440-61-1	U-238	0.037 +/- 0.040	0.058	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.4	pCi/sample	82.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG001
Lab ID: 1701082-15

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.02 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	1.22 +/- 0.25	0.03	0.1	NA	
15117-96-1	U-235	0.042 +/- 0.032	0.030	0.1	NA	LT
7440-61-1	U-238	1.19 +/- 0.24	0.04	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.598	4.08	pCi/g	88.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG002
Lab ID: 1701082-16

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.77 +/- 0.17	0.04	0.1	NA	
15117-96-1	U-235	0.044 +/- 0.034	0.041	0.1	NA	LT
7440-61-1	U-238	0.89 +/- 0.19	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.506	3.77	pCi/g	83.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG003
Lab ID: 1701082-17

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.70 +/- 0.17	0.03	0.1	NA	
15117-96-1	U-235	0.018 +/- 0.022	0.016	0.1	NA	LT
7440-61-1	U-238	0.85 +/- 0.19	0.04	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.638	3.85	pCi/g	83.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG004
Lab ID: 1701082-18

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.05 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.63 +/- 0.15	0.02	0.1	NA	
15117-96-1	U-235	0.039 +/- 0.031	0.036	0.1	NA	LT
7440-61-1	U-238	0.82 +/- 0.18	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.476	3.95	pCi/g	88.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG005
Lab ID: 1701082-19

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.02 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.78 +/- 0.17	0.03	0.1	NA	
15117-96-1	U-235	0.048 +/- 0.033	0.014	0.1	NA	LT
7440-61-1	U-238	0.65 +/- 0.15	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.613	4.14	pCi/g	89.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SG006
Lab ID: 1701082-20

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.89 +/- 0.20	0.01	0.1	NA	
15117-96-1	U-235	0.040 +/- 0.033	0.033	0.1	NA	LT
7440-61-1	U-238	0.80 +/- 0.18	0.04	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.638	3.80	pCi/g	81.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] SC007
Lab ID: 1701082-21

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.75 +/- 0.16	0.04	0.1	NA	
15117-96-1	U-235	0.011 +/- 0.018	0.032	0.1	NA	U
7440-61-1	U-238	0.75 +/- 0.16	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.549	4.46	pCi/g	98.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] BD01
Lab ID: 1701082-22

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-1
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.593 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.267 +/- 0.068	0.025	0.1	NA	
15117-96-1	U-235	0.042 +/- 0.026	0.024	0.1	NA	LT
7440-61-1	U-238	0.248 +/- 0.066	0.029	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	7.913	6.6	pCi/g	83.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] BD02
Lab ID: 1701082-23

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-1
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.383 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.366 +/- 0.099	0.040	0.1	NA	
15117-96-1	U-235	0.005 +/- 0.025	0.038	0.1	NA	U
7440-61-1	U-238	0.231 +/- 0.078	0.057	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	12.25	10.1	pCi/g	82.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] FB
Lab ID: 1701082-24

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 09-Feb-17

Prep Batch: AS170201-4
QCBatchID: AS170201-4-1
Run ID: AS170201-4UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.155 +/- 0.076	0.072	0.1	NA	
15117-96-1	U-235	0.040 +/- 0.042	0.058	0.1	NA	U
7440-61-1	U-238	0.054 +/- 0.043	0.050	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.9	pCi/g	84.9	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701082-1*

Lead-210

Case Narrative

TetraTech

Bridgeton Dust Site - 103X9025160104.003

Work Order Number: 1701082

1. This report consists of the analytical results and supporting documentation for seven soil samples received by ALS on 01/10/2017.

2. These samples were prepared according to the current revisions of SOP 726 and SOP 736.

3. These samples were analyzed for the presence of ^{210}Pb according to the current revision of SOP 704. The analyses were completed on 02/09/2017.

4. The analysis results for these samples are reported on a 'Dry Weight' basis in units of pCi/gram.

5. The ICP-AES measurement of lead concentrations prior to chemical separation for samples 1701082-18 through -21 showed concentrations less than the amount known to have been added to the samples in the form of lead carrier. To avoid and minimize the potential low bias in the final analytical results for these samples, the known concentration of the carrier was used in the chemical yield calculations in lieu of the pre-separation measurement. These samples have a low bias of 15% or less in the pre-separation measurement and are identified with an 'LB' flag. The low bias in the pre-separation ICP measurement for the client's samples may be attributable to matrix interference. The reported TPU values for the affected samples may not reflect the additional uncertainty imparted in the pre-separation ICP measurement due to matrix effects. These qualifications can be found on the Radiochemistry ICP Worksheet, located in Section 5, "Raw Data" of this report.

6. No further anomalous situations were encountered during the preparation and analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Jean Anderson — 2/13/17

Jean Anderson
Radiochemistry Primary Data Reviewer

Date

2/22/17

Radiochemistry Final Data Reviewer

Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701082
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701082-1		WIPE	27-Dec-16	15:35
BDS-[redacted]W002	1701082-2		WIPE	27-Dec-16	15:37
BDS-[redacted]W006	1701082-3		WIPE	27-Dec-16	16:12
BDS-[redacted]W014	1701082-4		WIPE	27-Dec-16	16:56
BDS-[redacted]W019	1701082-5		WIPE	27-Dec-16	17:28
BDS-[redacted]W021	1701082-6		WIPE	27-Dec-16	17:38
BDS-[redacted]W034	1701082-7		WIPE	28-Dec-16	10:25
BDS-[redacted]W036	1701082-8		WIPE	28-Dec-16	11:12
BDS-[redacted]W048	1701082-9		WIPE	28-Dec-16	11:17
BDS-[redacted]W049	1701082-10		WIPE	28-Dec-16	10:01
BDS-[redacted]W052	1701082-11		WIPE	28-Dec-16	12:38
BDS-[redacted]W058	1701082-12		WIPE	28-Dec-16	12:34
BDS-[redacted]W061	1701082-13		WIPE	28-Dec-16	12:22
BDS-[redacted]W074	1701082-14		WIPE	28-Dec-16	15:05
BDS-[redacted]SG001	1701082-15		SOIL	27-Dec-16	16:05
BDS-[redacted]SG002	1701082-16		SOIL	27-Dec-16	16:10
BDS-[redacted]SG003	1701082-17		SOIL	27-Dec-16	16:20
BDS-[redacted]SG004	1701082-18		SOIL	27-Dec-16	16:27
BDS-[redacted]SG005	1701082-19		SOIL	27-Dec-16	16:32
BDS-[redacted]SG006	1701082-20		SOIL	27-Dec-16	17:26
BDS-[redacted]SC007	1701082-21		SOIL	27-Dec-16	15:32
BDS-[redacted]BD01	1701082-22		FILTER	28-Dec-16	11:15
BDS-[redacted]BD02	1701082-23		FILTER	28-Dec-16	16:00
BDS-[redacted]FB	1701082-24		FILTER	28-Dec-16	12:00

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER # 1701082

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS[redacted]W001	F	12/27/16	15:35	1	none		X	X			X						
2	BDS[redacted]W002	F	12/27/16	15:37	1	none		X	X			X						
3	BDS[redacted]W006	F	12/27/16	16:12	1	none		X	X			X						
4	BDS[redacted]W014	F	12/27/16	16:56	1	none		X	X			X						
5	BDS[redacted]W019	F	12/27/16	17:28	1	none		X	X			X						
6	BDS[redacted]W021	F	12/27/16	17:38	1	none		X	X			X						
7	BDS[redacted]W034	F	12/28/16	10:25	1	none		X	X			X						
8	BDS[redacted]W036	F	12/28/16	11:12	1	none		X	X			X						
9	BDS[redacted]W048	F	12/28/16	11:17	1	none		X	X			X						
10	BDS[redacted]W049	F	12/28/16	10:01	1	none		X	X			X						
11	BDS[redacted]W052	F	12/28/16	12:38	1	none		X	X			X						
12	BDS[redacted]W058	F	12/28/16	12:34	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua North Shea	1/10/17	10:10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701082	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
13	BDS-[redacted]W061	F	12/28/16	12:22	1	none		X	X			X						
14	BDS-[redacted]W074	F	12/28/16	15:05	1	none		X	X			X						
15	BDS-[redacted]SG001	S	12/27/16	16:05	1	none		X	X	X	X							
16	BDS-[redacted]SG002	S	12/27/16	16:10	1	none		X	X	X	X							
17	BDS-[redacted]SG003	S	12/27/16	16:20	1	none		X	X	X	X							
18	BDS-[redacted]SG004	S	12/27/16	16:27	1	none		X	X	X	X							
19	BDS-[redacted]SG005	S	12/27/16	16:32	1	none		X	X	X	X							
20	BDS-[redacted]SG006	S	12/27/16	17:26	1	none		X	X	X	X							
21	BDS-[redacted]SC007	S	12/27/16	15:32	1	none		X	X	X	X							
22	BDS-[redacted]BD01	F	12/28/16	11:15	3	none		X	X			X						
23	BDS-[redacted]BD02	F	12/28/16	16:00	2	none		X	X			X						
24	BDS-[redacted]FB	F	12/28/16	12:00	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)
PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other	

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nathan Swan	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 1701082

Project Manager: JE/MH Initials: JWS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?		YES	NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are Custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5. Are the COC and bottle labels complete and legible?		YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		YES	NO
12. Are all samples within holding times for the requested analyses?		YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A	YES	NO
16. Were the samples shipped on ice?		YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: JE 1/10/17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701082

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Lead-210 by Liquid Scintilation Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Friday, February 10, 2017
2:30:28 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701082-15	BDS[redacted]SG001	Sample	Pb-210	6.6 +/- 1.6	0.3	NA	pCi/g	SOIL	PB170131-1	2/7/2017	
1701082-16	BDS[redacted]SG002	Sample	Pb-210	5.2 +/- 1.3	0.2	NA	pCi/g	SOIL	PB170131-1	2/7/2017	
1701082-17	BDS[redacted]SG003	Sample	Pb-210	1.28 +/- 0.36	0.26	NA	pCi/g	SOIL	PB170131-1	2/7/2017	
1701082-18	BDS[redacted]SG004	Sample	Pb-210	1.24 +/- 0.35	0.26	NA	pCi/g	SOIL	PB170131-1	2/7/2017	
1701082-19	BDS[redacted]SG005	Sample	Pb-210	1.16 +/- 0.33	0.26	NA	pCi/g	SOIL	PB170131-1	2/8/2017	
1701082-20	BDS[redacted]SG006	Sample	Pb-210	1.86 +/- 0.50	0.28	NA	pCi/g	SOIL	PB170131-1	2/8/2017	
1701082-21	BDS[redacted]SC007	Sample	Pb-210	1.45 +/- 0.41	0.30	NA	pCi/g	SOIL	PB170131-1	2/8/2017	

Comments:

Data Package ID: *PB1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: PB170131-1MB

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 31-Jan-17
Date Prepared: 31-Jan-17
Date Analyzed: 08-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.701 minutes

Final Aliquot: 1.66 g
Result Units: pCi/g
File Name: Q212101N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	-0.11 +/- 0.17	0.28	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	817.2	665.7	ug	81.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *PB1701082-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: PB170131-1LCS

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 31-Jan-17
Date Prepared: 31-Jan-17
Date Analyzed: 09-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 29.6294 minutes

Final Aliquot: 1.66 g
Result Units: pCi/g
File Name: Q222201N.001

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14255-04-0	Pb-210	21.1 +/- 5.2	0.7	21.60	97.5	70 - 130	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	809.8	690.3	ug	85.2	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *PB1701082-1*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG001
Lab ID: 1701082-15

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 27-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.67 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q090901N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	6.6 +/- 1.6	0.3	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	864.4	756.9	ug	87.6	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701082-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG002
Lab ID: 1701082-16

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 27-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.66 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q101001N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	5.2 +/- 1.3	0.2	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	800.8	743.8	ug	92.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701082-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG003
Lab ID: 1701082-17

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 27-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.7 minutes
Report Basis: Dry Weight

Final Aliquot: 1.67 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q111101N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.28 +/- 0.36	0.26	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	839.5	726.5	ug	86.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701082-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG004
Lab ID: 1701082-18

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 27-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.67 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q131301N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.24 +/- 0.35	0.26	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	782.5	683.3	ug	87.3	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701082-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG005
Lab ID: 1701082-19

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 27-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 08-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.7 minutes
Report Basis: Dry Weight

Final Aliquot: 1.69 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q141401N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.16 +/- 0.33	0.26	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	782.5	675.7	ug	86.4	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701082-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SG006
Lab ID: 1701082-20

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 27-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 08-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.7 minutes
Report Basis: Dry Weight

Final Aliquot: 1.66 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q151501N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.86 +/- 0.50	0.28	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	782.5	641.9	ug	82.0	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701082-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]SC007
Lab ID: 1701082-21

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 27-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 08-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.701 minutes
Report Basis: Dry Weight

Final Aliquot: 1.67 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q161601N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.45 +/- 0.41	0.30	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	782.5	598.7	ug	76.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701082-1*

Radium-226

Case Narrative

TetraTech

Bridgeton Dust Site – 103X9025160104.003

Work Order Number: 1701082

1. This report consists of the analytical results and supporting documentation for 14 wipe samples and three filter samples received by ALS on 01/10/2017.

2. These samples were prepared and analyzed according to the current revision of SOP 783. The analyses were completed on 01/19/2017.

3. The analysis results for wipe samples are reported on an 'As Received' basis in units of pCi/sample. The analysis results for the filter samples are reported on an 'As Received' basis in units of pCi/g.

4. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.

5. No anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen — 2/21/17
Pik Yee Yuen — Date
Radiochemistry Primary Data Reviewer

Radiochemistry Final Data Reviewer — 2/22/17
Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701082
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701082-1		WIPE	27-Dec-16	15:35
BDS-[redacted]W002	1701082-2		WIPE	27-Dec-16	15:37
BDS-[redacted]W006	1701082-3		WIPE	27-Dec-16	16:12
BDS-[redacted]W014	1701082-4		WIPE	27-Dec-16	16:56
BDS-[redacted]W019	1701082-5		WIPE	27-Dec-16	17:28
BDS-[redacted]W021	1701082-6		WIPE	27-Dec-16	17:38
BDS-[redacted]W034	1701082-7		WIPE	28-Dec-16	10:25
BDS-[redacted]W036	1701082-8		WIPE	28-Dec-16	11:12
BDS-[redacted]W048	1701082-9		WIPE	28-Dec-16	11:17
BDS-[redacted]W049	1701082-10		WIPE	28-Dec-16	10:01
BDS-[redacted]W052	1701082-11		WIPE	28-Dec-16	12:38
BDS-[redacted]W058	1701082-12		WIPE	28-Dec-16	12:34
BDS-[redacted]W061	1701082-13		WIPE	28-Dec-16	12:22
BDS-[redacted]W074	1701082-14		WIPE	28-Dec-16	15:05
BDS-[redacted]SG001	1701082-15		SOIL	27-Dec-16	16:05
BDS-[redacted]SG002	1701082-16		SOIL	27-Dec-16	16:10
BDS-[redacted]SG003	1701082-17		SOIL	27-Dec-16	16:20
BDS-[redacted]SG004	1701082-18		SOIL	27-Dec-16	16:27
BDS-[redacted]SG005	1701082-19		SOIL	27-Dec-16	16:32
BDS-[redacted]SG006	1701082-20		SOIL	27-Dec-16	17:26
BDS-[redacted]SC007	1701082-21		SOIL	27-Dec-16	15:32
BDS-[redacted]BD01	1701082-22		FILTER	28-Dec-16	11:15
BDS-[redacted]BD02	1701082-23		FILTER	28-Dec-16	16:00
BDS-[redacted]FB	1701082-24		FILTER	28-Dec-16	12:00

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER # 1701082

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS-[redacted]W001	F	12/27/16	15:35	1	none		X	X			X						
2	BDS-[redacted]W002	F	12/27/16	15:37	1	none		X	X			X						
3	BDS-[redacted]W006	F	12/27/16	16:12	1	none		X	X			X						
4	BDS-[redacted]W014	F	12/27/16	16:56	1	none		X	X			X						
5	BDS-[redacted]W019	F	12/27/16	17:28	1	none		X	X			X						
6	BDS-[redacted]W021	F	12/27/16	17:38	1	none		X	X			X						
7	BDS-[redacted]W034	F	12/28/16	10:25	1	none		X	X			X						
8	BDS-[redacted]W036	F	12/28/16	11:12	1	none		X	X			X						
9	BDS-[redacted]W048	F	12/28/16	11:17	1	none		X	X			X						
10	BDS-[redacted]W049	F	12/28/16	10:01	1	none		X	X			X						
11	BDS-[redacted]W052	F	12/28/16	12:38	1	none		X	X			X						
12	BDS-[redacted]W058	F	12/28/16	12:34	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua North Shea	1/10/17	10:10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701082	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 1	DISPOSAL	BY LAB or RETURN
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv	PARAMETER/METHOD REQUEST FOR ANALYSIS	
		PURCHASE ORDER	1133109	A	Isotopic Thorium
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.	B	Isotopic Uranium
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher	C	Radionuclides by gamma spectrometry scan, including Radium-226
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street	D	Lead-210
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106	E	Radium-226
PHONE	816-412-1755	PHONE	816-412-1755	F	
FAX		FAX		G	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com	H	
				I	
				J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
13	BDS[redacted]W061	F	12/28/16	12:22	1	none		X	X			X						
14	BDS[redacted]W074	F	12/28/16	15:05	1	none		X	X			X						
15	BDS[redacted]SG001	S	12/27/16	16:05	1	none		X	X	X	X							
16	BDS[redacted]SG002	S	12/27/16	16:10	1	none		X	X	X	X							
17	BDS[redacted]SG003	S	12/27/16	16:20	1	none		X	X	X	X							
18	BDS[redacted]SG004	S	12/27/16	16:27	1	none		X	X	X	X							
19	BDS[redacted]SG005	S	12/27/16	16:32	1	none		X	X	X	X							
20	BDS[redacted]SG006	S	12/27/16	17:26	1	none		X	X	X	X							
21	BDS[redacted]SC007	S	12/27/16	15:32	1	none		X	X	X	X							
22	BDS[redacted]BD01	F	12/28/16	11:15	3	none		X	X			X						
23	BDS[redacted]BD02	F	12/28/16	16:00	2	none		X	X			X						
24	BDS[redacted]FB	F	12/28/16	12:00	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)
PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other	

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nathan Swan	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 1701082

Project Manager: JE/MH Initials: JWS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?		YES	NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are Custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5. Are the COC and bottle labels complete and legible?		YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		YES	NO
12. Are all samples within holding times for the requested analyses?		YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A	YES	NO
16. Were the samples shipped on ice?		YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: JE 1/10/17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701082

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Radium-226 by Radon Emanation - Method 903.1 Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Tuesday, February 21, 2017
2:34:59 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyze	Flags
1701082-1	BDS[redacted]W001	Sample	Ra-226	0.06 +/- 0.13	0.23	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-2	BDS[redacted]W002	Sample	Ra-226	0.038 +/- 0.092	0.175	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-3	BDS[redacted]W006	Sample	Ra-226	-0.02 +/- 0.11	0.24	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-4	BDS[redacted]W014	Sample	Ra-226	-0.02 +/- 0.14	0.29	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-5	BDS[redacted]W019	Sample	Ra-226	0 +/- 0.16	0.32	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-6	BDS[redacted]W021	Sample	Ra-226	0 +/- 0.093	0.177	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-7	BDS[redacted]W034	Sample	Ra-226	0 +/- 0.092	0.174	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-8	BDS[redacted]W036	Sample	Ra-226	-0.02 +/- 0.10	0.23	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-9	BDS[redacted]W048	Sample	Ra-226	0 +/- 0.11	0.25	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U

Comments:

Data Package ID: *RE1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Radium-226 by Radon Emanation - Method 903.1 Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701082

Reported on: Tuesday, February 21, 2017
2:34:59 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyze	Flags
1701082-10	BDS[redacted]W049	Sample	Ra-226	0.02 +/- 0.15	0.30	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-11	BDS[redacted]W052	Sample	Ra-226	-0.04 +/- 0.11	0.26	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-12	BDS[redacted]W058	Sample	Ra-226	0.02 +/- 0.10	0.21	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-13	BDS[redacted]W061	Sample	Ra-226	-0.04 +/- 0.11	0.26	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-14	BDS[redacted]W074	Sample	Ra-226	0.02 +/- 0.12	0.24	NA	pCi/sample	WIPE	RE170201-2	2/19/2017	U
1701082-22	BDS[redacted]BD01	Sample	Ra-226	0.061 +/- 0.064	0.094	NA	pCi/g	FILTER	RE170201-2	2/19/2017	U
1701082-23	BDS[redacted]BD02	Sample	Ra-226	0.105 +/- 0.093	0.126	NA	pCi/g	FILTER	RE170201-2	2/19/2017	U
1701082-24	BDS[redacted]FB	Sample	Ra-226	0.019 +/- 0.094	0.141	NA	pCi/g	FILTER	RE170201-2	2/19/2017	U

Comments:

Data Package ID: *RE1701082-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-2MB

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.093	0.205	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-2MB

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-1
Run ID: RE170201-2B
Count Time: 15 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.093	0.205	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *RE1701082-2*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-2LCS

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	44.5 +/- 8.2	0.2	46.04	96.6	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-2LCS

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-1
Run ID: RE170201-2B
Count Time: 15 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	44.5 +/- 8.2	0.2	46.04	96.6	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *RE1701082-2*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-2LCSD

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	46.7 +/- 8.6	0.3	46.04	101	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-2LCSD

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-1
Run ID: RE170201-2B
Count Time: 15 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	46.7 +/- 8.6	0.3	46.04	101	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *RE1701082-2*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: RE170201-2LCSD

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13982-63-3	Ra-226	44.5 +/- 8.2	0.2	P	46.7 +/- 8.6	0.3	P	0.187	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: RE170201-2LCSD

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-1
Run ID: RE170201-2B
Count Time: 15 minutes

Final Aliquot: 1.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Manual Entry

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13982-63-3	Ra-226	44.5 +/- 8.2	0.2	P	46.7 +/- 8.6	0.3	P	0.187	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *RE1701082-2*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W001
Lab ID:	1701082-1

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.06 +/- 0.13	0.23	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W002
Lab ID: 1701082-2

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.038 +/- 0.092	0.175	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W006
Lab ID: 1701082-3

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.02 +/- 0.11	0.24	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W014
Lab ID: 1701082-4

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.02 +/- 0.14	0.29	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W019
Lab ID:	1701082-5

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.16	0.32	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W021
Lab ID: 1701082-6

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 27-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.093	0.177	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W034
Lab ID:	1701082-7

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.092	0.174	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W036
Lab ID: 1701082-8

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.02 +/- 0.10	0.23	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W048
Lab ID: 1701082-9

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.11	0.25	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W049
Lab ID: 1701082-10

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.02 +/- 0.15	0.30	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W052
Lab ID: 1701082-11

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.04 +/- 0.11	0.26	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W058
Lab ID:	1701082-12

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.02 +/- 0.10	0.21	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W061
Lab ID:	1701082-13

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.04 +/- 0.11	0.26	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W074
Lab ID: 1701082-14

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-2
Run ID: RE170201-2A
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.02 +/- 0.12	0.24	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]BD01
Lab ID: 1701082-22

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-1
Run ID: RE170201-2B
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 2.37 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.061 +/- 0.064	0.094	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]BD02
Lab ID: 1701082-23

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-1
Run ID: RE170201-2B
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.53 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.105 +/- 0.093	0.126	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701082
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]FB
Lab ID:	1701082-24

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 19-Feb-17

Prep Batch: RE170201-2
QCBatchID: RE170201-2-1
Run ID: RE170201-2B
Count Time: 15 minutes
Report Basis: As Received

Final Aliquot: 1.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.019 +/- 0.094	0.141	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701082-1*

HOUSE 2 ANALYTICAL LABORATORY REPORT

Gamma Spectroscopy

Case Narrative

TetraTech

Bridgeton Dust Site – 103X9025160104.003

Work Order Number: 1701077

1. The following report consists of analytical results and supporting documentation for seven soil samples received by ALS on 01/10/2017.

2. These samples were prepared according to the current revision of SOP 739. The samples were sealed in steel cans on 01/13/2017 and stored for at least 21 days to allow ^{222}Rn to approach secular equilibrium with its parent, ^{226}Ra. The degree of ingrowth achieved prior to analysis on 02/03/2017 is at least 97.8%. Conservatively assuming a radon emanation efficiency of approximately 50%, the effective radon progeny ingrowth for these samples would be greater than 98.9%.

3. The samples were analyzed for the presence of gamma emitting radionuclides according to the current revision of SOP 713. The analyses were completed on 02/06/2017

4. The results for these samples are reported on a “Dry Weight” basis in units of pCi/gram.

5. ALS has observed a reproducible low bias in ^{226}Ra results (about -30% for the geometry in question) when using a mixed gamma source for the calibration of HPGe detectors for solid samples. This bias is eliminated by calibration using a NIST traceable ^{226}Ra source in the same geometry and configuration as the samples.

6. The library used for calibration and analysis employs multiple peaks for the ^{226}Ra progeny, ^{214}Pb (352 and 295 keV) and ^{214}Bi (609 and 1120 keV). Using these peaks avoids the use of the problematic ^{226}Ra photopeak at 186 keV, which suffers from poorly resolvable interference from ^{235}U at the same energy. Final activity results for ^{226}Ra are calculated, using the uncertainty-weighted mean of the activities for the four photopeaks, by the Seeker gamma spectroscopy software assuming secular equilibrium.

7. ALS has found there to be a significant low bias to ^{214}Pb and ^{214}Bi results when using a mixed nuclide gamma source for efficiency calibrations. The magnitude of this bias has been determined to be approximately 32% for ^{214}Bi, and 23% for ^{214}Pb. Therefore, any reported results for ^{214}Pb and ^{214}Bi are flagged with a "J" qualifier, indicating the activity values to be an estimated value. Results are reported without further qualification.

8. Activity concentrations above the calculated MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Nuclides not meeting these requirements have been flagged with a "TI" qualifier.

9. In cases where there are no peaks found in the peak search routine, the software performs a net quantification. This indicates that nuclides are not detected or supported at any level above the reported MDC. Consequently, these nuclides are flagged with an "NQ" qualifier on the final reports. Please refer to the Technical Bulletin Addendum in section 5 of this report.

10. There are cases where the sample density is less than the associated calibration standard density. Cases that exceed the limit of +/- 15% of the density of the calibration standard are flagged with a 'G', denoting a significant density difference between the sample and calibration standard. Consequently, the results may be biased high for the flagged results in this work order. If requested, ALS can perform a transmission spike in order to estimate a magnitude of this bias. The results are reported without further qualification.

11. Technical considerations made in the creation of the gamma spectroscopy library used in this analysis are detailed in the document "Technical Comments Regarding Gamma Spectroscopy Libraries" found in Section 5.

12. There are cases where the magnitude of negative activity is greater than the 2σ TPU. Under typical conditions, where background data is normally distributed and analyzed by paired observations, this event is likely to occur at least 2.5% of the time. Review of the data does not indicate a problem with the instrument or reporting systems and results are reported without further qualification.

13. No further problems were encountered with either the client samples or the associated quality control samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen — 2/8/17

Pik Yee Yuen — Date

Radiochemistry Primary Data Reviewer

2/21/17

Radiochemistry Final Data Reviewer — Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701077
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701077-1		WIPE	29-Dec-16	9:24
BDS-[redacted]W003	1701077-2		WIPE	29-Dec-16	9:37
BDS-[redacted]W004	1701077-3		WIPE	29-Dec-16	9:48
BDS-[redacted]W005	1701077-4		WIPE	29-Dec-16	9:51
BDS-[redacted]W006	1701077-5		WIPE	29-Dec-16	9:50
BDS-[redacted]W007	1701077-6		WIPE	29-Dec-16	9:45
BDS-[redacted]W010	1701077-7		WIPE	29-Dec-16	9:55
BDS-[redacted]W016	1701077-8		WIPE	29-Dec-16	10:25
BDS-[redacted]W024	1701077-9		WIPE	29-Dec-16	11:11
BDS-[redacted]W034	1701077-10		WIPE	29-Dec-16	10:55
BDS-[redacted]W036	1701077-11		WIPE	29-Dec-16	11:10
BDS-[redacted]W042	1701077-12		WIPE	29-Dec-16	11:32
BDS-[redacted]W055	1701077-13		WIPE	29-Dec-16	13:06
BDS-[redacted]W061	1701077-14		WIPE	29-Dec-16	14:44
BDS-[redacted]BD01	1701077-15		FILTER	29-Dec-16	11:15
BDS-[redacted]FB	1701077-16		FILTER	29-Dec-16	12:00
BDS-[redacted]C-S001	1701077-17		SOIL	28-Dec-16	15:20
BDS-[redacted]C-S002	1701077-18		SOIL	28-Dec-16	15:40
BDS-[redacted]G-S003	1701077-19		SOIL	28-Dec-16	15:42
BDS-[redacted]G-S004	1701077-20		SOIL	28-Dec-16	15:43
BDS-[redacted]G-S005	1701077-21		SOIL	28-Dec-16	15:45
BDS-[redacted]G-S006	1701077-22		SOIL	28-Dec-16	15:47
BDS-[redacted]G-S007	1701077-23		SOIL	28-Dec-16	15:52

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701077	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2		
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv	PARAMETER/METHOD REQUEST FOR ANALYSIS	
		PURCHASE ORDER	1133109	A	Isotopic Thorium
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.	B	Isotopic Uranium
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher	C	Radionuclides by gamma spectrometry scan, including Radium-226
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street	D	Lead-210
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106	E	Radium-226
PHONE	816-412-1755	PHONE	816-412-1755	F	
FAX		FAX		G	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com	H	
				I	
				J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS-[redacted]-W001	F	12/29/16	09:24	1	none		X	X			X						
2	BDS-[redacted]-W003	F	12/29/16	09:37	1	none		X	X			X						
3	BDS-[redacted]-W004	F	12/29/16	09:48	1	none		X	X			X						
4	BDS-[redacted]-W005	F	12/29/16	09:51	1	none		X	X			X						
5	BDS-[redacted]-W006	F	12/29/16	09:50	1	none		X	X			X						
6	BDS-[redacted]-W007	F	12/29/16	09:45	1	none		X	X			X						
7	BDS-[redacted]-W010	F	12/29/16	09:55	1	none		X	X			X						
8	BDS-[redacted]-W016	F	12/29/16	10:25	1	none		X	X			X						
9	BDS-[redacted]-W024	F	12/29/16	11:11	1	none		X	X			X						
10	BDS-[redacted]-W034	F	12/29/16	10:55	1	none		X	X			X						
11	BDS-[redacted]-W036	F	12/29/16	11:10	1	none		X	X			X						
12	BDS-[redacted]-W042	F	12/29/16	11:32	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)
PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other	

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nevatt-Sugg	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.
Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER # 1701077

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
wipes 13	BDS-[redacted]W055	F	12/29/16	13:06	1	None		X	X			X						
14	BDS-[redacted]W061	F	12/29/16	14:44	1	none		X	X			X						
BD cartridge 15	BDS-[redacted]BD01	F	12/29/16	11:15	2	none		X	X			X						
16	BDS-[redacted]FB	F	12/29/16	12:00	1	none		X	X			X						
17	BDS-[redacted]C-S001	S	12/28/16	15:20	1	none		X	X	X	X							
18	BDS-[redacted]C-S002	S	12/28/16	15:40	1	none		X	X	X	X							
19	BDS-[redacted]G-S003	S	12/28/16	15:42	1	none		X	X	X	X							
Soil bags 20	BDS-[redacted]G-S004	S	12/28/16	15:43	1	none		X	X	X	X							
21	BDS-[redacted]G-S005	S	12/28/16	15:45	1	none		X	X	X	X							
22	BDS-[redacted]G-S006	S	12/28/16	15:47	1	none		X	X	X	X							
23	BDS-[redacted]G-S007	S	12/28/16	15:52	1	none		X	X	X	X							

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua [illegible] Shea	1-10-17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 170177

Project Manager: JE / MH Initials: JNS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?			YES	NO
2. Are custody seals on shipping containers intact?	NONE		YES	NO
3. Are Custody seals on sample containers intact?	NONE		YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?			YES	NO
5. Are the COC and bottle labels complete and legible?			YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)			YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF		YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A		YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A		YES	NO
10. Is there sufficient sample for the requested analyses?			YES	NO
11. Were all samples placed in the proper containers for the requested analyses?			YES	NO
12. Are all samples within holding times for the requested analyses?			YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)			YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A		YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A		YES	NO
16. Were the samples shipped on ice?			YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY		YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [signature] 1-10-17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701077

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Due to the nature of gamma spectroscopy data, a summary report is not provided.

Please refer to the individual sample results in Section 4.

Section 3

QC RESULTS SUMMARY ❸

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB

Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	0.04 +/- 0.25	0.48		NA	U
14391-76-5	Ag-110m	-0.049 +/- 0.064	0.140		NA	U
14682-66-7	Al-26	-0.12 +/- 0.10	0.25		NA	U
14596-10-2	Am-241	-0.09 +/- 0.41	0.80		NA	U
13966-02-4	Be-7	0.33 +/- 0.54	0.91		NA	U
14913-49-6	Bi-212	0.9 +/- 1.1	1.7		NA	U
14733-03-0	Bi-214	-0.07 +/- 0.18	0.34		NA	U,J
13982-30-4	Ce-139	0.006 +/- 0.036	0.066		NA	U
14762-78-8	Ce-144	0.12 +/- 0.28	0.49		NA	U
14093-03-9	Co-56	0.089 +/- 0.091	0.127		NA	U
13981-50-5	Co-57	0.005 +/- 0.033	0.061		NA	U
13981-38-9	Co-58	-0.023 +/- 0.059	0.127		NA	U
10198-40-0	Co-60	0.026 +/- 0.064	0.120		NA	U
14392-02-0	Cr-51	0.08 +/- 0.31	0.58		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB

Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13967-70-9	Cs-134	0.012 +/- 0.075	0.136		NA	U
10045-97-3	Cs-137	0.038 +/- 0.063	0.108	0.5	NA	U
14683-23-9	Eu-152	-0.08 +/- 0.48	0.96		NA	U
15585-10-1	Eu-154	-0.41 +/- 0.52	1.11		NA	U
14391-16-3	Eu-155	0.06 +/- 0.13	0.23		NA	U
14596-12-4	Fe-59	-0.01 +/- 0.15	0.30		NA	U
10043-66-0	I-131	0.031 +/- 0.060	0.103		NA	U
13966-00-2	K-40	0.3 +/- 1.1	2.0		NA	U
13966-31-9	Mn-54	0.015 +/- 0.073	0.135		NA	U
13966-32-0	Na-22	0.004 +/- 0.055	0.116		NA	U
14681-63-1	Nb-94	0.006 +/- 0.074	0.139		NA	U
13967-76-5	Nb-95	0.039 +/- 0.064	0.109		NA	U
15100-28-4	Pa-234m	24 +/- 14	15		NA	NQ
15092-94-1	Pb-212	-0.06 +/- 0.11	0.21		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB

Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15067-28-4	Pb-214	-0.06 +/- 0.15	0.28		NA	U,J
13967-48-1	Ru-106	-0.25 +/- 0.69	1.39		NA	U
14683-10-4	Sb-124	0.025 +/- 0.070	0.124		NA	U
14234-35-6	Sb-125	-0.02 +/- 0.16	0.31		NA	U
13967-63-0	Sc-46	-0.016 +/- 0.073	0.147		NA	U
15623-47-9	Th-227	0.11 +/- 0.32	0.56		NA	U
15065-10-8	Th-234	0.3 +/- 1.0	1.8		NA	U
14913-50-9	Tl-208	0 +/- 0.082	0.154		NA	U
15117-96-1	U-235	0.06 +/- 0.27	0.49		NA	U
13982-39-3	Zn-65	-0.02 +/- 0.15	0.31		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2MB

Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170143d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.07 +/- 0.18	0.36	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP
U
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2ALCS

Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170163d01

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	463 +/- 54	3	468.6	98.8	85 - 115	P,M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: GS170113-2LCS

Library: ANALYTICAL.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jan-17
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 170131d08

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14596-10-2	Am-241	421 +/- 49	2	462.7	91.0	85 - 115	P
10198-40-0	Co-60	192 +/- 23	1	200.9	95.4	85 - 115	P
10045-97-3	Cs-137	170 +/- 20	1	176.7	96.4	85 - 115	P,M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP
U
LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14331-83-0	Ac-228	1.31 +/- 0.75	0.99	G,TI	0.96 +/- 0.48	0.84	G,TI	0.399	2.13
14391-76-5	Ag-110m	-0.05 +/- 0.12	0.25	U,G	0.05 +/- 0.13	0.23	U,G	0.528	2.13
14682-66-7	Al-26	-0.11 +/- 0.13	0.32	U,G	0.06 +/- 0.10	0.18	U,G	1.05	2.13
14596-10-2	Am-241	-0.83 +/- 0.94	1.87	U,G	-0.15 +/- 0.16	0.32	U,G	0.716	2.13
13966-02-4	Be-7	0.4 +/- 1.6	2.8	U,G	0.3 +/- 1.4	2.6	U,G	0.031	2.13
14913-49-6	Bi-212	0 +/- 2.3	4.2	U,G	2.2 +/- 1.7	2.3	U,G	0.765	2.13
14733-03-0	Bi-214	1.17 +/- 0.43	0.49	G,J	0.86 +/- 0.40	0.53	G,J	0.529	2.13
13982-30-4	Ce-139	-0.03 +/- 0.10	0.19	U,G	-0.045 +/- 0.069	0.137	U,G	0.0819	2.13
14762-78-8	Ce-144	0.63 +/- 0.64	1.02	U,G	0 +/- 0.41	0.77	U,G	0.822	2.13
14093-03-9	Co-56	0.48 +/- 0.35	0.47	G,NQ	-0.04 +/- 0.27	0.55	U,G	1.17	2.13
13981-50-5	Co-57	0.007 +/- 0.067	0.122	U,G	0.018 +/- 0.047	0.083	U,G	0.128	2.13
13981-38-9	Co-58	0 +/- 0.15	0.29	U,G	-0.02 +/- 0.15	0.29	U,G	0.0882	2.13
10198-40-0	Co-60	-0.03 +/- 0.17	0.34	U,G	0.03 +/- 0.13	0.25	U,G	0.299	2.13
14392-02-0	Cr-51	-0.8 +/- 2.1	4.0	U,G	0.4 +/- 1.6	2.9	U,G	0.437	2.13
13967-70-9	Cs-134	-0.05 +/- 0.17	0.31	U,G	-0.05 +/- 0.12	0.23	U,G	0.0203	2.13
10045-97-3	Cs-137	-0.01 +/- 0.13	0.25	U,G	0.12 +/- 0.14	0.23	U,G	0.696	2.13
14683-23-9	Eu-152	0.12 +/- 0.68	1.30	U,G	-0.26 +/- 0.57	1.29	U,G	0.423	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
15585-10-1	Eu-154	0.44 +/- 0.69	1.17	U,G	-0.38 +/- 0.76	1.57	U,G	0.792	2.13
14391-16-3	Eu-155	0.04 +/- 0.32	0.57	U,G	0.15 +/- 0.22	0.37	U,G	0.277	2.13
14596-12-4	Fe-59	-0.27 +/- 0.42	0.91	U,G	0.06 +/- 0.38	0.73	U,G	0.577	2.13
10043-66-0	I-131	0 +/- 2.7	5.0	U,G	-2.4 +/- 2.6	5.3	U,G	0.628	2.13
13966-00-2	K-40	11.4 +/- 3.8	4.1	G	14.0 +/- 3.8	2.9	G	0.486	2.13
13966-31-9	Mn-54	0.11 +/- 0.15	0.25	U,G	-0.04 +/- 0.12	0.25	U,G	0.766	2.13
13966-32-0	Na-22	0.08 +/- 0.18	0.31	U,G	0.09 +/- 0.14	0.23	U,G	0.0556	2.13
14681-63-1	Nb-94	-0.04 +/- 0.15	0.29	U,G	0.03 +/- 0.12	0.22	U,G	0.339	2.13
13967-76-5	Nb-95	-0.21 +/- 0.20	0.43	U,G	-0.11 +/- 0.17	0.36	U,G	0.358	2.13
15100-28-4	Pa-234m	8 +/- 23	42	U,G	11 +/- 18	30	U,G	0.126	2.13
15092-94-1	Pb-212	1.16 +/- 0.32	0.32	G	0.98 +/- 0.32	0.38	G	0.396	2.13
15067-28-4	Pb-214	1.30 +/- 0.37	0.44	G,J	0.84 +/- 0.26	0.35	G,J	1.02	2.13
13967-48-1	Ru-106	-0.2 +/- 1.1	2.2	U,G	0.1 +/- 1.3	2.3	U,G	0.184	2.13
14683-10-4	Sb-124	0.22 +/- 0.24	0.38	U,G	-0.15 +/- 0.17	0.36	U,G	1.27	2.13
14234-35-6	Sb-125	-0.13 +/- 0.28	0.57	U,G	0.08 +/- 0.30	0.54	U,G	0.49	2.13
13967-63-0	Sc-46	-0.04 +/- 0.15	0.30	U,G	-0.09 +/- 0.16	0.33	U,G	0.254	2.13
15623-47-9	Th-227	0.13 +/- 0.96	1.65	U,G	-0.03 +/- 0.56	1.01	U,G	0.149	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
15065-10-8	Th-234	-0.3 +/- 1.8	3.2	U,G	1.9 +/- 1.1	2.4	U,G	1.06	2.13
14913-50-9	Tl-208	0.47 +/- 0.19	0.21	G	0.22 +/- 0.15	0.22	G	1	2.13
15117-96-1	U-235	-0.30 +/- 0.58	1.10	U,G	0.04 +/- 0.50	0.89	U,G	0.447	2.13
13982-39-3	Zn-65	-0.35 +/- 0.43	0.88	U,G	-0.38 +/- 0.33	0.74	U,G	0.0557	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08A

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13982-63-3	Ra-226	1.65 +/- 0.39	0.56	G	1.18 +/- 0.32	0.49	G	0.941	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *GSS1701077-1*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S001
Lab ID: 1701077-17
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 154 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170150d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.29 +/- 0.54	0.76		NA	G,TI
14391-76-5	Ag-110m	-0.01 +/- 0.10	0.21		NA	U,G
14682-66-7	Al-26	-0.01 +/- 0.13	0.28		NA	U,G
14596-10-2	Am-241	0.5 +/- 2.0	3.4		NA	U,G
13966-02-4	Be-7	-0.3 +/- 1.4	2.8		NA	U,G
14913-49-6	Bi-212	2.1 +/- 2.3	3.7		NA	U,G
14733-03-0	Bi-214	1.35 +/- 0.45	0.47		NA	G,J
13982-30-4	Ce-139	0.004 +/- 0.098	0.176		NA	U,G
14762-78-8	Ce-144	0 +/- 0.68	1.23		NA	U,G
14093-03-9	Co-56	0.12 +/- 0.37	0.67		NA	U,G
13981-50-5	Co-57	-0.023 +/- 0.081	0.153		NA	U,G
13981-38-9	Co-58	-0.15 +/- 0.16	0.37		NA	U,G
10198-40-0	Co-60	-0.02 +/- 0.15	0.30		NA	U,G
14392-02-0	Cr-51	0.6 +/- 1.6	2.8		NA	U,G
13967-70-9	Cs-134	-0.06 +/- 0.12	0.24		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S001
Lab ID: 1701077-17
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 154 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170150d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.037 +/- 0.096	0.176	0.5	NA	U,G
14683-23-9	Eu-152	-0.09 +/- 0.68	1.41		NA	U,G
15585-10-1	Eu-154	-0.17 +/- 0.58	1.26		NA	U,G
14391-16-3	Eu-155	0.27 +/- 0.37	0.62		NA	U,G
14596-12-4	Fe-59	-0.24 +/- 0.37	0.85		NA	U,G
10043-66-0	I-131	0.5 +/- 2.5	4.5		NA	U,G
13966-00-2	K-40	14.0 +/- 4.1	3.8		NA	G
13966-31-9	Mn-54	0.09 +/- 0.15	0.26		NA	U,G
13966-32-0	Na-22	-0.17 +/- 0.13	0.33		NA	U,G
14681-63-1	Nb-94	0.03 +/- 0.15	0.26		NA	U,G
13967-76-5	Nb-95	0.04 +/- 0.16	0.30		NA	U,G
15100-28-4	Pa-234m	3 +/- 20	38		NA	U,G
15092-94-1	Pb-212	0.79 +/- 0.34	0.45		NA	G
15067-28-4	Pb-214	0.91 +/- 0.31	0.44		NA	G,J
13967-48-1	Ru-106	-0.3 +/- 1.1	2.2		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S001
Lab ID: 1701077-17
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 154 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170150d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	-0.03 +/- 0.18	0.34		NA	U,G
14234-35-6	Sb-125	-0.06 +/- 0.30	0.58		NA	U,G
13967-63-0	Sc-46	0.17 +/- 0.14	0.19		NA	U,G
15623-47-9	Th-227	1.2 +/- 1.1	1.6		NA	U,G
15065-10-8	Th-234	-1.5 +/- 2.1	4.0		NA	U,G
14913-50-9	Tl-208	0.31 +/- 0.20	0.28		NA	G
15117-96-1	U-235	0.20 +/- 0.55	0.95		NA	U,G
13982-39-3	Zn-65	-0.24 +/- 0.41	0.83		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S001
Lab ID: 1701077-17
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 154 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170150d01A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.46 +/- 0.38	0.60	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 166 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170164d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.26 +/- 0.63	0.73		NA	G,TI
14391-76-5	Ag-110m	-0.01 +/- 0.14	0.26		NA	U,G
14682-66-7	Al-26	0.02 +/- 0.13	0.25		NA	U,G
14596-10-2	Am-241	-0.6 +/- 1.1	2.1		NA	U,G
13966-02-4	Be-7	0.7 +/- 1.5	2.5		NA	U,G
14913-49-6	Bi-212	1.2 +/- 1.5	2.4		NA	U,G
14733-03-0	Bi-214	1.00 +/- 0.42	0.55		NA	G,J
13982-30-4	Ce-139	0.03 +/- 0.10	0.17		NA	U,G
14762-78-8	Ce-144	-0.23 +/- 0.57	1.08		NA	U,G
14093-03-9	Co-56	0.20 +/- 0.39	0.67		NA	U,G
13981-50-5	Co-57	0.070 +/- 0.072	0.114		NA	U,G
13981-38-9	Co-58	0.05 +/- 0.15	0.28		NA	U,G
10198-40-0	Co-60	-0.03 +/- 0.16	0.32		NA	U,G
14392-02-0	Cr-51	-0.3 +/- 1.9	3.5		NA	U,G
13967-70-9	Cs-134	-0.06 +/- 0.16	0.31		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 166 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170164d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.05 +/- 0.12	0.21	0.5	NA	U,G
14683-23-9	Eu-152	-0.56 +/- 0.56	1.39		NA	U,G
15585-10-1	Eu-154	0.18 +/- 0.68	1.25		NA	U,G
14391-16-3	Eu-155	-0.05 +/- 0.32	0.59		NA	U,G
14596-12-4	Fe-59	-0.23 +/- 0.43	0.90		NA	U,G
10043-66-0	I-131	-0.5 +/- 2.2	4.1		NA	U,G
13966-00-2	K-40	13.6 +/- 3.9	3.4		NA	G
13966-31-9	Mn-54	-0.02 +/- 0.13	0.25		NA	U,G
13966-32-0	Na-22	-0.08 +/- 0.17	0.34		NA	U,G
14681-63-1	Nb-94	-0.04 +/- 0.12	0.24		NA	U,G
13967-76-5	Nb-95	0.02 +/- 0.19	0.35		NA	U,G
15100-28-4	Pa-234m	10 +/- 19	34		NA	U,G
15092-94-1	Pb-212	0.83 +/- 0.26	0.30		NA	G
15067-28-4	Pb-214	1.07 +/- 0.32	0.50		NA	G,J
13967-48-1	Ru-106	0.3 +/- 1.2	2.1		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 166 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170164d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	-0.07 +/- 0.17	0.34		NA	U,G
14234-35-6	Sb-125	-0.15 +/- 0.30	0.58		NA	U,G
13967-63-0	Sc-46	-0.08 +/- 0.18	0.36		NA	U,G
15623-47-9	Th-227	0.21 +/- 0.57	0.99		NA	U,G
15065-10-8	Th-234	-1.4 +/- 2.1	3.9		NA	U,G
14913-50-9	Tl-208	0.25 +/- 0.16	0.23		NA	G
15117-96-1	U-235	0.18 +/- 0.53	0.92		NA	U,G
13982-39-3	Zn-65	-0.19 +/- 0.41	0.80		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 166 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170164d03A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.52 +/- 0.39	0.69	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S003
Lab ID: 1701077-19
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 163 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170264d04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.12 +/- 0.68	0.90		NA	G,TI
14391-76-5	Ag-110m	-0.14 +/- 0.17	0.35		NA	U,G
14682-66-7	Al-26	-0.08 +/- 0.12	0.32		NA	U,G
14596-10-2	Am-241	-0.43 +/- 0.78	1.48		NA	U,G
13966-02-4	Be-7	0.9 +/- 1.4	2.3		NA	U,G
14913-49-6	Bi-212	0.1 +/- 2.1	3.9		NA	U,G
14733-03-0	Bi-214	1.12 +/- 0.45	0.56		NA	G,J
13982-30-4	Ce-139	0.020 +/- 0.098	0.171		NA	U,G
14762-78-8	Ce-144	-0.56 +/- 0.53	1.05		NA	U,G
14093-03-9	Co-56	0.21 +/- 0.41	0.71		NA	U,G
13981-50-5	Co-57	-0.033 +/- 0.073	0.137		NA	U,G
13981-38-9	Co-58	-0.04 +/- 0.17	0.35		NA	U,G
10198-40-0	Co-60	-0.10 +/- 0.19	0.39		NA	U,G
14392-02-0	Cr-51	-1.4 +/- 1.7	3.5		NA	U,G
13967-70-9	Cs-134	-0.14 +/- 0.19	0.38		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S003
Lab ID: 1701077-19
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 163 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170264d04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.11 +/- 0.17	0.29	0.5	NA	U,G
14683-23-9	Eu-152	0.51 +/- 0.84	1.43		NA	U,G
15585-10-1	Eu-154	0.65 +/- 0.59	0.80		NA	U,G
14391-16-3	Eu-155	-0.12 +/- 0.30	0.56		NA	U,G
14596-12-4	Fe-59	-0.26 +/- 0.53	1.08		NA	U,G
10043-66-0	I-131	-1.2 +/- 2.1	4.2		NA	U,G
13966-00-2	K-40	18.6 +/- 5.2	5.1		NA	G
13966-31-9	Mn-54	-0.14 +/- 0.16	0.34		NA	U,G
13966-32-0	Na-22	-0.09 +/- 0.20	0.41		NA	U,G
14681-63-1	Nb-94	-0.12 +/- 0.16	0.31		NA	U,G
13967-76-5	Nb-95	-0.02 +/- 0.22	0.42		NA	U,G
15100-28-4	Pa-234m	-20 +/- 23	51		NA	U,G
15092-94-1	Pb-212	0.77 +/- 0.29	0.38		NA	G
15067-28-4	Pb-214	1.21 +/- 0.35	0.47		NA	G,J
13967-48-1	Ru-106	1.4 +/- 1.5	2.4		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S003
Lab ID: 1701077-19
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 163 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170264d04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	-0.01 +/- 0.20	0.38		NA	U,G
14234-35-6	Sb-125	-0.03 +/- 0.30	0.56		NA	U,G
13967-63-0	Sc-46	-0.17 +/- 0.17	0.38		NA	U,G
15623-47-9	Th-227	-0.97 +/- 0.90	1.79		NA	U,G
15065-10-8	Th-234	2.1 +/- 1.9	3.0		NA	U,G
14913-50-9	Tl-208	0.26 +/- 0.16	0.21		NA	G
15117-96-1	U-235	-0.39 +/- 0.58	1.09		NA	U,G
13982-39-3	Zn-65	-0.50 +/- 0.40	0.89		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S003
Lab ID: 1701077-19
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 163 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170264d04A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.68 +/- 0.42	0.68	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S004
Lab ID: 1701077-20
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 169 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170138d06

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.33 +/- 0.73	0.96		NA	G,NQ
14391-76-5	Ag-110m	-0.04 +/- 0.13	0.25		NA	U,G
14682-66-7	Al-26	-0.05 +/- 0.15	0.33		NA	U,G
14596-10-2	Am-241	0.23 +/- 0.99	1.71		NA	U,G
13966-02-4	Be-7	-0.7 +/- 1.4	2.8		NA	U,G
14913-49-6	Bi-212	1.2 +/- 1.9	3.1		NA	U,G
14733-03-0	Bi-214	1.03 +/- 0.40	0.49		NA	G,J
13982-30-4	Ce-139	-0.08 +/- 0.11	0.20		NA	U,G
14762-78-8	Ce-144	-0.42 +/- 0.53	1.03		NA	U,G
14093-03-9	Co-56	0.35 +/- 0.38	0.60		NA	U,G
13981-50-5	Co-57	0.032 +/- 0.076	0.129		NA	U,G
13981-38-9	Co-58	0.04 +/- 0.19	0.35		NA	U,G
10198-40-0	Co-60	-0.19 +/- 0.17	0.38		NA	U,G
14392-02-0	Cr-51	-0.9 +/- 2.3	4.2		NA	U,G
13967-70-9	Cs-134	0 +/- 0.22	0.39		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S004
Lab ID: 1701077-20
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 169 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170138d06

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0 +/- 0.13	0.24	0.5	NA	U,G
14683-23-9	Eu-152	-0.08 +/- 0.83	1.63		NA	U,G
15585-10-1	Eu-154	0.37 +/- 0.67	1.16		NA	U,G
14391-16-3	Eu-155	-0.14 +/- 0.38	0.68		NA	U,G
14596-12-4	Fe-59	0.14 +/- 0.46	0.83		NA	U,G
10043-66-0	I-131	2.4 +/- 2.7	4.3		NA	U,G
13966-00-2	K-40	16.9 +/- 4.2	2.9		NA	G
13966-31-9	Mn-54	-0.05 +/- 0.13	0.26		NA	U,G
13966-32-0	Na-22	-0.03 +/- 0.13	0.27		NA	U,G
14681-63-1	Nb-94	-0.06 +/- 0.13	0.26		NA	U,G
13967-76-5	Nb-95	0.03 +/- 0.17	0.32		NA	U,G
15100-28-4	Pa-234m	-12 +/- 25	50		NA	U,G
15092-94-1	Pb-212	1.06 +/- 0.33	0.41		NA	G
15067-28-4	Pb-214	0.86 +/- 0.29	0.45		NA	G,J
13967-48-1	Ru-106	0.8 +/- 1.3	2.1		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S004
Lab ID: 1701077-20
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 169 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170138d06

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	0.09 +/- 0.21	0.36		NA	U,G
14234-35-6	Sb-125	0.11 +/- 0.31	0.55		NA	U,G
13967-63-0	Sc-46	-0.13 +/- 0.16	0.35		NA	U,G
15623-47-9	Th-227	-0.67 +/- 0.95	1.79		NA	U,G
15065-10-8	Th-234	-0.9 +/- 2.2	3.9		NA	U,G
14913-50-9	Tl-208	0.28 +/- 0.15	0.21		NA	G
15117-96-1	U-235	-0.43 +/- 0.48	0.94		NA	U,G
13982-39-3	Zn-65	-0.94 +/- 0.56	1.16		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S004
Lab ID: 1701077-20
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 169 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170138d06A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.31 +/- 0.35	0.63	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 136 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170134d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.31 +/- 0.75	0.99		NA	G,TI
14391-76-5	Ag-110m	-0.05 +/- 0.12	0.25		NA	U,G
14682-66-7	Al-26	-0.11 +/- 0.13	0.32		NA	U,G
14596-10-2	Am-241	-0.83 +/- 0.94	1.87		NA	U,G
13966-02-4	Be-7	0.4 +/- 1.6	2.8		NA	U,G
14913-49-6	Bi-212	0 +/- 2.3	4.2		NA	U,G
14733-03-0	Bi-214	1.17 +/- 0.43	0.49		NA	G,J
13982-30-4	Ce-139	-0.03 +/- 0.10	0.19		NA	U,G
14762-78-8	Ce-144	0.63 +/- 0.64	1.02		NA	U,G
14093-03-9	Co-56	0.48 +/- 0.35	0.47		NA	G,NQ
13981-50-5	Co-57	0.007 +/- 0.067	0.122		NA	U,G
13981-38-9	Co-58	0 +/- 0.15	0.29		NA	U,G
10198-40-0	Co-60	-0.03 +/- 0.17	0.34		NA	U,G
14392-02-0	Cr-51	-0.8 +/- 2.1	4.0		NA	U,G
13967-70-9	Cs-134	-0.05 +/- 0.17	0.31		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 136 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170134d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	-0.01 +/- 0.13	0.25	0.5	NA	U,G
14683-23-9	Eu-152	0.12 +/- 0.68	1.30		NA	U,G
15585-10-1	Eu-154	0.44 +/- 0.69	1.17		NA	U,G
14391-16-3	Eu-155	0.04 +/- 0.32	0.57		NA	U,G
14596-12-4	Fe-59	-0.27 +/- 0.42	0.91		NA	U,G
10043-66-0	I-131	0 +/- 2.7	5.0		NA	U,G
13966-00-2	K-40	11.4 +/- 3.8	4.1		NA	G
13966-31-9	Mn-54	0.11 +/- 0.15	0.25		NA	U,G
13966-32-0	Na-22	0.08 +/- 0.18	0.31		NA	U,G
14681-63-1	Nb-94	-0.04 +/- 0.15	0.29		NA	U,G
13967-76-5	Nb-95	-0.21 +/- 0.20	0.43		NA	U,G
15100-28-4	Pa-234m	8 +/- 23	42		NA	U,G
15092-94-1	Pb-212	1.16 +/- 0.32	0.32		NA	G
15067-28-4	Pb-214	1.30 +/- 0.37	0.44		NA	G,J
13967-48-1	Ru-106	-0.2 +/- 1.1	2.2		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 136 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170134d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	0.22 +/- 0.24	0.38		NA	U,G
14234-35-6	Sb-125	-0.13 +/- 0.28	0.57		NA	U,G
13967-63-0	Sc-46	-0.04 +/- 0.15	0.30		NA	U,G
15623-47-9	Th-227	0.13 +/- 0.96	1.65		NA	U,G
15065-10-8	Th-234	-0.3 +/- 1.8	3.2		NA	U,G
14913-50-9	Tl-208	0.47 +/- 0.19	0.21		NA	G
15117-96-1	U-235	-0.30 +/- 0.58	1.10		NA	U,G
13982-39-3	Zn-65	-0.35 +/- 0.43	0.88		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 136 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170134d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.65 +/- 0.39	0.56	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Duplicate Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	0.96 +/- 0.48	0.84		NA	G,TI
14391-76-5	Ag-110m	0.05 +/- 0.13	0.23		NA	U,G
14682-66-7	Al-26	0.06 +/- 0.10	0.18		NA	U,G
14596-10-2	Am-241	-0.15 +/- 0.16	0.32		NA	U,G
13966-02-4	Be-7	0.3 +/- 1.4	2.6		NA	U,G
14913-49-6	Bi-212	2.2 +/- 1.7	2.3		NA	U,G
14733-03-0	Bi-214	0.86 +/- 0.40	0.53		NA	G,J
13982-30-4	Ce-139	-0.045 +/- 0.069	0.137		NA	U,G
14762-78-8	Ce-144	0 +/- 0.41	0.77		NA	U,G
14093-03-9	Co-56	-0.04 +/- 0.27	0.55		NA	U,G
13981-50-5	Co-57	0.018 +/- 0.047	0.083		NA	U,G
13981-38-9	Co-58	-0.02 +/- 0.15	0.29		NA	U,G
10198-40-0	Co-60	0.03 +/- 0.13	0.25		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Duplicate Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14392-02-0	Cr-51	0.4 +/- 1.6	2.9		NA	U,G
13967-70-9	Cs-134	-0.05 +/- 0.12	0.23		NA	U,G
10045-97-3	Cs-137	0.12 +/- 0.14	0.23	0.5	NA	U,G
14683-23-9	Eu-152	-0.26 +/- 0.57	1.29		NA	U,G
15585-10-1	Eu-154	-0.38 +/- 0.76	1.57		NA	U,G
14391-16-3	Eu-155	0.15 +/- 0.22	0.37		NA	U,G
14596-12-4	Fe-59	0.06 +/- 0.38	0.73		NA	U,G
10043-66-0	I-131	-2.4 +/- 2.6	5.3		NA	U,G
13966-00-2	K-40	14.0 +/- 3.8	2.9		NA	G
13966-31-9	Mn-54	-0.04 +/- 0.12	0.25		NA	U,G
13966-32-0	Na-22	0.09 +/- 0.14	0.23		NA	U,G
14681-63-1	Nb-94	0.03 +/- 0.12	0.22		NA	U,G
13967-76-5	Nb-95	-0.11 +/- 0.17	0.36		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Duplicate Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15100-28-4	Pa-234m	11 +/- 18	30		NA	U,G
15092-94-1	Pb-212	0.98 +/- 0.32	0.38		NA	G
15067-28-4	Pb-214	0.84 +/- 0.26	0.35		NA	G,J
13967-48-1	Ru-106	0.1 +/- 1.3	2.3		NA	U,G
14683-10-4	Sb-124	-0.15 +/- 0.17	0.36		NA	U,G
14234-35-6	Sb-125	0.08 +/- 0.30	0.54		NA	U,G
13967-63-0	Sc-46	-0.09 +/- 0.16	0.33		NA	U,G
15623-47-9	Th-227	-0.03 +/- 0.56	1.01		NA	U,G
15065-10-8	Th-234	1.9 +/- 1.1	2.4		NA	U,G
14913-50-9	Tl-208	0.22 +/- 0.15	0.22		NA	G
15117-96-1	U-235	0.04 +/- 0.50	0.89		NA	U,G
13982-39-3	Zn-65	-0.38 +/- 0.33	0.74		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Duplicate Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21DUP
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 148 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170126d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.18 +/- 0.32	0.49	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S006
Lab ID: 1701077-22
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 134 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170162d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	0.75 +/- 0.58	1.26		NA	U,G
14391-76-5	Ag-110m	-0.06 +/- 0.14	0.29		NA	U,G
14682-66-7	Al-26	0.01 +/- 0.16	0.32		NA	U,G
14596-10-2	Am-241	0.2 +/- 2.0	3.7		NA	U,G
13966-02-4	Be-7	-0.3 +/- 1.7	3.3		NA	U,G
14913-49-6	Bi-212	-0.1 +/- 2.2	4.2		NA	U,G
14733-03-0	Bi-214	1.07 +/- 0.47	0.58		NA	G,J
13982-30-4	Ce-139	-0.019 +/- 0.099	0.186		NA	U,G
14762-78-8	Ce-144	0.05 +/- 0.69	1.25		NA	U,G
14093-03-9	Co-56	-0.11 +/- 0.39	0.80		NA	U,G
13981-50-5	Co-57	0.045 +/- 0.092	0.158		NA	U,G
13981-38-9	Co-58	0 +/- 0.20	0.39		NA	U,G
10198-40-0	Co-60	0 +/- 0.12	0.26		NA	U,G
14392-02-0	Cr-51	0 +/- 2.2	4.1		NA	U,G
13967-70-9	Cs-134	-0.13 +/- 0.15	0.31		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S006
Lab ID: 1701077-22
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 134 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170162d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.01 +/- 0.16	0.30	0.5	NA	U,G
14683-23-9	Eu-152	0.11 +/- 0.78	1.52		NA	U,G
15585-10-1	Eu-154	0.29 +/- 0.64	1.16		NA	U,G
14391-16-3	Eu-155	-0.39 +/- 0.36	0.75		NA	U,G
14596-12-4	Fe-59	0.01 +/- 0.52	1.02		NA	U,G
10043-66-0	I-131	1.6 +/- 3.2	5.6		NA	U,G
13966-00-2	K-40	9.7 +/- 3.7	4.0		NA	G
13966-31-9	Mn-54	-0.07 +/- 0.14	0.30		NA	U,G
13966-32-0	Na-22	0.11 +/- 0.11	0.15		NA	U,G
14681-63-1	Nb-94	0.01 +/- 0.14	0.26		NA	U,G
13967-76-5	Nb-95	-0.12 +/- 0.21	0.45		NA	U,G
15100-28-4	Pa-234m	6 +/- 20	38		NA	U,G
15092-94-1	Pb-212	1.08 +/- 0.37	0.44		NA	G
15067-28-4	Pb-214	1.00 +/- 0.35	0.53		NA	G,J
13967-48-1	Ru-106	0.1 +/- 1.2	2.2		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S006
Lab ID: 1701077-22
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 134 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170162d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	0.02 +/- 0.22	0.41		NA	U,G
14234-35-6	Sb-125	-0.10 +/- 0.34	0.67		NA	U,G
13967-63-0	Sc-46	0.02 +/- 0.18	0.35		NA	U,G
15623-47-9	Th-227	0.77 +/- 0.71	1.10		NA	U,G
15065-10-8	Th-234	2.6 +/- 2.4	3.8		NA	U,G
14913-50-9	Tl-208	0.31 +/- 0.20	0.28		NA	G
15117-96-1	U-235	0.20 +/- 0.63	1.11		NA	U,G
13982-39-3	Zn-65	0.05 +/- 0.35	0.66		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S006
Lab ID: 1701077-22
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 134 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170162d01A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.43 +/- 0.40	0.72	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S007
Lab ID: 1701077-23
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 184 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170135d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14331-83-0	Ac-228	1.00 +/- 0.38	0.61		NA	
14391-76-5	Ag-110m	-0.12 +/- 0.11	0.24		NA	U
14682-66-7	Al-26	-0.09 +/- 0.11	0.27		NA	U
14596-10-2	Am-241	0.28 +/- 0.76	1.31		NA	U
13966-02-4	Be-7	-0.5 +/- 1.4	2.6		NA	U
14913-49-6	Bi-212	1.3 +/- 1.6	2.6		NA	U
14733-03-0	Bi-214	1.33 +/- 0.40	0.43		NA	J
13982-30-4	Ce-139	0.004 +/- 0.078	0.140		NA	U
14762-78-8	Ce-144	0.20 +/- 0.53	0.91		NA	U
14093-03-9	Co-56	0.34 +/- 0.37	0.59		NA	U
13981-50-5	Co-57	-0.026 +/- 0.054	0.104		NA	U
13981-38-9	Co-58	-0.06 +/- 0.14	0.28		NA	U
10198-40-0	Co-60	0.03 +/- 0.13	0.24		NA	U
14392-02-0	Cr-51	0.4 +/- 1.6	2.8		NA	U
13967-70-9	Cs-134	-0.03 +/- 0.10	0.20		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S007
Lab ID: 1701077-23
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 184 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170135d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
10045-97-3	Cs-137	0.22 +/- 0.12	0.14	0.5	NA	NQ
14683-23-9	Eu-152	-0.03 +/- 0.58	1.13		NA	U
15585-10-1	Eu-154	-0.18 +/- 0.57	1.16		NA	U
14391-16-3	Eu-155	0.04 +/- 0.26	0.45		NA	U
14596-12-4	Fe-59	-0.17 +/- 0.33	0.70		NA	U
10043-66-0	I-131	-0.4 +/- 2.1	4.0		NA	U
13966-00-2	K-40	16.3 +/- 3.6	2.4		NA	
13966-31-9	Mn-54	0.02 +/- 0.10	0.19		NA	U
13966-32-0	Na-22	0.05 +/- 0.15	0.27		NA	U
14681-63-1	Nb-94	0.07 +/- 0.12	0.19		NA	U
13967-76-5	Nb-95	-0.07 +/- 0.15	0.30		NA	U
15100-28-4	Pa-234m	-9 +/- 17	35		NA	U
15092-94-1	Pb-212	1.16 +/- 0.32	0.36		NA	
15067-28-4	Pb-214	1.23 +/- 0.31	0.37		NA	J
13967-48-1	Ru-106	-0.3 +/- 1.1	2.0		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

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M - The requested MDC was not met.

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Abbreviations:

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MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S007
Lab ID: 1701077-23
Library: FANP.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 184 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170135d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14683-10-4	Sb-124	-0.11 +/- 0.15	0.31		NA	U
14234-35-6	Sb-125	0.13 +/- 0.23	0.39		NA	U
13967-63-0	Sc-46	0.04 +/- 0.13	0.23		NA	U
15623-47-9	Th-227	0.4 +/- 1.0	1.6		NA	U
15065-10-8	Th-234	2.0 +/- 1.7	2.8		NA	U
14913-50-9	Tl-208	0.36 +/- 0.17	0.22		NA	
15117-96-1	U-235	-0.10 +/- 0.49	0.90		NA	U
13982-39-3	Zn-65	-0.42 +/- 0.38	0.78		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

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TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Gamma Spectroscopy Results

PAI 713 Rev 14

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S007
Lab ID: 1701077-23
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 13-Jan-17
Date Analyzed: 03-Feb-17

Prep Batch: GS170113-2
QCBatchID: GS170113-2-1
Run ID: GS170113-2A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 184 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 170135d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.66 +/- 0.35	0.46	1	NA	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

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M - The requested MDC was not met.

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TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1701077-1*

Isotopic Thorium

Case Narrative

TetraTech

Bridgeton Dust Site - 103X9025160104.003

Work Order Number: 1701077

1. This report consists of the analytical results and supporting documentation for two filter samples, seven soil samples and fourteen wipe samples received by ALS on 01/10/2017.

2. The soil samples were prepared according to the current revisions of SOP 773, SOP 777, and SOP 736. The wipe samples and the filter samples were prepared according to the current revisions of SOP 776 and SOP 777.

3. The samples were analyzed for the presence of isotopic thorium according to the current revision of SOP 714. The analyses were completed on 02/05/2017.

4. The analysis results for the soil samples are reported on a 'Dry Weight' basis in units of pCi/gram. The analysis results for the wipe samples are reported on an 'As Received' basis in units of pCi/sample. The analysis results for the filter samples are reported on an 'As Received' basis in units of pCi/g.

5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate for batch AS170201-1.

6. ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.

7. Th-232 activity is reported in method blank AS170201-1MB above the minimum detectable concentration value, as indicated with a "B3" qualifier on the final reports. The measured blank activity is below the requested MDC. Results are acceptable according to the current revision of SOP 715, and are submitted without further qualification.

8. The requested MDC for Th-228 and Th-230 for samples 1701077-1 through -16 was not met. These samples were counted for a maximum count time of 1000 minutes and results are reported without further qualification. The results are identified with an “M” and/or an “M3” qualifier on the final reports. The reported activity identified with an “M3” qualifier exceeds the achieved MDC.

9. In typical Thorium analyses the ^{229}Th tracer, added to monitor chemical losses during the separation process, tails into the ^{230}Th region-of-interest. ALS has determined that, on average, 2.37% of the counts in the ^{230}Th region of interest are attributable to this ^{229}Th “tailing” effect. Consequently, 2.37% of the ^{229}Th counts are systematically subtracted from the ^{230}Th net counts and are attributed to the ^{230}Th background counts for that analysis. In this analysis, samples 1701077-4, -8, and AS170201-1MB exhibited satisfactory peak resolution for the ^{229}Th peak, resulting in a less pronounced “tailing” effect that is routinely observed in an isotopic thorium determination. Because of the observed peak resolution in this analysis, the systematic subtraction of 2.37% of the tracer counts from the ^{230}Th region of interest resulted in a negative net sample activity. The magnitude of this negative activity is greater than the associated 2-sigma total propagated uncertainty for these sample analyses, suggesting a low bias in the reported net results. The analyst’s review of the spectral data shows no activity in the ^{230}Th region of interest. The data quality is not believed to be significantly affected, and the results are submitted without further qualification. Refer to the report detailing the ^{229}Th contribution to the ^{230}Th region-of-interest in Section 9 of this report.

10. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Jean Anderson — 2/7/17

Jean Anderson
Radiochemistry Primary Data Reviewer

Date

Radiochemistry Final Data Reviewer — 2/21/17

Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701077
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701077-1		WIPE	29-Dec-16	9:24
BDS-[redacted]W003	1701077-2		WIPE	29-Dec-16	9:37
BDS-[redacted]W004	1701077-3		WIPE	29-Dec-16	9:48
BDS-[redacted]W005	1701077-4		WIPE	29-Dec-16	9:51
BDS-[redacted]W006	1701077-5		WIPE	29-Dec-16	9:50
BDS-[redacted]W007	1701077-6		WIPE	29-Dec-16	9:45
BDS-[redacted]W010	1701077-7		WIPE	29-Dec-16	9:55
BDS-[redacted]W016	1701077-8		WIPE	29-Dec-16	10:25
BDS-[redacted]W024	1701077-9		WIPE	29-Dec-16	11:11
BDS-[redacted]W034	1701077-10		WIPE	29-Dec-16	10:55
BDS-[redacted]W036	1701077-11		WIPE	29-Dec-16	11:10
BDS-[redacted]W042	1701077-12		WIPE	29-Dec-16	11:32
BDS-[redacted]W055	1701077-13		WIPE	29-Dec-16	13:06
BDS-[redacted]W061	1701077-14		WIPE	29-Dec-16	14:44
BDS-[redacted]BD01	1701077-15		FILTER	29-Dec-16	11:15
BDS-[redacted]FB	1701077-16		FILTER	29-Dec-16	12:00
BDS-[redacted]C-S001	1701077-17		SOIL	28-Dec-16	15:20
BDS-[redacted]C-S002	1701077-18		SOIL	28-Dec-16	15:40
BDS-[redacted]G-S003	1701077-19		SOIL	28-Dec-16	15:42
BDS-[redacted]G-S004	1701077-20		SOIL	28-Dec-16	15:43
BDS-[redacted]G-S005	1701077-21		SOIL	28-Dec-16	15:45
BDS-[redacted]G-S006	1701077-22		SOIL	28-Dec-16	15:47
BDS-[redacted]G-S007	1701077-23		SOIL	28-Dec-16	15:52

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701077	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2		
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv	PARAMETER/METHOD REQUEST FOR ANALYSIS	
		PURCHASE ORDER	1133109	A	Isotopic Thorium
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.	B	Isotopic Uranium
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher	C	Radionuclides by gamma spectrometry scan, including Radium-226
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street	D	Lead-210
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106	E	Radium-226
PHONE	816-412-1755	PHONE	816-412-1755	F	
FAX		FAX		G	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com	H	
				I	
				J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS-[redacted]-W001	F	12/29/16	09:24	1	none		X	X			X						
2	BDS-[redacted]-W003	F	12/29/16	09:37	1	none		X	X			X						
3	BDS-[redacted]-W004	F	12/29/16	09:48	1	none		X	X			X						
4	BDS-[redacted]-W005	F	12/29/16	09:51	1	none		X	X			X						
5	BDS-[redacted]-W006	F	12/29/16	09:50	1	none		X	X			X						
6	BDS-[redacted]-W007	F	12/29/16	09:45	1	none		X	X			X						
7	BDS-[redacted]-W010	F	12/29/16	09:55	1	none		X	X			X						
8	BDS-[redacted]-W016	F	12/29/16	10:25	1	none		X	X			X						
9	BDS-[redacted]-W024	F	12/29/16	11:11	1	none		X	X			X						
10	BDS-[redacted]-W034	F	12/29/16	10:55	1	none		X	X			X						
11	BDS-[redacted]-W036	F	12/29/16	11:10	1	none		X	X			X						
12	BDS-[redacted]-W042	F	12/29/16	11:32	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)
PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other	

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nevatt-Sugg	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701077	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2		
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv	PARAMETER/METHOD REQUEST FOR ANALYSIS	
		PURCHASE ORDER	1133109	A	Isotopic Thorium
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.	B	Isotopic Uranium
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher	C	Radionuclides by gamma spectrometry scan, including Radium-226
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street	D	Lead-210
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106	E	Radium-226
PHONE	816-412-1755	PHONE	816-412-1755	F	
FAX		FAX		G	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com	H	
				I	
				J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
wipes 13	BDS-[redacted]W055	F	12/29/16	13:06	1	None		X	X			X						
14	BDS-[redacted]W061	F	12/29/16	14:44	1	none		X	X			X						
BD cartridge 15	BDS-[redacted]BD01	F	12/29/16	11:15	2	none		X	X			X						
16	BDS-[redacted]FB	F	12/29/16	12:00	1	none		X	X			X						
17	BDS-[redacted]C-S001	S	12/28/16	15:20	1	none		X	X	X	X							
18	BDS-[redacted]C-S002	S	12/28/16	15:40	1	none		X	X	X	X							
19	BDS-[redacted]G-S003	S	12/28/16	15:42	1	none		X	X	X	X							
Soil bags 20	BDS-[redacted]G-S004	S	12/28/16	15:43	1	none		X	X	X	X							
21	BDS-[redacted]G-S005	S	12/28/16	15:45	1	none		X	X	X	X							
22	BDS-[redacted]G-S006	S	12/28/16	15:47	1	none		X	X	X	X							
23	BDS-[redacted]G-S007	S	12/28/16	15:52	1	none		X	X	X	X							

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua [illegible] Shea	1-10-17	10 10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 170177

Project Manager: JE / MH Initials: JNS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?			YES	NO
2. Are custody seals on shipping containers intact?	NONE		YES	NO
3. Are Custody seals on sample containers intact?	NONE		YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?			YES	NO
5. Are the COC and bottle labels complete and legible?			YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)			YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF		YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A		YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A		YES	NO
10. Is there sufficient sample for the requested analyses?			YES	NO
11. Were all samples placed in the proper containers for the requested analyses?			YES	NO
12. Are all samples within holding times for the requested analyses?			YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)			YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A		YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A		YES	NO
16. Were the samples shipped on ice?			YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY		YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [signature] 1-10-17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701077

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017
1:11:17 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-1	BDS-[redacted]W001	Sample	Th-228	0.09 +/- 0.14	0.24	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-1	BDS-[redacted]W001	Sample	Th-230	0.05 +/- 0.19	0.32	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-1	BDS-[redacted]W001	Sample	Th-232	0.018 +/- 0.052	0.098	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-2	BDS-[redacted]W003	Sample	Th-228	0.05 +/- 0.12	0.22	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-2	BDS-[redacted]W003	Sample	Th-230	-0.01 +/- 0.16	0.28	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-2	BDS-[redacted]W003	Sample	Th-232	0.029 +/- 0.036	0.054	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-3	BDS-[redacted]W004	Sample	Th-228	-0.07 +/- 0.12	0.22	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-3	BDS-[redacted]W004	Sample	Th-230	-0.03 +/- 0.14	0.26	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-3	BDS-[redacted]W004	Sample	Th-232	0.044 +/- 0.046	0.068	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U

Comments:

Data Package ID: *TH1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017
1:11:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-4	BDS-[redacted]W005	Sample	Th-228	0.02 +/- 0.12	0.21	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-4	BDS-[redacted]W005	Sample	Th-230	-0.22 +/- 0.15	0.29	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-4	BDS-[redacted]W005	Sample	Th-232	0.008 +/- 0.037	0.070	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-5	BDS-[redacted]W006	Sample	Th-228	-0.01 +/- 0.13	0.23	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-5	BDS-[redacted]W006	Sample	Th-230	0 +/- 0.17	0.30	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-5	BDS-[redacted]W006	Sample	Th-232	0.023 +/- 0.038	0.057	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-6	BDS-[redacted]W007	Sample	Th-228	0.10 +/- 0.12	0.19	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-6	BDS-[redacted]W007	Sample	Th-230	-0.09 +/- 0.16	0.29	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-6	BDS-[redacted]W007	Sample	Th-232	0.016 +/- 0.044	0.084	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U

Comments:

Data Package ID: *TH1701077-1*

Qualifiers/Flags:

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Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017 1:11:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-7	BDS-[redacted]W010	Sample	Th-228	-0.02 +/- 0.14	0.25	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-7	BDS-[redacted]W010	Sample	Th-230	-0.10 +/- 0.15	0.29	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-7	BDS-[redacted]W010	Sample	Th-232	0.031 +/- 0.039	0.021	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	LT
1701077-8	BDS-[redacted]W016	Sample	Th-228	-0.01 +/- 0.11	0.21	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-8	BDS-[redacted]W016	Sample	Th-230	-0.20 +/- 0.14	0.28	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-8	BDS-[redacted]W016	Sample	Th-232	0.036 +/- 0.044	0.067	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-9	BDS-[redacted]W024	Sample	Th-228	0.12 +/- 0.12	0.19	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-9	BDS-[redacted]W024	Sample	Th-230	0.20 +/- 0.18	0.29	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-9	BDS-[redacted]W024	Sample	Th-232	0.090 +/- 0.058	0.055	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	LT

Comments:

Data Package ID: *TH1701077-1*

Qualifiers/Flags:

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Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017 1:11:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-10	BDS-[redacted]W034	Sample	Th-228	-0.01 +/- 0.12	0.22	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-10	BDS-[redacted]W034	Sample	Th-230	-0.12 +/- 0.16	0.29	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-10	BDS-[redacted]W034	Sample	Th-232	0.022 +/- 0.040	0.069	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-11	BDS-[redacted]W036	Sample	Th-228	-0.04 +/- 0.12	0.22	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-11	BDS-[redacted]W036	Sample	Th-230	-0.06 +/- 0.15	0.28	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-11	BDS-[redacted]W036	Sample	Th-232	0.007 +/- 0.035	0.053	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-12	BDS-[redacted]W042	Sample	Th-228	-0.02 +/- 0.12	0.23	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-12	BDS-[redacted]W042	Sample	Th-230	-0.03 +/- 0.16	0.29	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-12	BDS-[redacted]W042	Sample	Th-232	-0.008 +/- 0.041	0.093	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U

Comments:

Data Package ID: *TH1701077-1*

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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017 1:11:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-13	BDS-[redacted]W055	Sample	Th-228	0.04 +/- 0.14	0.24	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-13	BDS-[redacted]W055	Sample	Th-230	-0.11 +/- 0.16	0.30	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-13	BDS-[redacted]W055	Sample	Th-232	0 +/- 0.041	0.078	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-14	BDS-[redacted]W061	Sample	Th-228	0.04 +/- 0.12	0.21	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-14	BDS-[redacted]W061	Sample	Th-230	-0.02 +/- 0.16	0.28	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U,M
1701077-14	BDS-[redacted]W061	Sample	Th-232	0 +/- 0.037	0.082	NA	pCi/sample	WIPE	AS170201-1	2/3/2017	U
1701077-15	BDS-[redacted]BD01	Sample	Th-228	9.8 +/- 1.6	0.1	NA	pCi/g	FILTER	AS170201-1	2/3/2017	M3
1701077-15	BDS-[redacted]BD01	Sample	Th-230	1.80 +/- 0.35	0.19	NA	pCi/g	FILTER	AS170201-1	2/3/2017	M3
1701077-15	BDS-[redacted]BD01	Sample	Th-232	9.9 +/- 1.6	0	NA	pCi/g	FILTER	AS170201-1	2/3/2017	

Comments:

Data Package ID: *TH1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
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Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017
1:11:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-16	BDS-[redacted]FB	Sample	Th-228	-0.02 +/- 0.10	0.19	NA	pCi/g	FILTER	AS170201-1	2/3/2017	U,M
1701077-16	BDS-[redacted]FB	Sample	Th-230	0.04 +/- 0.16	0.28	NA	pCi/g	FILTER	AS170201-1	2/3/2017	U,M
1701077-16	BDS-[redacted]FB	Sample	Th-232	0.014 +/- 0.041	0.077	NA	pCi/g	FILTER	AS170201-1	2/3/2017	U
1701077-17	BDS-[redacted]C-S001	Sample	Th-228	1.00 +/- 0.18	0.05	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-17	BDS-[redacted]C-S001	Sample	Th-230	1.04 +/- 0.19	0.07	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-17	BDS-[redacted]C-S001	Sample	Th-232	0.95 +/- 0.17	0.01	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-18	BDS-[redacted]C-S002	Sample	Th-228	1.10 +/- 0.19	0.03	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-18	BDS-[redacted]C-S002	Sample	Th-230	1.18 +/- 0.21	0.07	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-18	BDS-[redacted]C-S002	Sample	Th-232	1.16 +/- 0.20	0.02	NA	pCi/g	SOIL	AS170131-5	2/3/2017	

Comments:

Data Package ID: *TH1701077-1*

Qualifiers/Flags:

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Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017
1:11:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-19	BDS-[redacted]G-S003	Sample	Th-228	1.16 +/- 0.20	0.03	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-19	BDS-[redacted]G-S003	Sample	Th-230	1.29 +/- 0.22	0.07	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-19	BDS-[redacted]G-S003	Sample	Th-232	1.04 +/- 0.18	0.02	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-20	BDS-[redacted]G-S004	Sample	Th-228	1.05 +/- 0.19	0.05	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-20	BDS-[redacted]G-S004	Sample	Th-230	1.15 +/- 0.21	0.08	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-20	BDS-[redacted]G-S004	Sample	Th-232	1.09 +/- 0.20	0.02	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-21	BDS-[redacted]G-S005	Sample	Th-228	1.01 +/- 0.19	0.04	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-21	BDS-[redacted]G-S005	Sample	Th-230	1.04 +/- 0.19	0.08	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-21	BDS-[redacted]G-S005	Sample	Th-232	0.99 +/- 0.18	0.02	NA	pCi/g	SOIL	AS170131-5	2/3/2017	

Comments:

Data Package ID: *TH1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Isotopic Thorium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 07, 2017
1:11:19 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-22	BDS-[redacted]G-S006	Sample	Th-228	0.74 +/- 0.13	0.03	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-22	BDS-[redacted]G-S006	Sample	Th-230	0.85 +/- 0.15	0.06	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-22	BDS-[redacted]G-S006	Sample	Th-232	0.72 +/- 0.13	0.01	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-23	BDS-[redacted]G-S007	Sample	Th-228	1.30 +/- 0.23	0.05	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-23	BDS-[redacted]G-S007	Sample	Th-230	1.17 +/- 0.21	0.08	NA	pCi/g	SOIL	AS170131-5	2/3/2017	
1701077-23	BDS-[redacted]G-S007	Sample	Th-232	1.16 +/- 0.21	0.01	NA	pCi/g	SOIL	AS170131-5	2/3/2017	

Comments:

Data Package ID: *TH1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-5MB

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.002 +/- 0.012	0.022	0.1	NA	U
14269-63-7	Th-230	-0.018 +/- 0.018	0.035	0.1	NA	U
7440-29-1	Th-232	0.0028 +/- 0.0055	0.0099	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.87	pCi/g	84.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-1MB

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.006 +/- 0.028	0.049	0.1	NA	U
14269-63-7	Th-230	-0.045 +/- 0.040	0.076	0.1	NA	U
7440-29-1	Th-232	0.015 +/- 0.012	0.014	0.1	NA	B3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.417	2.90	pCi/sample	65.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-1MB

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-2
Run ID: AS170201-1T
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.003 +/- 0.014	0.025	0.1	NA	U
14269-63-7	Th-230	-0.022 +/- 0.020	0.038	0.1	NA	U
7440-29-1	Th-232	0.0077 +/- 0.0062	0.0071	0.1	NA	B3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.45	pCi/g	65.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *TH1701077-2*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-5LCS

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	2.37 +/- 0.38	0.04	2.464	96.3	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.57	pCi/g	71.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-1LCS

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	4.84 +/- 0.77	0.07	4.929	98.2	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.417	3.02	pCi/sample	68.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-1LCS

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-2
Run ID: AS170201-1T
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	2.42 +/- 0.39	0.04	2.464	98.2	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.51	pCi/g	68.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701077-2*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-1LCSD

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	4.81 +/- 0.77	0.08	4.929	97.6	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.417	2.87	pCi/sample	64.9	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-1LCSD

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-2
Run ID: AS170201-1T
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14269-63-7	Th-230	2.41 +/- 0.39	0.04	2.464	97.6	85 - 121	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	2.209	1.43	pCi/g	64.9	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *TH1701077-2*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18DUP

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14274-82-9	Th-228	1.10 +/- 0.19	0.03		1.05 +/- 0.18	0.03		0.201	2.13
14269-63-7	Th-230	1.18 +/- 0.21	0.07		1.11 +/- 0.19	0.07		0.267	2.13
7440-29-1	Th-232	1.16 +/- 0.20	0.02		0.96 +/- 0.17	0.01		0.791	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-1LCSD

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14269-63-7	Th-230	4.84 +/- 0.77	0.07	P	4.81 +/- 0.77	0.08	P	0.0291	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-1LCSD

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-2
Run ID: AS170201-1T
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
14269-63-7	Th-230	2.42 +/- 0.39	0.04	P	2.41 +/- 0.39	0.04	P	0.0291	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *TH1701077-2*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W001
Lab ID: 1701077-1

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.09 +/- 0.14	0.24	0.1	NA	U,M
14269-63-7	Th-230	0.05 +/- 0.19	0.32	0.1	NA	U,M
7440-29-1	Th-232	0.018 +/- 0.052	0.098	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	12.1	pCi/sample	68.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W003
Lab ID: 1701077-2

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.05 +/- 0.12	0.22	0.1	NA	U,M
14269-63-7	Th-230	-0.01 +/- 0.16	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.029 +/- 0.036	0.054	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	15.3	pCi/sample	86.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W004
Lab ID: 1701077-3

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.07 +/- 0.12	0.22	0.1	NA	U,M
14269-63-7	Th-230	-0.03 +/- 0.14	0.26	0.1	NA	U,M
7440-29-1	Th-232	0.044 +/- 0.046	0.068	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	16.4	pCi/sample	92.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W005
Lab ID: 1701077-4

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.02 +/- 0.12	0.21	0.1	NA	U,M
14269-63-7	Th-230	-0.22 +/- 0.15	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.008 +/- 0.037	0.070	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.6	pCi/sample	77.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W006
Lab ID: 1701077-5

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.01 +/- 0.13	0.23	0.1	NA	U,M
14269-63-7	Th-230	0 +/- 0.17	0.30	0.1	NA	U,M
7440-29-1	Th-232	0.023 +/- 0.038	0.057	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.8	pCi/sample	78.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W007
Lab ID: 1701077-6

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.10 +/- 0.12	0.19	0.1	NA	U,M
14269-63-7	Th-230	-0.09 +/- 0.16	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.016 +/- 0.044	0.084	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.1	pCi/sample	80.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W010
Lab ID: 1701077-7

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.02 +/- 0.14	0.25	0.1	NA	U,M
14269-63-7	Th-230	-0.10 +/- 0.15	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.031 +/- 0.039	0.021	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.0	pCi/sample	79.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W016
Lab ID: 1701077-8

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.01 +/- 0.11	0.21	0.1	NA	U,M
14269-63-7	Th-230	-0.20 +/- 0.14	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.036 +/- 0.044	0.067	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.7	pCi/sample	82.9	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W024
Lab ID: 1701077-9

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.12 +/- 0.12	0.19	0.1	NA	U,M
14269-63-7	Th-230	0.20 +/- 0.18	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.090 +/- 0.058	0.055	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.4	pCi/sample	81.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W034
Lab ID: 1701077-10

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.01 +/- 0.12	0.22	0.1	NA	U,M
14269-63-7	Th-230	-0.12 +/- 0.16	0.29	0.1	NA	U,M
7440-29-1	Th-232	0.022 +/- 0.040	0.069	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.8	pCi/sample	78.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W036
Lab ID: 1701077-11

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.04 +/- 0.12	0.22	0.1	NA	U,M
14269-63-7	Th-230	-0.06 +/- 0.15	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.007 +/- 0.035	0.053	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	15.0	pCi/sample	84.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W042
Lab ID: 1701077-12

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.02 +/- 0.12	0.23	0.1	NA	U,M
14269-63-7	Th-230	-0.03 +/- 0.16	0.29	0.1	NA	U,M
7440-29-1	Th-232	-0.008 +/- 0.041	0.093	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	13.7	pCi/sample	77.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W055
Lab ID: 1701077-13

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.04 +/- 0.14	0.24	0.1	NA	U,M
14269-63-7	Th-230	-0.11 +/- 0.16	0.30	0.1	NA	U,M
7440-29-1	Th-232	0 +/- 0.041	0.078	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	12.5	pCi/sample	71.0	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W061
Lab ID: 1701077-14

Sample Matrix: WIPE
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-1
Run ID: AS170201-1TH
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.04 +/- 0.12	0.21	0.1	NA	U,M
14269-63-7	Th-230	-0.02 +/- 0.16	0.28	0.1	NA	U,M
7440-29-1	Th-232	0 +/- 0.037	0.082	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.1	pCi/sample	79.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]BD01
Lab ID: 1701077-15

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-2
Run ID: AS170201-1T
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.361 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	9.8 +/- 1.6	0.1	0.1	NA	M3
14269-63-7	Th-230	1.80 +/- 0.35	0.19	0.1	NA	M3
7440-29-1	Th-232	9.9 +/- 1.6	0	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	12.24	10.4	pCi/g	84.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] FB
Lab ID: 1701077-16

Sample Matrix: FILTER
Prep SOP: PAI 777 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170201-1
QCBatchID: AS170201-1-2
Run ID: AS170201-1T
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	-0.02 +/- 0.10	0.19	0.1	NA	U,M
14269-63-7	Th-230	0.04 +/- 0.16	0.28	0.1	NA	U,M
7440-29-1	Th-232	0.014 +/- 0.041	0.077	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	17.67	14.1	pCi/g	79.7	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S001
Lab ID: 1701077-17

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.00 +/- 0.18	0.05	0.1	NA	
14269-63-7	Th-230	1.04 +/- 0.19	0.07	0.1	NA	
7440-29-1	Th-232	0.95 +/- 0.17	0.01	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.396	3.22	pCi/g	73.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.10 +/- 0.19	0.03	0.1	NA	
14269-63-7	Th-230	1.18 +/- 0.21	0.07	0.1	NA	
7440-29-1	Th-232	1.16 +/- 0.20	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.409	3.39	pCi/g	76.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Duplicate Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18DUP

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.05 +/- 0.18	0.03	0.1	NA	
14269-63-7	Th-230	1.11 +/- 0.19	0.07	0.1	NA	
7440-29-1	Th-232	0.96 +/- 0.17	0.01	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.355	3.80	pCi/g	87.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] G-S003
Lab ID: 1701077-19

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.16 +/- 0.20	0.03	0.1	NA	
14269-63-7	Th-230	1.29 +/- 0.22	0.07	0.1	NA	
7440-29-1	Th-232	1.04 +/- 0.18	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.275	3.27	pCi/g	76.5	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] G-S004
Lab ID: 1701077-20

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.05 +/- 0.19	0.05	0.1	NA	
14269-63-7	Th-230	1.15 +/- 0.21	0.08	0.1	NA	
7440-29-1	Th-232	1.09 +/- 0.20	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.306	2.48	pCi/g	57.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] G-S005
Lab ID: 1701077-21

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.01 +/- 0.19	0.04	0.1	NA	
14269-63-7	Th-230	1.04 +/- 0.19	0.08	0.1	NA	
7440-29-1	Th-232	0.99 +/- 0.18	0.02	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.383	2.66	pCi/g	60.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] G-S006
Lab ID: 1701077-22

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	0.74 +/- 0.13	0.03	0.1	NA	
14269-63-7	Th-230	0.85 +/- 0.15	0.06	0.1	NA	
7440-29-1	Th-232	0.72 +/- 0.13	0.01	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.260	3.60	pCi/g	84.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Thorium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted] G-S007
Lab ID: 1701077-23

Sample Matrix: SOIL
Prep SOP: PAI 777 Rev 12
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 03-Feb-17

Prep Batch: AS170131-5
QCBatchID: AS170131-5-1
Run ID: AS170131-5TH
Count Time: 1000 minutes
Report Basis: Dry Weight

Final Aliquot: 1.00 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14274-82-9	Th-228	1.30 +/- 0.23	0.05	0.1	NA	
14269-63-7	Th-230	1.17 +/- 0.21	0.08	0.1	NA	
7440-29-1	Th-232	1.16 +/- 0.21	0.01	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Th-229	4.407	2.61	pCi/g	59.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *TH1701077-1*

Isotopic Uranium

Case Narrative

TetraTech

Bridgeton Dust Site – 103X9025160104.003

Work Order Number: 1701077

1. This report consists of the analytical results and supporting documentation for 14 wipe samples, two filter samples, and seven soil samples received by ALS on 01/10/2017.

2. The soil samples were prepared according to the current revisions of SOP 736, SOP 773, and SOP 778. The wipe and filter samples were prepared according to the current revisions of SOP 776 and SOP 778.

3. The samples were analyzed for the presence of isotopic uranium according to the current revision of SOP 714. The analyses were completed on 02/06/207.

4. The isotopic analysis results for the soil samples are reported on a 'Dry Weight' basis in units of pCi/gram. The analysis results for the filter samples are reported on an 'As Received' basis in pCi/gram. The analysis results for the wipe samples are reported on an 'As Received' basis in pCi/sample.

5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate in batch AS170201-3.

6. This analytical method quantifies U-235 alpha activity in a specific region of interest corresponding to emission energies between those of U-234 and U-238. A potential limitation of this method is that measurable amounts of U-234 in the sample may cause a small amount of characteristic activity in the U-235 region of interest due to poorly resolved alpha activity at the boundary between the two regions. To minimize the potential for a high bias in the U-235 analytical results, the U-235 region of interest has been narrowed and limited to a lower energy region. An 85.1% abundance correction has been made to the final U-235 results.

7. ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.

8. Uranium-238 activity in the associated method blank AS170131-1MB and all analyte activity in the associated method blank AS170201-3MB is reported above the minimum detectable concentration value, as indicated with a "B3" qualifier on the final reports. The measured blank activity is below the requested MDC. Results are acceptable according to the current revision of SOP 715, and are submitted without further qualification.

9. The requested MDC for U-234 was not met for sample 1701077-9. The sample was counted for a maximum count time of 1000 minutes. This sample is identified with an "M" flag on the final reports.

10. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen — 2/8/17
Radiochemistry Primary Data Reviewer — Date

Radiochemistry Final Data Reviewer — 2/21/17
Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701077
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701077-1		WIPE	29-Dec-16	9:24
BDS-[redacted]W003	1701077-2		WIPE	29-Dec-16	9:37
BDS-[redacted]W004	1701077-3		WIPE	29-Dec-16	9:48
BDS-[redacted]W005	1701077-4		WIPE	29-Dec-16	9:51
BDS-[redacted]W006	1701077-5		WIPE	29-Dec-16	9:50
BDS-[redacted]W007	1701077-6		WIPE	29-Dec-16	9:45
BDS-[redacted]W010	1701077-7		WIPE	29-Dec-16	9:55
BDS-[redacted]W016	1701077-8		WIPE	29-Dec-16	10:25
BDS-[redacted]W024	1701077-9		WIPE	29-Dec-16	11:11
BDS-[redacted]W034	1701077-10		WIPE	29-Dec-16	10:55
BDS-[redacted]W036	1701077-11		WIPE	29-Dec-16	11:10
BDS-[redacted]W042	1701077-12		WIPE	29-Dec-16	11:32
BDS-[redacted]W055	1701077-13		WIPE	29-Dec-16	13:06
BDS-[redacted]W061	1701077-14		WIPE	29-Dec-16	14:44
BDS-[redacted]BD01	1701077-15		FILTER	29-Dec-16	11:15
BDS-[redacted]FB	1701077-16		FILTER	29-Dec-16	12:00
BDS-[redacted]C-S001	1701077-17		SOIL	28-Dec-16	15:20
BDS-[redacted]C-S002	1701077-18		SOIL	28-Dec-16	15:40
BDS-[redacted]G-S003	1701077-19		SOIL	28-Dec-16	15:42
BDS-[redacted]G-S004	1701077-20		SOIL	28-Dec-16	15:43
BDS-[redacted]G-S005	1701077-21		SOIL	28-Dec-16	15:45
BDS-[redacted]G-S006	1701077-22		SOIL	28-Dec-16	15:47
BDS-[redacted]G-S007	1701077-23		SOIL	28-Dec-16	15:52

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701077	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2		
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv	PARAMETER/METHOD REQUEST FOR ANALYSIS	
		PURCHASE ORDER	1133109	A	Isotopic Thorium
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.	B	Isotopic Uranium
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher	C	Radionuclides by gamma spectrometry scan, including Radium-226
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street	D	Lead-210
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106	E	Radium-226
PHONE	816-412-1755	PHONE	816-412-1755	F	
FAX		FAX		G	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com	H	
				I	
				J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS-[redacted]-W001	F	12/29/16	09:24	1	none		X	X			X						
2	BDS-[redacted]-W003	F	12/29/16	09:37	1	none		X	X			X						
3	BDS-[redacted]-W004	F	12/29/16	09:48	1	none		X	X			X						
4	BDS-[redacted]-W005	F	12/29/16	09:51	1	none		X	X			X						
5	BDS-[redacted]-W006	F	12/29/16	09:50	1	none		X	X			X						
6	BDS-[redacted]-W007	F	12/29/16	09:45	1	none		X	X			X						
7	BDS-[redacted]-W010	F	12/29/16	09:55	1	none		X	X			X						
8	BDS-[redacted]-W016	F	12/29/16	10:25	1	none		X	X			X						
9	BDS-[redacted]-W024	F	12/29/16	11:11	1	none		X	X			X						
10	BDS-[redacted]-W034	F	12/29/16	10:55	1	none		X	X			X						
11	BDS-[redacted]-W036	F	12/29/16	11:10	1	none		X	X			X						
12	BDS-[redacted]-W042	F	12/29/16	11:32	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)
PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other	

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nevatt-Sweet	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER # 1701077

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
wipes 13	BDS-[redacted]-W055	F	12/29/16	13:06	1	None		X	X			X						
14	BDS-[redacted]-W061	F	12/29/16	14:44	1	none		X	X			X						
BD cartridge 15	BDS-[redacted]-BD01	F	12/29/16	11:15	2	none		X	X			X						
16	BDS-[redacted]-FB	F	12/29/16	12:00	1	none		X	X			X						
17	BDS-[redacted]-C-S001	S	12/28/16	15:20	1	none		X	X	X	X							
18	BDS-[redacted]-C-S002	S	12/28/16	15:40	1	none		X	X	X	X							
19	BDS-[redacted]-G-S003	S	12/28/16	15:42	1	none		X	X	X	X							
Soil bags 20	BDS-[redacted]-G-S004	S	12/28/16	15:43	1	none		X	X	X	X							
21	BDS-[redacted]-G-S005	S	12/28/16	15:45	1	none		X	X	X	X							
22	BDS-[redacted]-G-S006	S	12/28/16	15:47	1	none		X	X	X	X							
23	BDS-[redacted]-G-S007	S	12/28/16	15:52	1	none		X	X	X	X							

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua [illegible] Shea	1-10-17	10 10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 170177

Project Manager: JE / MH Initials: JNS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?			YES	NO
2. Are custody seals on shipping containers intact?	NONE		YES	NO
3. Are Custody seals on sample containers intact?	NONE		YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?			YES	NO
5. Are the COC and bottle labels complete and legible?			YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)			YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF		YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A		YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A		YES	NO
10. Is there sufficient sample for the requested analyses?			YES	NO
11. Were all samples placed in the proper containers for the requested analyses?			YES	NO
12. Are all samples within holding times for the requested analyses?			YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)			YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A		YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A		YES	NO
16. Were the samples shipped on ice?			YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY		YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [signature] 1-10-17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701077

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Wednesday, February 08, 2017
10:22:51 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-1	BDS-[redacted]W001	Sample	U-234	0.076 +/- 0.051	0.051	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	LT
1701077-1	BDS-[redacted]W001	Sample	U-235	0.016 +/- 0.040	0.022	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U
1701077-1	BDS-[redacted]W001	Sample	U-238	0.021 +/- 0.034	0.051	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U
1701077-2	BDS-[redacted]W003	Sample	U-234	0.128 +/- 0.068	0.069	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	
1701077-2	BDS-[redacted]W003	Sample	U-235	0.023 +/- 0.037	0.020	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	LT
1701077-2	BDS-[redacted]W003	Sample	U-238	0 +/- 0.031	0.060	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U
1701077-3	BDS-[redacted]W004	Sample	U-234	0.115 +/- 0.061	0.056	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	
1701077-3	BDS-[redacted]W004	Sample	U-235	0.014 +/- 0.035	0.052	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U
1701077-3	BDS-[redacted]W004	Sample	U-238	0.054 +/- 0.047	0.065	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U

Comments:

Data Package ID: *UR1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

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PAI Work Order: 1701077

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10:22:51 AM

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1701077-4	BDS-[redacted]W005	Sample	U-234	0.026 +/- 0.037	0.060	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U
1701077-4	BDS-[redacted]W005	Sample	U-235	0.030 +/- 0.037	0.056	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U
1701077-4	BDS-[redacted]W005	Sample	U-238	0 +/- 0.041	0.084	NA	pCi/sample	WIPE	AS170201-3	2/5/2017	U
1701077-5	BDS-[redacted]W006	Sample	U-234	0.069 +/- 0.050	0.058	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	LT
1701077-5	BDS-[redacted]W006	Sample	U-235	0.015 +/- 0.036	0.069	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-5	BDS-[redacted]W006	Sample	U-238	0 +/- 0.036	0.075	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-6	BDS-[redacted]W007	Sample	U-234	0.040 +/- 0.042	0.061	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-6	BDS-[redacted]W007	Sample	U-235	-0.016 +/- 0.038	0.093	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-6	BDS-[redacted]W007	Sample	U-238	0.033 +/- 0.040	0.061	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U

Comments:

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PAI Work Order: 1701077

Reported on: Wednesday, February 08, 2017 10:22:51 AM

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1701077-7	BDS-[redacted]W010	Sample	U-234	0.078 +/- 0.046	0.018	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	LT
1701077-7	BDS-[redacted]W010	Sample	U-235	0.030 +/- 0.038	0.021	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	LT
1701077-7	BDS-[redacted]W010	Sample	U-238	0 +/- 0.041	0.085	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-8	BDS-[redacted]W016	Sample	U-234	0.032 +/- 0.049	0.083	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-8	BDS-[redacted]W016	Sample	U-235	0.007 +/- 0.036	0.055	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-8	BDS-[redacted]W016	Sample	U-238	0.038 +/- 0.036	0.046	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-9	BDS-[redacted]W024	Sample	U-234	0.041 +/- 0.065	0.109	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U,M
1701077-9	BDS-[redacted]W024	Sample	U-235	-0.008 +/- 0.040	0.075	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-9	BDS-[redacted]W024	Sample	U-238	0.014 +/- 0.034	0.064	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U

Comments:

Data Package ID: *UR1701077-1*

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PAI Work Order: 1701077

Reported on: Wednesday, February 08, 2017 10:22:51 AM

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1701077-10	BDS-[redacted]W034	Sample	U-234	0.067 +/- 0.055	0.072	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-10	BDS-[redacted]W034	Sample	U-235	0.008 +/- 0.039	0.021	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-10	BDS-[redacted]W034	Sample	U-238	0.040 +/- 0.038	0.049	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-11	BDS-[redacted]W036	Sample	U-234	0.027 +/- 0.033	0.050	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-11	BDS-[redacted]W036	Sample	U-235	0.016 +/- 0.039	0.074	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-11	BDS-[redacted]W036	Sample	U-238	0.027 +/- 0.033	0.018	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	LT
1701077-12	BDS-[redacted]W042	Sample	U-234	0.021 +/- 0.045	0.082	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-12	BDS-[redacted]W042	Sample	U-235	0.016 +/- 0.039	0.059	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-12	BDS-[redacted]W042	Sample	U-238	0.027 +/- 0.039	0.063	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U

Comments:

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Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Wednesday, February 08, 2017 10:22:52 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-13	BDS-[redacted]W055	Sample	U-234	0.039 +/- 0.042	0.061	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-13	BDS-[redacted]W055	Sample	U-235	0.008 +/- 0.038	0.057	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-13	BDS-[redacted]W055	Sample	U-238	0.026 +/- 0.042	0.070	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-14	BDS-[redacted]W061	Sample	U-234	0.073 +/- 0.062	0.087	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-14	BDS-[redacted]W061	Sample	U-235	0 +/- 0.038	0.084	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-14	BDS-[redacted]W061	Sample	U-238	0.033 +/- 0.040	0.061	NA	pCi/sample	WIPE	AS170201-3	2/6/2017	U
1701077-15	BDS-[redacted]BD01	Sample	U-234	0.147 +/- 0.061	0.045	NA	pCi/g	FILTER	AS170201-3	2/6/2017	
1701077-15	BDS-[redacted]BD01	Sample	U-235	0.017 +/- 0.028	0.016	NA	pCi/g	FILTER	AS170201-3	2/6/2017	LT
1701077-15	BDS-[redacted]BD01	Sample	U-238	0.127 +/- 0.060	0.059	NA	pCi/g	FILTER	AS170201-3	2/6/2017	

Comments:

Data Package ID: *UR1701077-1*

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Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Wednesday, February 08, 2017
10:22:52 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-16	BDS-[redacted]FB	Sample	U-234	0.085 +/- 0.055	0.052	NA	pCi/g	FILTER	AS170201-3	2/6/2017	LT
1701077-16	BDS-[redacted]FB	Sample	U-235	0.017 +/- 0.041	0.077	NA	pCi/g	FILTER	AS170201-3	2/6/2017	U
1701077-16	BDS-[redacted]FB	Sample	U-238	0.028 +/- 0.035	0.052	NA	pCi/g	FILTER	AS170201-3	2/6/2017	U
1701077-17	BDS-[redacted]C-S001	Sample	U-234	0.68 +/- 0.16	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-17	BDS-[redacted]C-S001	Sample	U-235	0.072 +/- 0.043	0.036	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701077-17	BDS-[redacted]C-S001	Sample	U-238	0.85 +/- 0.19	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-18	BDS-[redacted]C-S002	Sample	U-234	0.78 +/- 0.17	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-18	BDS-[redacted]C-S002	Sample	U-235	0.030 +/- 0.030	0.044	NA	pCi/g	SOIL	AS170131-1	2/6/2017	U
1701077-18	BDS-[redacted]C-S002	Sample	U-238	0.88 +/- 0.19	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	

Comments:

Data Package ID: *UR1701077-1*

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Laboratory Name: **ALS -- Fort Collins**
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Reported on: Wednesday, February 08, 2017
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-19	BDS-[redacted]G-S003	Sample	U-234	0.78 +/- 0.18	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-19	BDS-[redacted]G-S003	Sample	U-235	0.053 +/- 0.036	0.030	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701077-19	BDS-[redacted]G-S003	Sample	U-238	0.86 +/- 0.19	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-20	BDS-[redacted]G-S004	Sample	U-234	0.79 +/- 0.18	0.05	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-20	BDS-[redacted]G-S004	Sample	U-235	0.040 +/- 0.032	0.036	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701077-20	BDS-[redacted]G-S004	Sample	U-238	0.85 +/- 0.19	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-21	BDS-[redacted]G-S005	Sample	U-234	0.94 +/- 0.21	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-21	BDS-[redacted]G-S005	Sample	U-235	0.053 +/- 0.039	0.018	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701077-21	BDS-[redacted]G-S005	Sample	U-238	0.75 +/- 0.18	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	

Comments:

Data Package ID: *UR1701077-1*

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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-22	BDS-[redacted]G-S006	Sample	U-234	0.69 +/- 0.17	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-22	BDS-[redacted]G-S006	Sample	U-235	0.033 +/- 0.032	0.041	NA	pCi/g	SOIL	AS170131-1	2/6/2017	U
1701077-22	BDS-[redacted]G-S006	Sample	U-238	0.77 +/- 0.18	0.01	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-23	BDS-[redacted]G-S007	Sample	U-234	0.86 +/- 0.19	0.04	NA	pCi/g	SOIL	AS170131-1	2/6/2017	
1701077-23	BDS-[redacted]G-S007	Sample	U-235	0.051 +/- 0.035	0.029	NA	pCi/g	SOIL	AS170131-1	2/6/2017	LT
1701077-23	BDS-[redacted]G-S007	Sample	U-238	0.95 +/- 0.20	0.03	NA	pCi/g	SOIL	AS170131-1	2/6/2017	

Comments:

Data Package ID: *UR1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-1MB

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.010 +/- 0.010	0.012	0.1	NA	U
15117-96-1	U-235	-0.0010 +/- 0.0097	0.0146	0.1	NA	U
7440-61-1	U-238	0.0068 +/- 0.0084	0.0061	0.1	NA	B3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	1.94	pCi/g	82.5	30 - 110 %	

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-3MB

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-1
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.0159 +/- 0.0084	0.0077	0.1	NA	B3
15117-96-1	U-235	0.0049 +/- 0.0049	0.0027	0.1	NA	B3
7440-61-1	U-238	0.0067 +/- 0.0054	0.0061	0.1	NA	B3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	2.08	pCi/g	88.8	30 - 110 %	

Comments:

Qualifiers/Flags:
U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit

M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-3MB

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.032 +/- 0.017	0.015	0.1	NA	B3
15117-96-1	U-235	0.0098 +/- 0.0097	0.0053	0.1	NA	B3
7440-61-1	U-238	0.013 +/- 0.011	0.012	0.1	NA	B3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.692	4.17	pCi/sample	88.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *UR1701077-2*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170131-1LCS

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	2.31 +/- 0.39	0.02	2.208	105	82 - 122	P
7440-61-1	U-238	2.33 +/- 0.40	0.02	2.292	102	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	2.16	pCi/g	92.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-3LCS

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-1
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	2.52 +/- 0.40	0	2.208	114	82 - 122	P
7440-61-1	U-238	2.62 +/- 0.41	0.01	2.292	114	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	2.14	pCi/g	91.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-3LCS

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	5.04 +/- 0.79	0	4.416	114	82 - 122	P
7440-61-1	U-238	5.24 +/- 0.82	0.02	4.585	114	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.692	4.29	pCi/sample	91.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701077-2*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-3LCSD

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-1
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	2.40 +/- 0.38	0.01	2.208	109	82 - 122	P
7440-61-1	U-238	2.47 +/- 0.39	0.01	2.292	108	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	2.346	2.10	pCi/g	89.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: AS170201-3LCSD

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13966-29-5	U-234	4.79 +/- 0.76	0.02	4.416	109	82 - 122	P
7440-61-1	U-238	4.94 +/- 0.78	0.02	4.585	108	82 - 122	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.692	4.19	pCi/sample	89.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *UR1701077-2*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-3LCSD

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-1
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 2.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13966-29-5	U-234	2.52 +/- 0.40	0	P	2.40 +/- 0.38	0.01	P	0.229	2.13
7440-61-1	U-238	2.62 +/- 0.41	0.01	P	2.47 +/- 0.39	0.01	P	0.266	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: AS170201-3LCSD

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 02-Feb-17
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13966-29-5	U-234	5.04 +/- 0.79	0	P	4.79 +/- 0.76	0.02	P	0.229	2.13
7440-61-1	U-238	5.24 +/- 0.82	0.02	P	4.94 +/- 0.78	0.02	P	0.266	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *UR1701077-2*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18DUP

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes

Final Aliquot: 1.04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13966-29-5	U-234	0.78 +/- 0.17	0.03		0.87 +/- 0.19	0.01		0.318	2.13
15117-96-1	U-235	0.030 +/- 0.030	0.044	U	0.040 +/- 0.031	0.015	LT	0.235	2.13
7440-61-1	U-238	0.88 +/- 0.19	0.03		0.83 +/- 0.19	0.04		0.19	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *UR1701077-1*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W001
Lab ID: 1701077-1

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.076 +/- 0.051	0.051	0.1	NA	LT
15117-96-1	U-235	0.016 +/- 0.040	0.022	0.1	NA	U
7440-61-1	U-238	0.021 +/- 0.034	0.051	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.4	pCi/sample	82.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W003
Lab ID: 1701077-2

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.128 +/- 0.068	0.069	0.1	NA	
15117-96-1	U-235	0.023 +/- 0.037	0.020	0.1	NA	LT
7440-61-1	U-238	0 +/- 0.031	0.060	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	15.0	pCi/sample	80.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W004
Lab ID: 1701077-3

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.115 +/- 0.061	0.056	0.1	NA	
15117-96-1	U-235	0.014 +/- 0.035	0.052	0.1	NA	U
7440-61-1	U-238	0.054 +/- 0.047	0.065	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.8	pCi/sample	89.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W005
Lab ID: 1701077-4

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 05-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.026 +/- 0.037	0.060	0.1	NA	U
15117-96-1	U-235	0.030 +/- 0.037	0.056	0.1	NA	U
7440-61-1	U-238	0 +/- 0.041	0.084	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.1	pCi/sample	85.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W006
Lab ID: 1701077-5

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.069 +/- 0.050	0.058	0.1	NA	LT
15117-96-1	U-235	0.015 +/- 0.036	0.069	0.1	NA	U
7440-61-1	U-238	0 +/- 0.036	0.075	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	18.7	pCi/sample	99.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W007
Lab ID: 1701077-6

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.040 +/- 0.042	0.061	0.1	NA	U
15117-96-1	U-235	-0.016 +/- 0.038	0.093	0.1	NA	U
7440-61-1	U-238	0.033 +/- 0.040	0.061	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	17.9	pCi/sample	95.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W010
Lab ID: 1701077-7

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.078 +/- 0.046	0.018	0.1	NA	LT
15117-96-1	U-235	0.030 +/- 0.038	0.021	0.1	NA	LT
7440-61-1	U-238	0 +/- 0.041	0.085	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	17.0	pCi/sample	90.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W016
Lab ID: 1701077-8

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.032 +/- 0.049	0.083	0.1	NA	U
15117-96-1	U-235	0.007 +/- 0.036	0.055	0.1	NA	U
7440-61-1	U-238	0.038 +/- 0.036	0.046	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	17.3	pCi/sample	92.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W024
Lab ID: 1701077-9

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.041 +/- 0.065	0.109	0.1	NA	U,M
15117-96-1	U-235	-0.008 +/- 0.040	0.075	0.1	NA	U
7440-61-1	U-238	0.014 +/- 0.034	0.064	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.6	pCi/sample	88.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W034
Lab ID: 1701077-10

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.067 +/- 0.055	0.072	0.1	NA	U
15117-96-1	U-235	0.008 +/- 0.039	0.021	0.1	NA	U
7440-61-1	U-238	0.040 +/- 0.038	0.049	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	17.4	pCi/sample	92.8	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W036
Lab ID: 1701077-11

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.027 +/- 0.033	0.050	0.1	NA	U
15117-96-1	U-235	0.016 +/- 0.039	0.074	0.1	NA	U
7440-61-1	U-238	0.027 +/- 0.033	0.018	0.1	NA	LT

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	17.3	pCi/sample	92.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W042
Lab ID: 1701077-12

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.021 +/- 0.045	0.082	0.1	NA	U
15117-96-1	U-235	0.016 +/- 0.039	0.059	0.1	NA	U
7440-61-1	U-238	0.027 +/- 0.039	0.063	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.4	pCi/sample	87.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W055
Lab ID: 1701077-13

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.039 +/- 0.042	0.061	0.1	NA	U
15117-96-1	U-235	0.008 +/- 0.038	0.057	0.1	NA	U
7440-61-1	U-238	0.026 +/- 0.042	0.070	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	17.5	pCi/sample	93.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W061
Lab ID: 1701077-14

Sample Matrix: WIPE
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-2
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.073 +/- 0.062	0.087	0.1	NA	U
15117-96-1	U-235	0 +/- 0.038	0.084	0.1	NA	U
7440-61-1	U-238	0.033 +/- 0.040	0.061	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.6	pCi/sample	88.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]BD01
Lab ID: 1701077-15

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-1
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.361 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.147 +/- 0.061	0.045	0.1	NA	
15117-96-1	U-235	0.017 +/- 0.028	0.016	0.1	NA	LT
7440-61-1	U-238	0.127 +/- 0.060	0.059	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	13.00	11.2	pCi/g	86.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]FB
Lab ID: 1701077-16

Sample Matrix: FILTER
Prep SOP: PAI 778 Rev 14
Date Collected: 29-Dec-16
Date Prepared: 02-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170201-3
QCBatchID: AS170201-3-1
Run ID: AS170201-3UR
Count Time: 1000 minutes
Report Basis: As Received

Final Aliquot: 0.250 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.085 +/- 0.055	0.052	0.1	NA	LT
15117-96-1	U-235	0.017 +/- 0.041	0.077	0.1	NA	U
7440-61-1	U-238	0.028 +/- 0.035	0.052	0.1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	18.77	16.0	pCi/g	85.4	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S001
Lab ID: 1701077-17

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.68 +/- 0.16	0.03	0.1	NA	
15117-96-1	U-235	0.072 +/- 0.043	0.036	0.1	NA	LT
7440-61-1	U-238	0.85 +/- 0.19	0.04	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.549	4.15	pCi/g	91.3	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.78 +/- 0.17	0.03	0.1	NA	
15117-96-1	U-235	0.030 +/- 0.030	0.044	0.1	NA	U
7440-61-1	U-238	0.88 +/- 0.19	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.495	4.16	pCi/g	92.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Duplicate Results

Lab Name: ALS -- Fort Collins
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18DUP

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.04 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.87 +/- 0.19	0.01	0.1	NA	
15117-96-1	U-235	0.040 +/- 0.031	0.015	0.1	NA	LT
7440-61-1	U-238	0.83 +/- 0.19	0.04	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.499	3.65	pCi/g	81.2	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Sample specific Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S003
Lab ID: 1701077-19

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.78 +/- 0.18	0.04	0.1	NA	
15117-96-1	U-235	0.053 +/- 0.036	0.030	0.1	NA	LT
7440-61-1	U-238	0.86 +/- 0.19	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.564	3.81	pCi/g	83.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S004
Lab ID: 1701077-20

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.79 +/- 0.18	0.05	0.1	NA	
15117-96-1	U-235	0.040 +/- 0.032	0.036	0.1	NA	LT
7440-61-1	U-238	0.85 +/- 0.19	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.547	4.00	pCi/g	87.9	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.03 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.94 +/- 0.21	0.04	0.1	NA	
15117-96-1	U-235	0.053 +/- 0.039	0.018	0.1	NA	LT
7440-61-1	U-238	0.75 +/- 0.18	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.537	3.34	pCi/g	73.6	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S006
Lab ID: 1701077-22

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.01 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.69 +/- 0.17	0.03	0.1	NA	
15117-96-1	U-235	0.033 +/- 0.032	0.041	0.1	NA	U
7440-61-1	U-238	0.77 +/- 0.18	0.01	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.663	3.78	pCi/g	81.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Isotopic Uranium by Alpha Spectroscopy

PAI 714 Rev 13

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S007
Lab ID: 1701077-23

Sample Matrix: SOIL
Prep SOP: PAI 778 Rev 14
Date Collected: 28-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 06-Feb-17

Prep Batch: AS170131-1
QCBatchID: AS170131-1-1
Run ID: AS170131-1UR
Count Time: 360 minutes
Report Basis: Dry Weight

Final Aliquot: 1.02 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Spectrum #1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13966-29-5	U-234	0.86 +/- 0.19	0.04	0.1	NA	
15117-96-1	U-235	0.051 +/- 0.035	0.029	0.1	NA	LT
7440-61-1	U-238	0.95 +/- 0.20	0.03	0.1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
U-232	4.605	4.15	pCi/g	90.1	30 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *UR1701077-1*

Lead-210

Case Narrative

TetraTech

Bridgeton Dust Site - 103X9025160104.003

Work Order Number: 1701077

1. This report consists of the analytical results and supporting documentation for seven soil samples received by ALS on 01/10/2017.

2. These samples were prepared according to the current revisions of SOP 726 and SOP 736.

3. These samples were analyzed for the presence of ^{210}Pb according to the current revision of SOP 704. The analyses were completed on 02/09/2017.

4. The analysis results for these samples are reported on a 'Dry Weight' basis in units of pCi/gram.

5. The (SQP(E) #) for sample 1701077-22 is below the lower control limit of 765.61 at 700.17. There is a potential low bias to the results due to this excursion. The results are reported with project manager's instructions.

6. For this analysis, "Window 2" is monitored for high-energy beta contamination. Samples 1701077-17, -18, -20, and -21 have "Window 2" count rates of 1.33 cpm, 1.05 cpm, 1.05, cpm, and 1.13 cpm, respectively, above the upper control limit of 1.031 cpm, established from calibration on 02/06/2017 through 02/09/2017. Any bias is considered insignificant compared to the sample activity. It is believed that the data quality is unaffected.

7. Sample 1701077-22 has a "Window 2" count rate below the lower control limit of 0.622 cpm, determined from calibration on 02/06/2017 through 02/09/2017, at 0.38 cpm. For this analysis, "Window 2" is monitored for high-energy beta contamination, therefore no contamination is observed. It is believed that the data quality is unaffected.

8. No further anomalous situations were encountered during the preparation and analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Jean Anderson — 2/13/17

Jean Anderson
Radiochemistry Primary Data Reviewer

Date

2/21/17

Radiochemistry Final Data Reviewer

Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701077
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701077-1		WIPE	29-Dec-16	9:24
BDS-[redacted]W003	1701077-2		WIPE	29-Dec-16	9:37
BDS-[redacted]W004	1701077-3		WIPE	29-Dec-16	9:48
BDS-[redacted]W005	1701077-4		WIPE	29-Dec-16	9:51
BDS-[redacted]W006	1701077-5		WIPE	29-Dec-16	9:50
BDS-[redacted]W007	1701077-6		WIPE	29-Dec-16	9:45
BDS-[redacted]W010	1701077-7		WIPE	29-Dec-16	9:55
BDS-[redacted]W016	1701077-8		WIPE	29-Dec-16	10:25
BDS-[redacted]W024	1701077-9		WIPE	29-Dec-16	11:11
BDS-[redacted]W034	1701077-10		WIPE	29-Dec-16	10:55
BDS-[redacted]W036	1701077-11		WIPE	29-Dec-16	11:10
BDS-[redacted]W042	1701077-12		WIPE	29-Dec-16	11:32
BDS-[redacted]W055	1701077-13		WIPE	29-Dec-16	13:06
BDS-[redacted]W061	1701077-14		WIPE	29-Dec-16	14:44
BDS-[redacted]BD01	1701077-15		FILTER	29-Dec-16	11:15
BDS-[redacted]FB	1701077-16		FILTER	29-Dec-16	12:00
BDS-[redacted]C-S001	1701077-17		SOIL	28-Dec-16	15:20
BDS-[redacted]C-S002	1701077-18		SOIL	28-Dec-16	15:40
BDS-[redacted]G-S003	1701077-19		SOIL	28-Dec-16	15:42
BDS-[redacted]G-S004	1701077-20		SOIL	28-Dec-16	15:43
BDS-[redacted]G-S005	1701077-21		SOIL	28-Dec-16	15:45
BDS-[redacted]G-S006	1701077-22		SOIL	28-Dec-16	15:47
BDS-[redacted]G-S007	1701077-23		SOIL	28-Dec-16	15:52

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701077	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2		
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv	PARAMETER/METHOD REQUEST FOR ANALYSIS	
		PURCHASE ORDER	1133109	A	Isotopic Thorium
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.	B	Isotopic Uranium
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher	C	Radionuclides by gamma spectrometry scan, including Radium-226
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street	D	Lead-210
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106	E	Radium-226
PHONE	816-412-1755	PHONE	816-412-1755	F	
FAX		FAX		G	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com	H	
				I	
				J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS-[redacted]-W001	F	12/29/16	09:24	1	none		X	X			X						
2	BDS-[redacted]-W003	F	12/29/16	09:37	1	none		X	X			X						
3	BDS-[redacted]-W004	F	12/29/16	09:48	1	none		X	X			X						
4	BDS-[redacted]-W005	F	12/29/16	09:51	1	none		X	X			X						
5	BDS-[redacted]-W006	F	12/29/16	09:50	1	none		X	X			X						
6	BDS-[redacted]-W007	F	12/29/16	09:45	1	none		X	X			X						
7	BDS-[redacted]-W010	F	12/29/16	09:55	1	none		X	X			X						
8	BDS-[redacted]-W016	F	12/29/16	10:25	1	none		X	X			X						
9	BDS-[redacted]-W024	F	12/29/16	11:11	1	none		X	X			X						
10	BDS-[redacted]-W034	F	12/29/16	10:55	1	none		X	X			X						
11	BDS-[redacted]-W036	F	12/29/16	11:10	1	none		X	X			X						
12	BDS-[redacted]-W042	F	12/29/16	11:32	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)
PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other	

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nevatt-Sweet	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.
Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER # 1701077

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
wipes 13	BDS-[redacted]-W055	F	12/29/16	13:06	1	None		X	X			X						
14	BDS-[redacted]-W061	F	12/29/16	14:44	1	none		X	X			X						
BD 15	BDS-[redacted]-BD01	F	12/29/16	11:15	2	none		X	X			X						
cartridge 16	BDS-[redacted]-FB	F	12/29/16	12:00	1	none		X	X			X						
17	BDS-[redacted]-C-S001	S	12/28/16	15:20	1	none		X	X	X	X							
18	BDS-[redacted]-C-S002	S	12/28/16	15:40	1	none		X	X	X	X							
19	BDS-[redacted]-G-S003	S	12/28/16	15:42	1	none		X	X	X	X							
Soil bags 20	BDS-[redacted]-G-S004	S	12/28/16	15:43	1	none		X	X	X	X							
21	BDS-[redacted]-G-S005	S	12/28/16	15:45	1	none		X	X	X	X							
22	BDS-[redacted]-G-S006	S	12/28/16	15:47	1	none		X	X	X	X							
23	BDS-[redacted]-G-S007	S	12/28/16	15:52	1	none		X	X	X	X							

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua [illegible] Shea	1-10-17	10 10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 170177

Project Manager: JE / MH Initials: JNS Date: 1/10/17

1. Does this project require any special handling in addition to standard ALS procedures?			YES	NO
2. Are custody seals on shipping containers intact?	NONE		YES	NO
3. Are Custody seals on sample containers intact?	NONE		YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?			YES	NO
5. Are the COC and bottle labels complete and legible?			YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)			YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF		YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A		YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A		YES	NO
10. Is there sufficient sample for the requested analyses?			YES	NO
11. Were all samples placed in the proper containers for the requested analyses?			YES	NO
12. Are all samples within holding times for the requested analyses?			YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)			YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A		YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A		YES	NO
16. Were the samples shipped on ice?			YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY		YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [signature] 1-10-17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701077

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Lead-210 by Liquid Scintilation Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Friday, February 10, 2017
2:27:22 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyzed	Flags
1701077-17	BDS[redacted]C-S001	Sample	Pb-210	1.95 +/- 0.52	0.29	NA	pCi/g	SOIL	PB170131-1	2/6/2017	
1701077-18	BDS[redacted]C-S002	Sample	Pb-210	1.46 +/- 0.40	0.26	NA	pCi/g	SOIL	PB170131-1	2/6/2017	
1701077-19	BDS[redacted]G-S003	Sample	Pb-210	14.4 +/- 3.5	0.3	NA	pCi/g	SOIL	PB170131-1	2/6/2017	
1701077-20	BDS[redacted]G-S004	Sample	Pb-210	1.54 +/- 0.42	0.25	NA	pCi/g	SOIL	PB170131-1	2/7/2017	
1701077-21	BDS[redacted]G-S005	Sample	Pb-210	1.41 +/- 0.39	0.27	NA	pCi/g	SOIL	PB170131-1	2/7/2017	
1701077-22	BDS[redacted]G-S006	Sample	Pb-210	2.30 +/- 0.64	0.43	NA	pCi/g	SOIL	PB170131-1	2/7/2017	
1701077-23	BDS[redacted]G-S007	Sample	Pb-210	6.4 +/- 1.6	0.2	NA	pCi/g	SOIL	PB170131-1	2/7/2017	

Comments:

Data Package ID: *PB1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: PB170131-1MB

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 31-Jan-17
Date Prepared: 31-Jan-17
Date Analyzed: 08-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.701 minutes

Final Aliquot: 1.66 g
Result Units: pCi/g
File Name: Q212101N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	-0.11 +/- 0.17	0.28	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	817.2	665.7	ug	81.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *PB1701077-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: PB170131-1LCS

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 31-Jan-17
Date Prepared: 31-Jan-17
Date Analyzed: 09-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 29.6294 minutes

Final Aliquot: 1.66 g
Result Units: pCi/g
File Name: Q222201N.001

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14255-04-0	Pb-210	21.1 +/- 5.2	0.7	21.60	97.5	70 - 130	P

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	809.8	690.3	ug	85.2	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *PB1701077-1*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S001
Lab ID: 1701077-17

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 28-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.68 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q020201N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.95 +/- 0.52	0.29	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	868.0	686.4	ug	79.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701077-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]C-S002
Lab ID: 1701077-18

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 28-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.7 minutes
Report Basis: Dry Weight

Final Aliquot: 1.68 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q030301N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.46 +/- 0.40	0.26	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	784.7	676.3	ug	86.2	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701077-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S003
Lab ID: 1701077-19

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 28-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 06-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.69 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q040401N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	14.4 +/- 3.5	0.3	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	867.1	640.7	ug	73.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701077-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S004
Lab ID: 1701077-20

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 28-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.69 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q050501N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.54 +/- 0.42	0.25	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	810.6	719.0	ug	88.7	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701077-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S005
Lab ID: 1701077-21

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 28-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.698 minutes
Report Basis: Dry Weight

Final Aliquot: 1.66 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q060601N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	1.41 +/- 0.39	0.27	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	800.9	688.9	ug	86.0	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701077-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S006
Lab ID: 1701077-22

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 28-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.71 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q070701N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	2.30 +/- 0.64	0.43	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	874.3	451.8	ug	51.7	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701077-1*

Lead-210 by Liquid Scintilation

PAI 704 Rev 11

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]G-S007
Lab ID: 1701077-23

Sample Matrix: SOIL
Prep SOP: PAI 726 Rev 9
Date Collected: 28-Dec-16
Date Prepared: 31-Jan-17
Date Analyzed: 07-Feb-17

Prep Batch: PB170131-1
QCBatchID: PB170131-1-1
Run ID: PB170131-1A
Count Time: 177.699 minutes
Report Basis: Dry Weight

Final Aliquot: 1.71 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: Q080801N.001

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14255-04-0	Pb-210	6.4 +/- 1.6	0.2	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
LEAD	834.8	745.8	ug	89.3	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *PB1701077-1*

Radium-226

Case Narrative

TetraTech

Bridgeton Dust Site - 103X9025160104.003

Work Order Number: 1701077

1. This report consists of the analytical results and supporting documentation for 14 wipe samples and two filter samples received by ALS on 01/10/2017.

2. These samples were prepared and analyzed according to the current revision of SOP 783. The analyses were completed on 01/18/2017.

3. The analysis results for wipe samples are reported on an 'As Received' basis in units of pCi/sample. The analysis results for the filter samples are reported on an 'As Received' basis in units of pCi/g.

4. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.

5. No anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen — 2/21/17
Pik Yee Yuen — Date
Radiochemistry Primary Data Reviewer

Radiochemistry Final Data Reviewer — 2/21/17
Date

1

Section 1

CHAIN OF CUSTODY

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1701077
Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Client PO Number: 1133109

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
BDS-[redacted]W001	1701077-1		WIPE	29-Dec-16	9:24
BDS-[redacted]W003	1701077-2		WIPE	29-Dec-16	9:37
BDS-[redacted]W004	1701077-3		WIPE	29-Dec-16	9:48
BDS-[redacted]W005	1701077-4		WIPE	29-Dec-16	9:51
BDS-[redacted]W006	1701077-5		WIPE	29-Dec-16	9:50
BDS-[redacted]W007	1701077-6		WIPE	29-Dec-16	9:45
BDS-[redacted]W010	1701077-7		WIPE	29-Dec-16	9:55
BDS-[redacted]W016	1701077-8		WIPE	29-Dec-16	10:25
BDS-[redacted]W024	1701077-9		WIPE	29-Dec-16	11:11
BDS-[redacted]W034	1701077-10		WIPE	29-Dec-16	10:55
BDS-[redacted]W036	1701077-11		WIPE	29-Dec-16	11:10
BDS-[redacted]W042	1701077-12		WIPE	29-Dec-16	11:32
BDS-[redacted]W055	1701077-13		WIPE	29-Dec-16	13:06
BDS-[redacted]W061	1701077-14		WIPE	29-Dec-16	14:44
BDS-[redacted]BD01	1701077-15		FILTER	29-Dec-16	11:15
BDS-[redacted]FB	1701077-16		FILTER	29-Dec-16	12:00
BDS-[redacted]C-S001	1701077-17		SOIL	28-Dec-16	15:20
BDS-[redacted]C-S002	1701077-18		SOIL	28-Dec-16	15:40
BDS-[redacted]G-S003	1701077-19		SOIL	28-Dec-16	15:42
BDS-[redacted]G-S004	1701077-20		SOIL	28-Dec-16	15:43
BDS-[redacted]G-S005	1701077-21		SOIL	28-Dec-16	15:45
BDS-[redacted]G-S006	1701077-22		SOIL	28-Dec-16	15:47
BDS-[redacted]G-S007	1701077-23		SOIL	28-Dec-16	15:52

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701077	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	1 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2		
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv	PARAMETER/METHOD REQUEST FOR ANALYSIS	
		PURCHASE ORDER	1133109	A	Isotopic Thorium
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.	B	Isotopic Uranium
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher	C	Radionuclides by gamma spectrometry scan, including Radium-226
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street	D	Lead-210
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106	E	Radium-226
PHONE	816-412-1755	PHONE	816-412-1755	F	
FAX		FAX		G	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com	H	
				I	
				J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	BDS-[redacted]-W001	F	12/29/16	09:24	1	none		X	X			X						
2	BDS-[redacted]-W003	F	12/29/16	09:37	1	none		X	X			X						
3	BDS-[redacted]-W004	F	12/29/16	09:48	1	none		X	X			X						
4	BDS-[redacted]-W005	F	12/29/16	09:51	1	none		X	X			X						
5	BDS-[redacted]-W006	F	12/29/16	09:50	1	none		X	X			X						
6	BDS-[redacted]-W007	F	12/29/16	09:45	1	none		X	X			X						
7	BDS-[redacted]-W010	F	12/29/16	09:55	1	none		X	X			X						
8	BDS-[redacted]-W016	F	12/29/16	10:25	1	none		X	X			X						
9	BDS-[redacted]-W024	F	12/29/16	11:11	1	none		X	X			X						
10	BDS-[redacted]-W034	F	12/29/16	10:55	1	none		X	X			X						
11	BDS-[redacted]-W036	F	12/29/16	11:10	1	none		X	X			X						
12	BDS-[redacted]-W042	F	12/29/16	11:32	1	none		X	X			X						

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES	REPORT LEVEL / QC REQUIRED	
Level IV reporting in accordance with MARLAP recommendations		Summary (Standard QC)
Dry and homogenize soil samples		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
	X	LEVEL IV (Std QC + forms + raw data)
PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other	

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua Nevatt-Sweet	1/10/17	1010
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1701077	

TURNAROUND TIME	standard	SAMPLER	US EPA Region 7	PAGE	2 of 2
				DISPOSAL	BY LAB or RETURN

PROJECT NAME	Bridgeton Dust Site	SITE ID	House 2
PROJECT No.	103X9025160104.003	EDD FORMAT	Excel or csv
		PURCHASE ORDER	1133109
COMPANY NAME	Tetra Tech, Inc.	BILL TO COMPANY	Tetra Tech, Inc.
SEND REPORT TO	Emily Fisher	INVOICE ATTN TO	Emily Fisher
ADDRESS	415 Oak Street	ADDRESS	415 Oak Street
CITY / STATE / ZIP	Kansas City, MO 64106	CITY / STATE / ZIP	Kansas City, MO 64106
PHONE	816-412-1755	PHONE	816-412-1755
FAX		FAX	
E-MAIL	emily.fisher@tetratech.com	E-MAIL	emily.fisher@tetratech.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Isotopic Thorium
B	Isotopic Uranium
C	Radionuclides by gamma spectrometry scan, including Radium-226
D	Lead-210
E	Radium-226
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
wipes 13	BDS-[redacted]-W055	F	12/29/16	13:06	1	None		X	X			X						
14	BDS-[redacted]-W061	F	12/29/16	14:44	1	none		X	X			X						
BD 15	BDS-[redacted]-BD01	F	12/29/16	11:15	2	none		X	X			X						
cartridge 16	BDS-[redacted]-FB	F	12/29/16	12:00	1	none		X	X			X						
17	BDS-[redacted]-C-S001	S	12/28/16	15:20	1	none		X	X	X	X							
18	BDS-[redacted]-C-S002	S	12/28/16	15:40	1	none		X	X	X	X							
19	BDS-[redacted]-G-S003	S	12/28/16	15:42	1	none		X	X	X	X							
Soil 20	BDS-[redacted]-G-S004	S	12/28/16	15:43	1	none		X	X	X	X							
bags 21	BDS-[redacted]-G-S005	S	12/28/16	15:45	1	none		X	X	X	X							
22	BDS-[redacted]-G-S006	S	12/28/16	15:47	1	none		X	X	X	X							
23	BDS-[redacted]-G-S007	S	12/28/16	15:52	1	none		X	X	X	X							

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES
Level IV reporting in accordance with MARLAP recommendations
Dry and homogenize soil samples

REPORT LEVEL / QC REQUIRED	
	Summary (Standard QC)
	LEVEL II (Standard QC)
	LEVEL III (Std QC + forms)
X	LEVEL IV (Std QC + forms + raw data)

PRESERVATION KEY	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

Form 202r9	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Tom Mahler	Tom Mahler	1-9-17	16:00
RECEIVED BY	[illegible]	Joshua [illegible] Shea	1-10-17	10 10
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: TETRA TECH Workorder No: 170177

Project Manager: JE / MH Initials: JNS Date: 1/10/17

1.	Does this project require any special handling in addition to standard ALS procedures?		YES	NO
2.	Are custody seals on shipping containers intact?	NONE	YES	NO
3.	Are Custody seals on sample containers intact?	NONE	YES	NO
4.	Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5.	Are the COC and bottle labels complete and legible?		YES	NO
6.	Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	NO
7.	Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8.	Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10.	Is there sufficient sample for the requested analyses?		YES	NO
11.	Were all samples placed in the proper containers for the requested analyses?		YES	NO
12.	Are all samples within holding times for the requested analyses?		YES	NO
13.	Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15.	Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A	YES	NO
16.	Were the samples shipped on ice?		YES	NO
17.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [signature] 1-10-17

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

1701077

MARK ZIPF
913.485.3242
ENVIRONMENTAL PROTECTION AGENC
8600 NE UNDERGROUND RD.
KANSAS CITY MO 64161

40 LBS

1 OF 1

DWT: 25,14,13

10

SHIP TO:
SAMPLE RECEIVING
9704901511
ALS
225 COMMERCE DRIVE
FORT COLLINS CO 80524-2762

CO 805 0-01

UPS NEXT DAY AIR

1

TRACKING #: 1Z 871 249 01 9049 7243

BILLING: P/P

CARBON NEUTRAL SHIPMENT

CS 19.0.28. WNINV50 81.0A 10/2016

Section 2

SAMPLE RESULTS SUMMARY

Radium-226 by Radon Emanation - Method 903.1 Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 21, 2017
9:05:26 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyze	Flags
1701077-1	BDS[redacted]W001	Sample	Ra-226	0.28 +/- 0.14	0.13	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	LT
1701077-2	BDS[redacted]W003	Sample	Ra-226	0.048 +/- 0.096	0.167	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-3	BDS[redacted]W004	Sample	Ra-226	0.047 +/- 0.068	0.110	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-4	BDS[redacted]W005	Sample	Ra-226	0.010 +/- 0.086	0.165	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-5	BDS[redacted]W006	Sample	Ra-226	0.08 +/- 0.12	0.19	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-6	BDS[redacted]W007	Sample	Ra-226	0.081 +/- 0.096	0.153	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-7	BDS[redacted]W010	Sample	Ra-226	0.23 +/- 0.12	0.14	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	LT
1701077-8	BDS[redacted]W016	Sample	Ra-226	0.22 +/- 0.13	0.16	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	LT
1701077-9	BDS[redacted]W024	Sample	Ra-226	0.035 +/- 0.091	0.165	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U

Comments:

Data Package ID: *RE1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Radium-226 by Radon Emanation - Method 903.1 Sample Results Summary

Client Name: TetraTech
Client Project Name: Bridgeton Dust Site
Client Project Number: 103X9025160104.003
Laboratory Name: **ALS -- Fort Collins**
PAI Work Order: 1701077

Reported on: Tuesday, February 21, 2017
9:05:26 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	DL	Units	Matrix	Prep Batch	Date Analyze	Flags
1701077-10	BDS[redacted]W034	Sample	Ra-226	0 +/- 0.072	0.150	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-11	BDS[redacted]W036	Sample	Ra-226	-0.032 +/- 0.084	0.180	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-12	BDS[redacted]W042	Sample	Ra-226	-0.010 +/- 0.083	0.167	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-13	BDS[redacted]W055	Sample	Ra-226	0.012 +/- 0.088	0.171	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-14	BDS[redacted]W061	Sample	Ra-226	0.071 +/- 0.063	0.082	NA	pCi/sample	WIPE	RE170201-1	2/18/2017	U
1701077-15	BDS[redacted]BD01	Sample	Ra-226	0.121 +/- 0.093	0.128	NA	pCi/g	FILTER	RE170201-1	2/18/2017	U
1701077-16	BDS[redacted]FB	Sample	Ra-226	-0.030 +/- 0.050	0.121	NA	pCi/g	FILTER	RE170201-1	2/18/2017	U

Comments:

Data Package ID: *RE1701077-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

Section 3

QC RESULTS SUMMARY ❸

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-1MB

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.042 +/- 0.073	0.167	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Method Blank Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-1MB

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-1
Run ID: RE170201-1B
Count Time: 30 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.042 +/- 0.073	0.167	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: *RE1701077-2*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-1LCS

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	53.6 +/- 9.7	0.1	46.04	116	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-1LCS

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-1
Run ID: RE170201-1B
Count Time: 30 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	53.6 +/- 9.7	0.1	46.04	116	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *RE1701077-2*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-1LCSD

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes

Final Aliquot: 1.00 sample
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	47.9 +/- 8.7	0.1	46.04	104	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Laboratory Control Sample(s)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Lab ID: RE170201-1LCSD

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-1
Run ID: RE170201-1B
Count Time: 30 minutes

Final Aliquot: 1.00 g
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	47.9 +/- 8.7	0.1	46.04	104	57 - 126	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *RE1701077-2*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: RE170201-1LCSD

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13982-63-3	Ra-226	53.6 +/- 9.7	0.1	P	47.9 +/- 8.7	0.1	P	0.438	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Duplicate Sample Results (DER)

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:
Lab ID: RE170201-1LCSD

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 01-Feb-17
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-1
Run ID: RE170201-1B
Count Time: 30 minutes

Final Aliquot: 1.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Manual Entry

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
13982-63-3	Ra-226	53.6 +/- 9.7	0.1	P	47.9 +/- 8.7	0.1	P	0.438	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *RE1701077-2*

Section 4

INDIVIDUAL SAMPLE RESULTS

4

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W001
Lab ID: 1701077-1

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.28 +/- 0.14	0.13	1	NA	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W003
Lab ID:	1701077-2

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.048 +/- 0.096	0.167	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W004
Lab ID:	1701077-3

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.047 +/- 0.068	0.110	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W005
Lab ID: 1701077-4

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.010 +/- 0.086	0.165	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W006
Lab ID: 1701077-5

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.08 +/- 0.12	0.19	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W007
Lab ID: 1701077-6

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.081 +/- 0.096	0.153	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W010
Lab ID: 1701077-7

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.23 +/- 0.12	0.14	1	NA	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W016
Lab ID: 1701077-8

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.22 +/- 0.13	0.16	1	NA	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W024
Lab ID:	1701077-9

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.035 +/- 0.091	0.165	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W034
Lab ID: 1701077-10

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0 +/- 0.072	0.150	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W036
Lab ID: 1701077-11

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.032 +/- 0.084	0.180	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID:	BDS-[redacted]W042
Lab ID:	1701077-12

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.010 +/- 0.083	0.167	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W055
Lab ID: 1701077-13

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.012 +/- 0.088	0.171	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]W061
Lab ID: 1701077-14

Sample Matrix: WIPE
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-2
Run ID: RE170201-1A
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 sample
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/sample
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.071 +/- 0.063	0.082	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]BD01
Lab ID: 1701077-15

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-1
Run ID: RE170201-1B
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.44 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.121 +/- 0.093	0.128	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 12

Sample Results

Lab Name: **ALS -- Fort Collins**
Work Order Number: 1701077
Client Name: TetraTech
ClientProject ID: Bridgeton Dust Site 103X9025160104.003

Field ID: BDS-[redacted]FB
Lab ID: 1701077-16

Sample Matrix: FILTER
Prep SOP: PAI 783 Rev 12
Date Collected: 29-Dec-16
Date Prepared: 01-Feb-17
Date Analyzed: 18-Feb-17

Prep Batch: RE170201-1
QCBatchID: RE170201-1-1
Run ID: RE170201-1B
Count Time: 30 minutes
Report Basis: As Received

Final Aliquot: 1.00 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.030 +/- 0.050	0.121	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *RE1701077-1*

APPENDIX J

DATA VALIDATION REPORTS

HOUSE 1 DATA VALIDATION REPORT

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL IV

Site:	Bridgeton Dust Site, Bridgeton, Missouri
Laboratory:	ALS Environmental (ALS), (Fort Collins, Colorado)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 6, 2017
Sample Delivery Group (SDG):	1701082
Sample Numbers:	BDS-[redacted]W001, BDS-[redacted]W002, BDS-[redacted]W006, BDS-[redacted]W014, BDS-[redacted]W019, BDS-[redacted]W021, BDS-[redacted]W034, BDS-[redacted]W036, BDS-[redacted]W048, BDS-[redacted]W049, BDS-[redacted]W052, BDS-[redacted]W058, BDS-[redacted]W061, BDS-[redacted]W074, BDS-[redacted]SG001, BDS-[redacted]SG002, BDS-[redacted]SG003, BDS-[redacted]SG004, BDS-[redacted]SG005, BDS-[redacted]SG006, BDS-[redacted]SC007, BDS-[redacted]BD01, BDS-[redacted]BD02, and BDS-[redacted]FB
Matrix / Number of Samples:	Fourteen Wipe Samples, Three Filter Samples, and Seven Soil 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" (9355.0-131), August 2014. In addition, the Tetra Tech document “Review of Data Packages from Subcontracted Laboratories” (February 2002), the project-specific “Quality Assurance Project Plan (QAPP) for Pre-CERCLIS Screening at Bridgeton Dust Site, Revision 01” dated 22 December 2016 as amended on 29 December 2016, and the EPA and others document “Multi-Agency Radiological Laboratory Analytical Protocols Manual” (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies 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, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

6 March 2017

Certified by Harry Ellis, Chemist

Date

DATA VALIDATION QUALIFIERS

U	—	The analyte 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.
UJ	—	The analyte was not detected above the reported sample quantitation limit, which is estimated.
R	—	Sample results are rejected due to serious deficiencies in ability to analyze the sample and meet QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) 1701082 included 23 environmental samples and one QC sample (a filter field blank). Samples were analyzed via (1) liquid scintillation counting (LSC) for lead-210, (2) radon emanation analysis for radium-226, (3) alpha spectroscopy for isotopic thorium and uranium, and (4) gamma spectroscopy for other radioisotopes. ALS applied its own methods that, where practical, followed equivalent EPA-approved methods. No sample underwent all analyses. The following summarizes the data validation. All holding time and chain-of-custody requirements were met. Also, in a number of cases, ALS could not meet requested quantitation goals; however, these goals had been conservatively established at levels below anticipated benchmarks. These were flagged "M" in the ALS report, but are not qualified here. The Pre-CERCLIS screening report identifies instances where detection limits exceeded benchmarks.

LIQUID SCINTILLATION COUNTING ANALYSES

I. Method Description and Specific Objectives

In liquid scintillation counting, the sample is dissolved or suspended in a mixture of organic compounds in a solvent ("liquid scintillation cocktail"). When a beta decay occurs, the emitted particle interacts with some components of the cocktail to produce a number of flashes of light. That number varies with energy of the beta particle, so this technique is used primarily to identify and quantify isotopes that emit low-energy betas, including tritium, carbon-14, and lead-210. Intensity of light produced (number of flashes, more or less simultaneous) provides information on energy of the emitted beta and therefore allows discrimination among isotopes.

II. Blanks

The laboratory (method) blank yielded no detectable concentration of the analyte. No qualifications were applied.

III. Laboratory Control Sample (LCS)

Percent recovery from the LCS analysis was within established control limits. No qualifications were applied.

IV. Surrogates

This method involves a solution of non-radioactive lead nitrate as a "carrier." Recovery of the carrier is determined, and this parameter provides the same information as a surrogate. All carrier recoveries were within acceptance limits. However, the laboratory noted that the pre-extraction measurement of elemental lead in the samples yielded a result below the amounts known to have been added to samples BDS-[redacted]SG004, BDS-[redacted]SG005, BDS-[redacted]SG006, and BDS-[redacted]SC007 (which may be a typographical error on the chain-of-custody form for "BDS-[redacted]SG007.") ALS's calculations adjusted for this, but lead-210 results (including the total propagated uncertainty, TPU) from those samples possibly are biased low. These results were flagged "J" to indicate the uncertainty.

V. Other Quality Control Measures.

All calibration (initial and continuing results were within their various QC limits.

VI. Comments

None.

VII. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

RADIUM-226 VIA RADON EMANATION ANALYSIS

I. Method Description and Specific Objectives

These analyses involve converting the sample into a liquid form (as with metal analyses) and then determining radium-226 in the sample solutions via a minor modification of EPA Water Method 903.1.

II. Blanks

The laboratory (method) blanks yielded no reportable concentrations of the analyte. No qualifications were applied.

III. Laboratory Control Sample (LCS)

The duplicate LCS yielded fully acceptable results. No qualifications were applied.

IV. Surrogates

Surrogates are not used in this analysis. No qualifications were applied.

V. Other Quality Control Measures

All initial and continuing calibration results were within their various QC limits. Due to insufficient sample volume, no laboratory duplicate analysis was performed. Duplicate LCS results confirmed the precision of the analyses. No qualifications were applied.

VI. Comments

Filter results are presented relative to the total amount of dust on the filter, not to total quantity per sample (as are results from wipes).

VII. Overall Assessment of Data

Overall data quality is acceptable, with no radium-226 detected and no qualifications applied. All data are usable as reported for their intended purposes.

ALPHA SPECTROSCOPY ANALYSES

I. Method Description and Specific Objectives

These analyses, by application of standard alpha spectroscopy methods, are intended to help characterize the thorium isotopes (228, 230, and 232) and the uranium isotopes (234, 235, and 238) in field samples.

II. Blanks

Laboratory (method) blanks yielded no detectable activities of thorium isotopes. However, blanks for wipe and filter samples yielded low activities of uranium-234, and the blank for soil samples yielded a low activity of uranium-238. Similar activities of uranium-234 in wipe and filter samples were qualified as estimated, possibly biased high, and flagged "J". All soil uranium-238 activities were much larger than the blank activity, so these were not qualified.

The filter field blank yielded low activities of uranium-234 (possibly from the laboratory blank) and uranium-238. Therefore, similar concentrations in the filter samples were also qualified as estimated, possibly biased high, and flagged "J".

III. Laboratory Control Sample (LCS)

All percent recoveries from analyses of the LCS and duplicate LCS were within established control limits. No qualifications were applied.

IV. Surrogates

Surrogates are not used in this method. "Tracers" of thorium-229 and uranium-232 were included in sample preparation, and provided the same information as a surrogate. All recoveries were within QC limits so no qualifications were applied.

Peaks associated with the thorium-229 tracer may overlap those associated with thorium-230. Similarly, peaks associated with uranium-235 may overlap those associated with both uranium-234 and uranium-238. The laboratory took care to correct for any overlap, so no qualifications were applied.

V. Comments

Calibration results were within their QC limits. Laboratory duplicate results were similar. No qualifications were applied.

VI. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

GAMMA SPECTROSCOPY ANALYSES

I. Method Description and Specific Objectives

Gamma spectroscopy was used to characterize a variety of daughters of the naturally occurring uranium and thorium already discussed, as well as other isotopes such as naturally occurring potassium-40 and the fission product cesium-137. The method is standard: putting a sample in an air-tight can (to retain radon until it decays) and placing that in a suitable counting instrument.

II. Blanks

The laboratory blank was found to contain no detectable analytes. No qualifications were applied.

III. Laboratory Control Sample (LCS)

All percent recoveries from analysis of the LCS were within established control limits. No qualifications were applied.

IV. Surrogates

Surrogates are not used in this radioanalytical method.

V. Comments

Calibration results were within their QC limits. Duplicate results were within their QC limits.

Some prepared samples had densities less than the standard range of 85 to 115 percent of the densities of the calibration standards. ALS flagged these "G" to indicate that detected results may be biased high due to less self-absorption. No qualifications were applied.

Some sample results posed difficulty in distinguishing spectral peaks or (occasionally) determining definite presence of a peak. ALS indicated the various irregularities with flags of "TI" or "J". All such results were qualified as estimated and flagged "J".

VI. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

HOUSE 2 DATA VALIDATION REPORT

Tetra Tech, Inc.
DATA VALIDATION REPORT
LEVEL IV

Site:	Bridgeton Dust Site, Bridgeton, Missouri
Laboratory:	ALS Environmental (ALS), (Fort Collins, Colorado)
Data Reviewer:	Harry Ellis, Tetra Tech, Inc. (Tetra Tech)
Review Date	March 1, 2017
Sample Delivery Group (SDG):	1701077
Sample Numbers:	BDS-[redacted] W001, BDS-[redacted] W003, BDS-[redacted] W004, BDS-[redacted] W005, BDS-[redacted] W006, BDS-[redacted] W007, BDS-[redacted] W010, BDS-[redacted] W016, BDS-[redacted] W024, BDS-[redacted] W034, BDS-[redacted] W036, BDS-[redacted] W042, BDS-[redacted] W055, BDS-[redacted] W061, BDS-[redacted] BD01, BDS-[redacted] FB, BDS-[redacted] C-S001, BDS-[redacted] C-S002, BDS-[redacted] C-S003, BDS-[redacted] C-S004, BDS-[redacted] C-S005, BDS-[redacted] C-S006, and BDS-[redacted] C-S007
Matrix / Number of Samples:	Fourteen Wipe Samples, Two Filter Samples, and Seven Soil 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" (9355.0-131), August 2014. In addition, the Tetra Tech document “Review of Data Packages from Subcontracted Laboratories” (February 2002), the project-specific “Quality Assurance Project Plan (QAPP) for Pre-CERCLIS Screening at Bridgeton Dust Site, Revision 01” dated 22 December 2016 as amended on 29 December 2016, and the EPA and others document “Multi-Agency Radiological Laboratory Analytical Protocols Manual” (July 2004) were used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies 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, Harry Ellis, certify that all data validation criteria outlined in the above-referenced documents were assessed, and any qualifications made to the data accorded with those documents.

Harry N. Ellis III

1 March 2017

Certified by Harry Ellis, Chemist

Date

DATA VALIDATION QUALIFIERS

U — The analyte 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.

UJ — The analyte 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 QC criteria. Presence or absence of the analyte cannot be verified.

DATA ASSESSMENT

Sample delivery group (SDG) 1701077 included twenty-two (22) environmental samples and one (1) QC sample (a filter field blank). Samples were analyzed via (1) liquid scintillation counting (LSC) for lead-210, (2) radon emanation analysis for radium-226, (3) alpha spectroscopy for isotopic thorium and uranium, and (4) gamma spectroscopy for other radioisotopes. ALS applied its own methods that, where practical, followed equivalent EPA-approved methods. No sample underwent all analyses. The following summarizes the data validation. All holding time and chain-of-custody requirements were met. Also, in a number of cases, ALS could not meet the requested quantitation goals; however, these goals had been conservatively established at levels below anticipated benchmarks. These were flagged "M" in the ALS report, but are not qualified here. The Pre-CERCLIS screening report identifies instances where detection limits exceed benchmarks.

LIQUID SCINTILLATION COUNTING ANALYSES

I. Method Description and Specific Objectives

In liquid scintillation counting, the sample is dissolved or suspended in a mixture of organic compounds in a solvent ("liquid scintillation cocktail"). When a beta decay occurs, the emitted particle interacts with some components of the cocktail to produce a number of flashes of light. That number varies with the energy of the beta particle, so this technique is used primarily to identify and quantify isotopes that emit low-energy betas, including tritium, carbon-14, and lead-210. Intensity of light produced (number of flashes, more or less simultaneous) provides information on energy of the emitted beta and therefore allows discrimination among isotopes.

II. Blanks

The laboratory (method) blank yielded no detectable concentration of the analyte. No qualifications were applied.

III. Laboratory Control Sample (LCS)

Percent recovery from the LCS analysis was within established control limits. No qualifications were applied.

IV. Surrogates

This method involves a solution of non-radioactive lead nitrate as a "carrier." Recovery of the carrier is determined, and this parameter provides the same information as a surrogate. All carrier recoveries were within acceptance limits, so no qualifications were applied.

V. Other Quality Control Measures.

All calibration (initial and continuing) results were within their various QC limits. However, analysis of sample BDS-[redacted]G-S006 yielded a low recovery for the "spectral quench parameter." This indicates matrix interference, yielding low quantitative results. Therefore, the lead-210 result from sample BDS-[redacted]B-S-006 was qualified as estimated, possibly biased low, and flagged "J".

VI. Comments

None.

VII. Overall Assessment of Data

Overall data quality is acceptable, with only one qualification applied. All data are usable as qualified for their intended purposes.

RADIUM-226 VIA RADON EMANATION ANALYSIS

I. Method Description and Specific Objectives

These analyses involve converting the sample into a liquid form (as with metal analyses) and then determining radium-226 in the sample solutions via a minor modification of EPA Water Method 903.1.

II. Blanks

The laboratory (method) blank yielded no reportable concentrations of analytes. No qualifications were applied.

III. Laboratory Control Sample (LCS)

The duplicate LCS yielded fully acceptable results. No qualifications were applied.

IV. Surrogates

Surrogates are not used in this analysis. No qualifications were applied.

V. Other Quality Control Measures

All initial and continuing calibration results were within their various QC limits. Due to insufficient sample volume, no laboratory duplicate analysis occurred. Duplicate LCS results confirmed the precision of the analyses. No qualifications were applied.

VI. Comments

Filter results are presented relative to the total amount of dust on the filter, not to the total quantity per sample, as for the wipes.

VII. Overall Assessment of Data

Overall data quality is acceptable, with no qualifications applied. All data are usable as reported for their intended purposes.

ALPHA SPECTROSCOPY ANALYSES

I. Method Description and Specific Objectives

These analyses, applying standard alpha spectroscopy methods, are intended to help characterize thorium isotopes (228, 230, and 232) and uranium isotopes (234, 235, and 238) in the field samples.

II. Blanks

The laboratory (method) blanks yielded low activities of thorium-232 and all three uranium isotopes. In most cases, field sample results from the related isotopes were nondetect or much higher than associated blank results, so no qualifications were applied. A few detected results, such as uranium-235 in sample BDS-[redacted]G-S004, were similar to the blank concentration and qualified as estimated, possibly biased high, and flagged "J".

The filter field blank yielded a low activity of uranium-234. Therefore, the similar concentration in sample BDS-[redacted]BD01 was also qualified as estimated, possibly biased high, and flagged "J".

III. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses and duplicate LCS were within established control limits. No qualifications were applied.

IV. Surrogates

Surrogates are not used in this method. "Tracers" of thorium-229 and uranium-232 included in sample preparation provided the same information as a surrogate. All recoveries were within QC limits, so no qualifications were applied.

Peaks from the thorium-229 tracer may overlap those from thorium-230. Similarly, peaks from uranium-235 may overlap those from both uranium-234 and uranium-238. The laboratory took care to correct for any overlap, so no qualifications were applied.

V. Comments

Calibration results were within their QC limits. Laboratory duplicate results were similar. No qualifications were applied.

VI. Overall Assessment of Data

Overall data quality is acceptable, with no significant qualifications applied. All data are usable as qualified for their intended purposes.

GAMMA SPECTROSCOPY ANALYSES

I. Method Description and Specific Objectives

Gamma spectroscopy was used to characterize a variety of daughters of the naturally occurring uranium and thorium already discussed, as well as other isotopes such as naturally occurring potassium-40 and the fission product cesium-137. The method applied was standard—putting a sample in an air-tight can (to retain radon until it decays), and placing that in a suitable counting instrument.

II. Blanks

The laboratory blank yielded no detectable analyses. No qualifications were applied.

III. Laboratory Control Sample (LCS)

All percent recoveries from the LCS analyses were within established control limits. No qualifications were applied.

IV. Surrogates

Surrogates are not used in this radioanalytical method.

V. Comments

Calibration results were within their QC limits. Duplicate results were within their QC limits.

Some prepared samples had densities less than the standard range of 85 to 115 percent of densities of the calibration standards. ALS flagged these "G" to indicate that detected results may be biased high due to less self-absorption. No qualifications were applied.

Some sample results posed difficulty in distinguishing spectral peaks or (occasionally) determining definite presence of a peak. ALS indicated the various irregularities with flags of "TI" or "J". All such results were qualified as estimated and flagged "J".

In cases of no evident peaks for a radionuclide, the software performing the quantitation uses a "net quantification" method. ALS indicates that this method of quantitation can yield activity results associated with radionuclides whose presence cannot be determined definitively. ALS flags these results with an "NQ" qualifier, and indicates that the radionuclide is not detected or supported at any level above the reported minimum detectable concentration (MDC). All such results were qualified as non-detect and flagged "UJ".

VI. Overall Assessment of Data

Overall data quality is acceptable, with few qualifications applied. All data are usable as qualified for their intended purposes.

APPENDIX K

ANALYTICAL DATA SUMMARY TABLES

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Ac-228	Gamma Spec.	1.26	G,TI	J,G	0.5	0.85
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Ag-110m	Gamma Spec.	-0.13	U,G	U	0.13	0.28
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Al-26	Gamma Spec.	-0.01	U,G	U	0.12	0.25
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Am-241	Gamma Spec.	-0.25	U,G	U	0.86	1.61
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Be-7	Gamma Spec.	0.4	U,G	U	1.3	2.4
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Bi-212	Gamma Spec.	0.5	U,G	U	2.1	3.8
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Bi-214	Gamma Spec.	0.96	G,J	J,G	0.39	0.47
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Ce-139	Gamma Spec.	0.073	U,G	U	0.083	0.133
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Ce-144	Gamma Spec.	-0.11	U,G	U	0.57	1.04
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Co-56	Gamma Spec.	0.14	U,G	U	0.36	0.63
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Co-57	Gamma Spec.	-0.03	U,G	U	0.064	0.123
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Co-58	Gamma Spec.	0.1	U,G	U	0.19	0.32
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Co-60	Gamma Spec.	-0.18	U,G	U	0.17	0.38
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Cr-51	Gamma Spec.	-0.6	U,G	U	1.9	3.7
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Cs-134	Gamma Spec.	0.07	U,G	U	0.12	0.2
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Cs-137	Gamma Spec.	0.07	U,G	U	0.13	0.23
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Eu-152	Gamma Spec.	0.58	U,G	U	0.73	1.17
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Eu-154	Gamma Spec.	0.44	U,G	U	0.8	1.37
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Eu-155	Gamma Spec.	0.23	U,G	U	0.29	0.48
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Fe-59	Gamma Spec.	-0.16	U,G	U	0.4	0.84
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	I-131	Gamma Spec.	1.4	U,G	U	2.6	4.5
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	K-40	Gamma Spec.	9.6	G	G	3.2	3.5
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Mn-54	Gamma Spec.	0.06	U,G	U	0.13	0.23
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Na-22	Gamma Spec.	-0.07	U,G	U	0.14	0.3
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Nb-94	Gamma Spec.	-0.02	U,G	U	0.14	0.26
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Nb-95	Gamma Spec.	-0.16	U,G	U	0.2	0.41
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Pa-234m	Gamma Spec.	1	U,G	U	26	49
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Pb-210	LCS	1.86		J	0.5	0.28
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Pb-212	Gamma Spec.	1.12	G	G	0.34	0.4
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Pb-214	Gamma Spec.	1.08	G,J	J,G	0.31	0.36
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Ra-226	Gamma Spec.	1.37	G	G	0.33	0.46
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Ru-106	Gamma Spec.	0.5	U,G	U	1.1	2
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Sb-124	Gamma Spec.	0.07	U,G	U	0.18	0.31
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Sb-125	Gamma Spec.	-0.09	U,G	U	0.26	0.52

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Sc-46	Gamma Spec.	-0.05	U,G	U	0.17	0.33
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Th-227	Gamma Spec.	0.59	U,G	U	0.98	1.55
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Th-228	Alpha Spec.	1.03			0.18	0.05
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Th-230	Alpha Spec.	1.17			0.2	0.07
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Th-232	Alpha Spec.	1.06			0.18	0.01
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Th-234	Gamma Spec.	-0.5	U,G	U	1.7	3.1
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Tl-208	Gamma Spec.	0.48	G	G	0.19	0.23
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	U-234	Alpha Spec.	0.89			0.2	0.01
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	U-235	Gamma Spec.	0.39	U,G	U	0.49	0.81
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	U-235	Alpha Spec.	0.04	LT		0.033	0.033
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	U-238	Alpha Spec.	0.8			0.18	0.04
House 1	BDS-[redacted]SC006	1701082-20	12/27/2016	Zn-65	Gamma Spec.	-0.25	U,G	U	0.4	0.8
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Ac-228	Gamma Spec.	1.08	G,TI	J,G	0.44	0.68
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Ag-110m	Gamma Spec.	0.041	U,G	U	0.092	0.163
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Al-26	Gamma Spec.	-0.03	U,G	U	0.12	0.26
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Am-241	Gamma Spec.	0.14	U,G	U	0.16	0.27
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Be-7	Gamma Spec.	-0.1	U,G	U	1.3	2.4
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Bi-212	Gamma Spec.	0.3	U,G	U	1.8	3.3
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Bi-214	Gamma Spec.	1.12	G,J	J,G	0.41	0.49
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Ce-139	Gamma Spec.	-0.03	U,G	U	0.066	0.128
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Ce-144	Gamma Spec.	0.1	U,G	U	0.48	0.84
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Co-56	Gamma Spec.	-0.02	U,G	U	0.33	0.63
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Co-57	Gamma Spec.	-0.01	U,G	U	0.052	0.097
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Co-58	Gamma Spec.	0.09	U,G	U	0.15	0.26
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Co-60	Gamma Spec.	-0.02	U,G	U	0.12	0.25
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Cr-51	Gamma Spec.	-1.2	U,G	U	1.6	3.2
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Cs-134	Gamma Spec.	-0.017	U,G	U	0.093	0.181
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Cs-137	Gamma Spec.	0.03	U,G	U	0.1	0.18
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Eu-152	Gamma Spec.	0.31	U,G	U	0.49	0.84
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Eu-154	Gamma Spec.	0	U,G	U	0.51	1.03
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Eu-155	Gamma Spec.	0.14	U,G	U	0.22	0.37
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Fe-59	Gamma Spec.	0.18	U,G	U	0.38	0.67
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	I-131	Gamma Spec.	-1.7	U,G	U	2.5	4.9
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	K-40	Gamma Spec.	15.1	G	G	3.7	2.3

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Mn-54	Gamma Spec.	0.06	U,G	U	0.12	0.21
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Na-22	Gamma Spec.	-0.05	U,G	U	0.12	0.25
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Nb-94	Gamma Spec.	0.05	U,G	U	0.1	0.17
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Nb-95	Gamma Spec.	0.02	U,G	U	0.18	0.33
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Pa-234m	Gamma Spec.	0	U,G	U	15	31
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Pb-210	LCS	1.45		J	0.41	0.3
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Pb-212	Gamma Spec.	1.07	G	G	0.29	0.3
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Pb-214	Gamma Spec.	1.1	G,J	J,G	0.28	0.38
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Ra-226	Gamma Spec.	1.53	G	G	0.35	0.52
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Ru-106	Gamma Spec.	1.1	U,G	U	1	1.6
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Sb-124	Gamma Spec.	-0.13	U,G	U	0.14	0.3
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Sb-125	Gamma Spec.	0.06	U,G	U	0.29	0.51
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Sc-46	Gamma Spec.	0	U,G	U	0.14	0.28
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Th-227	Gamma Spec.	0.28	U,G	U	0.5	0.85
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Th-228	Alpha Spec.	1.03			0.2	0.08
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Th-230	Alpha Spec.	1.1			0.2	0.08
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Th-232	Alpha Spec.	1.06			0.19	0.03
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Th-234	Gamma Spec.	1.4	U,G	U	1.4	2.2
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Tl-208	Gamma Spec.	0.32	G	G	0.17	0.23
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	U-234	Alpha Spec.	0.75			0.16	0.04
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	U-235	Gamma Spec.	-0.05	U,G	U	0.42	0.78
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	U-235	Alpha Spec.	0.011	U	U	0.018	0.032
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	U-238	Alpha Spec.	0.75			0.16	0.03
House 1	BDS-[redacted]SC007	1701082-21	12/27/2016	Zn-65	Gamma Spec.	-0.19	U,G	U	0.33	0.67
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Ac-228	Gamma Spec.	1.21	G,TI	J,G	0.48	0.7
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Ag-110m	Gamma Spec.	0	U,G	U	0.1	0.2
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Al-26	Gamma Spec.	0.013	U,G	U	0.096	0.202
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Am-241	Gamma Spec.	0.02	U,G	U	0.17	0.3
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Be-7	Gamma Spec.	1.5	U,G	U	1.3	1.9
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Bi-212	Gamma Spec.	0	U,G	U	1.7	3.2
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Bi-214	Gamma Spec.	1.41	G,J	J,G	0.42	0.43
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Ce-139	Gamma Spec.	-0.011	U,G	U	0.068	0.127
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Ce-144	Gamma Spec.	-0.23	U,G	U	0.43	0.83
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Co-56	Gamma Spec.	0.17	U,G	U	0.28	0.48

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Co-57	Gamma Spec.	-0.006	U,G	U	0.052	0.096
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Co-58	Gamma Spec.	0.05	U,G	U	0.12	0.22
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Co-60	Gamma Spec.	0.08	U,G	U	0.11	0.19
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Cr-51	Gamma Spec.	-0.7	U,G	U	1.7	3.3
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Cs-134	Gamma Spec.	-0.03	U,G	U	0.11	0.22
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Cs-137	Gamma Spec.	0.17	U,G	U	0.13	0.2
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Eu-152	Gamma Spec.	-0.39	U,G	U	0.6	1.35
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Eu-154	Gamma Spec.	-0.27	U,G	U	0.64	1.33
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Eu-155	Gamma Spec.	0.1	U,G	U	0.24	0.41
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Fe-59	Gamma Spec.	0.05	U,G	U	0.37	0.7
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	I-131	Gamma Spec.	-1.3	U,G	U	2.2	4.5
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	K-40	Gamma Spec.	15.2	G	G	3.7	2.5
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Mn-54	Gamma Spec.	0.09	U,G	U	0.11	0.18
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Na-22	Gamma Spec.	0.04	U,G	U	0.14	0.26
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Nb-94	Gamma Spec.	0.11	U,G	U	0.11	0.17
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Nb-95	Gamma Spec.	-0.14	U,G	U	0.17	0.35
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Pa-234m	Gamma Spec.	10	U,G	U	21	37
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Pb-210	LCS	6.6			1.6	0.3
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Pb-212	Gamma Spec.	1.02	G	G	0.29	0.33
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Pb-214	Gamma Spec.	0.9	G,J	J,G	0.26	0.35
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Ra-226	Gamma Spec.	1.43	G	G	0.33	0.48
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Ru-106	Gamma Spec.	-0.2	U,G	U	1	2
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Sb-124	Gamma Spec.	0	U,G	U	0.17	0.31
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Sb-125	Gamma Spec.	0.2	U,G	U	0.27	0.44
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Sc-46	Gamma Spec.	-0.13	U,G	U	0.13	0.29
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Th-227	Gamma Spec.	0.15	U,G	U	0.48	0.83
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Th-228	Alpha Spec.	1.12			0.21	0.07
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Th-230	Alpha Spec.	1.14			0.21	0.09
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Th-232	Alpha Spec.	1.08			0.2	0.03
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Th-234	Gamma Spec.	0.6	U,G	U	1.1	1.9
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Tl-208	Gamma Spec.	0.52	G	G	0.18	0.19
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	U-234	Alpha Spec.	1.22			0.25	0.03
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	U-235	Gamma Spec.	0.38	U,G	U	0.46	0.76
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	U-235	Alpha Spec.	0.042	LT		0.032	0.03

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	U-238	Alpha Spec.	1.19			0.24	0.04
House 1	BDS-[redacted]SG001	1701082-15	12/27/2016	Zn-65	Gamma Spec.	-0.09	U,G	U	0.29	0.58
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Ac-228	Gamma Spec.	0.79	U,G	U	0.88	1.4
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Ag-110m	Gamma Spec.	-0.33	U,G	U	0.23	0.49
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Al-26	Gamma Spec.	-0.05	U,G	U	0.1	0.31
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Am-241	Gamma Spec.	-1.1	U,G	U	1.9	3.5
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Be-7	Gamma Spec.	2.2	U,G	U	2.5	4
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Bi-212	Gamma Spec.	1	U,G	U	2.8	5
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Bi-214	Gamma Spec.	1.53	G,J	J,G	0.66	0.86
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Ce-139	Gamma Spec.	0.05	U,G	U	0.15	0.26
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Ce-144	Gamma Spec.	0.79	U,G	U	0.94	1.52
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Co-56	Gamma Spec.	0.5	U,G	U	0.51	0.79
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Co-57	Gamma Spec.	-0.07	U,G	U	0.13	0.25
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Co-58	Gamma Spec.	-0.26	U,G	U	0.28	0.61
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Co-60	Gamma Spec.	0.01	U,G	U	0.23	0.45
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Cr-51	Gamma Spec.	1.8	U,G	U	3.5	5.9
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Cs-134	Gamma Spec.	-0.1	U,G	U	0.27	0.51
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Cs-137	Gamma Spec.	0.17	U,G	U	0.23	0.38
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Eu-152	Gamma Spec.	0.44	U,G	U	0.93	1.67
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Eu-154	Gamma Spec.	0.3	U,G	U	1.4	2.5
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Eu-155	Gamma Spec.	-0.26	U,G	U	0.56	1.04
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Fe-59	Gamma Spec.	-0.13	U,G	U	0.66	1.35
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	I-131	Gamma Spec.	0	U,G	U	5.9	10.7
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	K-40	Gamma Spec.	20.4	G	G	5.9	5.2
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Mn-54	Gamma Spec.	0.14	U,G	U	0.18	0.3
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Na-22	Gamma Spec.	-0.03	U,G	U	0.27	0.52
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Nb-94	Gamma Spec.	0.1	U,G	U	0.2	0.35
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Nb-95	Gamma Spec.	0.01	U,G	U	0.31	0.57
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Pa-234m	Gamma Spec.	26	U,G	U	38	63
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Pb-210	LCS	5.2			1.3	0.2
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Pb-212	Gamma Spec.	1.42	G	G	0.45	0.54
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Pb-214	Gamma Spec.	1.79	G,J	J,G	0.49	0.64
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Ra-226	Gamma Spec.	2.43	G	G	0.59	0.88
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Ru-106	Gamma Spec.	-2	U,G	U	2	4.1

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Sb-124	Gamma Spec.	0	U,G	U	0.25	0.47
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Sb-125	Gamma Spec.	-0.34	U,G	U	0.47	0.95
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Sc-46	Gamma Spec.	-0.16	U,G	U	0.25	0.54
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Th-227	Gamma Spec.	-0.6	U,G	U	1.3	2.5
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Th-228	Alpha Spec.	1.06			0.18	0.03
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Th-230	Alpha Spec.	1.01			0.18	0.07
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Th-232	Alpha Spec.	0.97			0.17	0.02
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Th-234	Gamma Spec.	0.1	U,G	U	3.2	5.7
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Tl-208	Gamma Spec.	0.33	U,G	U	0.28	0.43
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	U-234	Alpha Spec.	0.77			0.17	0.04
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	U-235	Gamma Spec.	0.05	U,G	U	0.86	1.54
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	U-235	Alpha Spec.	0.044	LT		0.034	0.041
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	U-238	Alpha Spec.	0.89			0.19	0.03
House 1	BDS-[redacted]SG002	1701082-16	12/27/2016	Zn-65	Gamma Spec.	-0.62	U,G	U	0.61	1.29
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Ac-228	Gamma Spec.	0.95	G,TI	J,G	0.46	0.79
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Ag-110m	Gamma Spec.	-0.14	U,G	U	0.1	0.24
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Al-26	Gamma Spec.	0.025	U,G	U	0.089	0.179
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Am-241	Gamma Spec.	0.39	U,G	U	0.84	1.43
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Be-7	Gamma Spec.	1	U,G	U	1.3	2.1
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Bi-212	Gamma Spec.	2.3	U,G	U	2	3
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Bi-214	Gamma Spec.	1.09	G,J	J,G	0.4	0.49
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Ce-139	Gamma Spec.	-0.044	U,G	U	0.081	0.155
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Ce-144	Gamma Spec.	-0.28	U,G	U	0.57	1.06
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Co-56	Gamma Spec.	0.08	U,G	U	0.36	0.66
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Co-57	Gamma Spec.	0.034	U,G	U	0.065	0.111
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Co-58	Gamma Spec.	-0.1	U,G	U	0.17	0.34
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Co-60	Gamma Spec.	0.065	U,G	U	0.097	0.163
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Cr-51	Gamma Spec.	-0.3	U,G	U	1.6	3.1
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Cs-134	Gamma Spec.	0.05	U,G	U	0.15	0.25
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Cs-137	Gamma Spec.	0.04	U,G	U	0.11	0.19
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Eu-152	Gamma Spec.	0.21	U,G	U	0.66	1.2
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Eu-154	Gamma Spec.	0.21	U,G	U	0.68	1.22
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Eu-155	Gamma Spec.	0.16	U,G	U	0.26	0.43
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Fe-59	Gamma Spec.	0.2	U,G	U	0.39	0.67

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	I-131	Gamma Spec.	-0.4	U,G	U	2.5	4.6
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	K-40	Gamma Spec.	11.8	G	G	3.3	2.8
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Mn-54	Gamma Spec.	0.07	U,G	U	0.15	0.26
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Na-22	Gamma Spec.	-0.13	U,G	U	0.15	0.32
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Nb-94	Gamma Spec.	-0.02	U,G	U	0.1	0.2
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Nb-95	Gamma Spec.	-0.08	U,G	U	0.16	0.32
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Pa-234m	Gamma Spec.	13	U,G	U	19	32
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Pb-210	LCS	1.28			0.36	0.26
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Pb-212	Gamma Spec.	1.25	G	G	0.32	0.32
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Pb-214	Gamma Spec.	1.25	G,J	J,G	0.33	0.37
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Ra-226	Gamma Spec.	1.57	G	G	0.36	0.47
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Ru-106	Gamma Spec.	0.2	U,G	U	1	1.8
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Sb-124	Gamma Spec.	0.09	U,G	U	0.14	0.23
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Sb-125	Gamma Spec.	-0.09	U,G	U	0.27	0.52
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Sc-46	Gamma Spec.	-0.01	U,G	U	0.12	0.25
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Th-227	Gamma Spec.	-0.24	U,G	U	0.97	1.74
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Th-228	Alpha Spec.	1.04			0.19	0.04
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Th-230	Alpha Spec.	1.01			0.19	0.08
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Th-232	Alpha Spec.	0.93			0.17	0.02
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Th-234	Gamma Spec.	1.1	U,G	U	2.2	3.7
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Tl-208	Gamma Spec.	0.27	G	G	0.16	0.22
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	U-234	Alpha Spec.	0.7			0.17	0.03
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	U-235	Gamma Spec.	0.25	U,G	U	0.49	0.82
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	U-235	Alpha Spec.	0.018	LT		0.022	0.016
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	U-238	Alpha Spec.	0.85			0.19	0.04
House 1	BDS-[redacted]SG003	1701082-17	12/27/2016	Zn-65	Gamma Spec.	-0.4	U,G	U	0.39	0.8
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Ac-228	Gamma Spec.	0.77	TI		0.38	0.73
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Ag-110m	Gamma Spec.	-0.017	U	U	0.096	0.185
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Al-26	Gamma Spec.	0.044	U	U	0.092	0.167
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Am-241	Gamma Spec.	0.08	U	U	0.13	0.22
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Be-7	Gamma Spec.	0.37	U	U	0.8	1.41
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Bi-212	Gamma Spec.	0.7	U	U	1.4	2.4
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Bi-214	Gamma Spec.	0.78	J	J	0.31	0.38
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Ce-139	Gamma Spec.	-0.093	U	U	0.06	0.126

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Ce-144	Gamma Spec.	0.44	U	U	0.4	0.63
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Co-56	Gamma Spec.	0.16	U	U	0.29	0.49
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Co-57	Gamma Spec.	-0.008	U	U	0.053	0.096
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Co-58	Gamma Spec.	-0.09	U	U	0.11	0.24
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Co-60	Gamma Spec.	-0.09	U	U	0.12	0.27
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Cr-51	Gamma Spec.	0.3	U	U	1.3	2.4
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Cs-134	Gamma Spec.	0.021	U	U	0.085	0.153
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Cs-137	Gamma Spec.	-0.02	U	U	0.1	0.19
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Eu-152	Gamma Spec.	-0.51	U	U	0.55	1.25
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Eu-154	Gamma Spec.	0.17	U	U	0.47	0.85
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Eu-155	Gamma Spec.	0.22	U	U	0.19	0.28
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Fe-59	Gamma Spec.	-0.08	U	U	0.36	0.72
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	I-131	Gamma Spec.	-0.7	U	U	1.9	3.6
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	K-40	Gamma Spec.	13.7			3.3	2.1
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Mn-54	Gamma Spec.	-0.04	U	U	0.1	0.2
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Na-22	Gamma Spec.	0.033	U	U	0.098	0.181
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Nb-94	Gamma Spec.	-0.031	U	U	0.084	0.167
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Nb-95	Gamma Spec.	-0.02	U	U	0.13	0.25
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Pa-234m	Gamma Spec.	3	U	U	14	27
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Pb-210	LCS	1.24		J	0.35	0.26
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Pb-212	Gamma Spec.	0.99			0.25	0.26
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Pb-214	Gamma Spec.	1.05	J	J	0.26	0.3
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Ra-226	Gamma Spec.	1.33			0.3	0.41
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Ru-106	Gamma Spec.	0.22	U	U	0.8	1.44
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Sb-124	Gamma Spec.	-0.02	U	U	0.13	0.25
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Sb-125	Gamma Spec.	0	U	U	0.19	0.35
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Sc-46	Gamma Spec.	-0.06	U	U	0.11	0.23
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Th-227	Gamma Spec.	0	U	U	0.42	0.77
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Th-228	Alpha Spec.	1.02			0.18	0.03
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Th-230	Alpha Spec.	0.98			0.18	0.07
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Th-232	Alpha Spec.	0.97			0.17	0.02
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Th-234	Gamma Spec.	0.8	U	U	1.2	1.9
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Tl-208	Gamma Spec.	0.4			0.15	0.17
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	U-234	Alpha Spec.	0.63			0.15	0.02

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	U-235	Gamma Spec.	-0.13	U	U	0.37	0.69
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	U-235	Alpha Spec.	0.039	LT		0.031	0.036
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	U-238	Alpha Spec.	0.82			0.18	0.02
House 1	BDS-[redacted]SG004	1701082-18	12/27/2016	Zn-65	Gamma Spec.	-0.23	U	U	0.24	0.54
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Ac-228	Gamma Spec.	1.21	G,TI	J,G	0.57	0.69
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Ag-110m	Gamma Spec.	0.1	U,G	U	0.1	0.16
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Al-26	Gamma Spec.	-0.009	U,G	U	0.078	0.181
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Am-241	Gamma Spec.	0.3	U,G	U	2.2	3.9
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Be-7	Gamma Spec.	0.1	U,G	U	1.1	2.1
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Bi-212	Gamma Spec.	1.6	U,G	U	1.7	2.7
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Bi-214	Gamma Spec.	0.92	G,J	J,G	0.34	0.4
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Ce-139	Gamma Spec.	0.047	U,G	U	0.076	0.128
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Ce-144	Gamma Spec.	0.21	U,G	U	0.48	0.83
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Co-56	Gamma Spec.	0.05	U,G	U	0.24	0.45
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Co-57	Gamma Spec.	-0.078	U,G	U	0.068	0.138
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Co-58	Gamma Spec.	0.01	U,G	U	0.13	0.25
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Co-60	Gamma Spec.	0.06	U,G	U	0.12	0.22
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Cr-51	Gamma Spec.	1	U,G	U	1.5	2.6
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Cs-134	Gamma Spec.	-0.03	U,G	U	0.099	0.19
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Cs-137	Gamma Spec.	-0.01	U,G	U	0.11	0.2
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Eu-152	Gamma Spec.	0.31	U,G	U	0.54	0.93
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Eu-154	Gamma Spec.	0.3	U,G	U	0.63	1.11
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Eu-155	Gamma Spec.	-0.03	U,G	U	0.32	0.58
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Fe-59	Gamma Spec.	0.22	U,G	U	0.34	0.58
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	I-131	Gamma Spec.	0	U,G	U	2.8	5.2
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	K-40	Gamma Spec.	8.1	G	G	2.7	2.6
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Mn-54	Gamma Spec.	-0.03	U,G	U	0.1	0.21
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Na-22	Gamma Spec.	-0.01	U,G	U	0.12	0.24
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Nb-94	Gamma Spec.	-0.006	U,G	U	0.093	0.176
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Nb-95	Gamma Spec.	0.02	U,G	U	0.15	0.28
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Pa-234m	Gamma Spec.	-8	U,G	U	19	39
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Pb-210	LCS	1.16		J	0.33	0.26
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Pb-212	Gamma Spec.	0.87	G	G	0.26	0.29
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Pb-214	Gamma Spec.	0.82	G,J	J,G	0.26	0.4

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Ra-226	Gamma Spec.	1.23	G	G	0.31	0.56
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Ru-106	Gamma Spec.	-0.32	U,G	U	0.84	1.68
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Sb-124	Gamma Spec.	-0.11	U,G	U	0.15	0.31
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Sb-125	Gamma Spec.	0.2	U,G	U	0.24	0.4
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Sc-46	Gamma Spec.	0.01	U,G	U	0.15	0.27
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Th-227	Gamma Spec.	-0.09	U,G	U	0.49	0.91
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Th-228	Alpha Spec.	0.96			0.18	0.06
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Th-230	Alpha Spec.	0.89			0.17	0.08
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Th-232	Alpha Spec.	0.86			0.16	0.02
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Th-234	Gamma Spec.	2.1	U,G	U	1.7	2.7
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Tl-208	Gamma Spec.	0.24	G	G	0.12	0.15
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	U-234	Alpha Spec.	0.78			0.17	0.03
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	U-235	Gamma Spec.	-0.08	U,G	U	0.48	0.88
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	U-235	Alpha Spec.	0.048	LT		0.033	0.014
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	U-238	Alpha Spec.	0.65			0.15	0.02
House 1	BDS-[redacted]SG005	1701082-19	12/27/2016	Zn-65	Gamma Spec.	-0.18	U,G	U	0.36	0.71
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Ac-228	Gamma Spec.	1.29	G,TI	J,G	0.54	0.76
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Ag-110m	Gamma Spec.	-0.01	U,G	U	0.1	0.21
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Al-26	Gamma Spec.	-0.01	U,G	U	0.13	0.28
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Am-241	Gamma Spec.	0.5	U,G	U	2	3.4
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Be-7	Gamma Spec.	-0.3	U,G	U	1.4	2.8
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Bi-212	Gamma Spec.	2.1	U,G	U	2.3	3.7
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Bi-214	Gamma Spec.	1.35	G,J	J,G	0.45	0.47
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Ce-139	Gamma Spec.	0.004	U,G	U	0.098	0.176
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Ce-144	Gamma Spec.	0	U,G	U	0.68	1.23
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Co-56	Gamma Spec.	0.12	U,G	U	0.37	0.67
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Co-57	Gamma Spec.	-0.023	U,G	U	0.081	0.153
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Co-58	Gamma Spec.	-0.15	U,G	U	0.16	0.37
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Co-60	Gamma Spec.	-0.02	U,G	U	0.15	0.3
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Cr-51	Gamma Spec.	0.6	U,G	U	1.6	2.8
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Cs-134	Gamma Spec.	-0.06	U,G	U	0.12	0.24
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Cs-137	Gamma Spec.	0.037	U,G	U	0.096	0.176
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Eu-152	Gamma Spec.	-0.09	U,G	U	0.68	1.41
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Eu-154	Gamma Spec.	-0.17	U,G	U	0.58	1.26

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Eu-155	Gamma Spec.	0.27	U,G	U	0.37	0.62
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Fe-59	Gamma Spec.	-0.24	U,G	U	0.37	0.85
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	I-131	Gamma Spec.	0.5	U,G	U	2.5	4.5
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	K-40	Gamma Spec.	14	G	G	4.1	3.8
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Mn-54	Gamma Spec.	0.09	U,G	U	0.15	0.26
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Na-22	Gamma Spec.	-0.17	U,G	U	0.13	0.33
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Nb-94	Gamma Spec.	0.03	U,G	U	0.15	0.26
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Nb-95	Gamma Spec.	0.04	U,G	U	0.16	0.3
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Pa-234m	Gamma Spec.	3	U,G	U	20	38
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Pb-210	LCS	1.95			0.52	0.29
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Pb-212	Gamma Spec.	0.79	G	G	0.34	0.45
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Pb-214	Gamma Spec.	0.91	G,J	J,G	0.31	0.44
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Ra-226	Gamma Spec.	1.46	G	G	0.38	0.6
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Ru-106	Gamma Spec.	-0.3	U,G	U	1.1	2.2
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Sb-124	Gamma Spec.	-0.03	U,G	U	0.18	0.34
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Sb-125	Gamma Spec.	-0.06	U,G	U	0.3	0.58
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Sc-46	Gamma Spec.	0.17	U,G	U	0.14	0.19
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Th-227	Gamma Spec.	1.2	U,G	U	1.1	1.6
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Th-228	Alpha Spec.	1			0.18	0.05
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Th-230	Alpha Spec.	1.04			0.19	0.07
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Th-232	Alpha Spec.	0.95			0.17	0.01
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Th-234	Gamma Spec.	-1.5	U,G	U	2.1	4
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Tl-208	Gamma Spec.	0.31	G	G	0.2	0.28
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	U-234	Alpha Spec.	0.68			0.16	0.03
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	U-235	Gamma Spec.	0.2	U,G	U	0.55	0.95
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	U-235	Alpha Spec.	0.072	LT		0.043	0.036
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	U-238	Alpha Spec.	0.85			0.19	0.04
House 2	BDS-[redacted]C-S001	1701077-17	12/28/2016	Zn-65	Gamma Spec.	-0.24	U,G	U	0.41	0.83
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Ac-228	Gamma Spec.	1.26	G,TI	J,G	0.63	0.73
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Ag-110m	Gamma Spec.	-0.01	U,G	U	0.14	0.26
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Al-26	Gamma Spec.	0.02	U,G	U	0.13	0.25
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Am-241	Gamma Spec.	-0.6	U,G	U	1.1	2.1
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Be-7	Gamma Spec.	0.7	U,G	U	1.5	2.5
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Bi-212	Gamma Spec.	1.2	U,G	U	1.5	2.4

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Bi-214	Gamma Spec.	1	G,J	J,G	0.42	0.55
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Ce-139	Gamma Spec.	0.03	U,G	U	0.1	0.17
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Ce-144	Gamma Spec.	-0.23	U,G	U	0.57	1.08
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Co-56	Gamma Spec.	0.2	U,G	U	0.39	0.67
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Co-57	Gamma Spec.	0.07	U,G	U	0.072	0.114
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Co-58	Gamma Spec.	0.05	U,G	U	0.15	0.28
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Co-60	Gamma Spec.	-0.03	U,G	U	0.16	0.32
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Cr-51	Gamma Spec.	-0.3	U,G	U	1.9	3.5
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Cs-134	Gamma Spec.	-0.06	U,G	U	0.16	0.31
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Cs-137	Gamma Spec.	0.05	U,G	U	0.12	0.21
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Eu-152	Gamma Spec.	-0.56	U,G	U	0.56	1.39
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Eu-154	Gamma Spec.	0.18	U,G	U	0.68	1.25
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Eu-155	Gamma Spec.	-0.05	U,G	U	0.32	0.59
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Fe-59	Gamma Spec.	-0.23	U,G	U	0.43	0.9
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	I-131	Gamma Spec.	-0.5	U,G	U	2.2	4.1
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	K-40	Gamma Spec.	13.6	G	G	3.9	3.4
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Mn-54	Gamma Spec.	-0.02	U,G	U	0.13	0.25
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Na-22	Gamma Spec.	-0.08	U,G	U	0.17	0.34
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Nb-94	Gamma Spec.	-0.04	U,G	U	0.12	0.24
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Nb-95	Gamma Spec.	0.02	U,G	U	0.19	0.35
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Pa-234m	Gamma Spec.	10	U,G	U	19	34
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Pb-210	LCS	1.46			0.4	0.26
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Pb-212	Gamma Spec.	0.83	G	G	0.26	0.3
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Pb-214	Gamma Spec.	1.07	G,J	J,G	0.32	0.5
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Ra-226	Gamma Spec.	1.52	G	G	0.39	0.69
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Ru-106	Gamma Spec.	0.3	U,G	U	1.2	2.1
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Sb-124	Gamma Spec.	-0.07	U,G	U	0.17	0.34
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Sb-125	Gamma Spec.	-0.15	U,G	U	0.3	0.58
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Sc-46	Gamma Spec.	-0.08	U,G	U	0.18	0.36
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Th-227	Gamma Spec.	0.21	U,G	U	0.57	0.99
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Th-228	Alpha Spec.	1.1			0.19	0.03
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Th-230	Alpha Spec.	1.18			0.21	0.07
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Th-232	Alpha Spec.	1.16			0.2	0.02
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Th-234	Gamma Spec.	-1.4	U,G	U	2.1	3.9

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Tl-208	Gamma Spec.	0.25	G	G	0.16	0.23
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	U-234	Alpha Spec.	0.78			0.17	0.03
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	U-235	Gamma Spec.	0.18	U,G	U	0.53	0.92
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	U-235	Alpha Spec.	0.03	U	U	0.03	0.044
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	U-238	Alpha Spec.	0.88			0.19	0.03
House 2	BDS-[redacted]C-S002	1701077-18	12/28/2016	Zn-65	Gamma Spec.	-0.19	U,G	U	0.41	0.8
House 2	BDS-[redacted]C-S002 (DUP)	1701077-18	12/28/2016	Th-228	Alpha Spec.	1.05			0.18	0.03
House 2	BDS-[redacted]C-S002 (DUP)	1701077-18	12/28/2016	Th-230	Alpha Spec.	1.11			0.19	0.07
House 2	BDS-[redacted]C-S002 (DUP)	1701077-18	12/28/2016	Th-232	Alpha Spec.	0.96			0.17	0.01
House 2	BDS-[redacted]C-S002 (DUP)	1701077-18	12/28/2016	U-234	Alpha Spec.	0.87			0.19	0.01
House 2	BDS-[redacted]C-S002 (DUP)	1701077-18	12/28/2016	U-235	Alpha Spec.	0.04	LT		0.031	0.015
House 2	BDS-[redacted]C-S002 (DUP)	1701077-18	12/28/2016	U-238	Alpha Spec.	0.83			0.19	0.04
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Ac-228	Gamma Spec.	1.12	G,TI	J,G	0.68	0.9
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Ag-110m	Gamma Spec.	-0.14	U,G	U	0.17	0.35
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Al-26	Gamma Spec.	-0.08	U,G	U	0.12	0.32
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Am-241	Gamma Spec.	-0.43	U,G	U	0.78	1.48
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Be-7	Gamma Spec.	0.9	U,G	U	1.4	2.3
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Bi-212	Gamma Spec.	0.1	U,G	U	2.1	3.9
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Bi-214	Gamma Spec.	1.12	G,J	J,G	0.45	0.56
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Ce-139	Gamma Spec.	0.02	U,G	U	0.098	0.171
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Ce-144	Gamma Spec.	-0.56	U,G	U	0.53	1.05
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Co-56	Gamma Spec.	0.21	U,G	U	0.41	0.71
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Co-57	Gamma Spec.	-0.033	U,G	U	0.073	0.137
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Co-58	Gamma Spec.	-0.04	U,G	U	0.17	0.35
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Co-60	Gamma Spec.	-0.1	U,G	U	0.19	0.39
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Cr-51	Gamma Spec.	-1.4	U,G	U	1.7	3.5
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Cs-134	Gamma Spec.	-0.14	U,G	U	0.19	0.38
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Cs-137	Gamma Spec.	0.11	U,G	U	0.17	0.29
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Eu-152	Gamma Spec.	0.51	U,G	U	0.84	1.43
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Eu-154	Gamma Spec.	0.65	U,G	U	0.59	0.8
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Eu-155	Gamma Spec.	-0.12	U,G	U	0.3	0.56
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Fe-59	Gamma Spec.	-0.26	U,G	U	0.53	1.08
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	I-131	Gamma Spec.	-1.2	U,G	U	2.1	4.2
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	K-40	Gamma Spec.	18.6	G	G	5.2	5.1

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Mn-54	Gamma Spec.	-0.14	U,G	U	0.16	0.34
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Na-22	Gamma Spec.	-0.09	U,G	U	0.2	0.41
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Nb-94	Gamma Spec.	-0.12	U,G	U	0.16	0.31
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Nb-95	Gamma Spec.	-0.02	U,G	U	0.22	0.42
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Pa-234m	Gamma Spec.	-20	U,G	U	23	51
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Pb-210	LCS	14.4			3.5	0.3
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Pb-212	Gamma Spec.	0.77	G	G	0.29	0.38
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Pb-214	Gamma Spec.	1.21	G,J	J,G	0.35	0.47
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Ra-226	Gamma Spec.	1.68	G	G	0.42	0.68
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Ru-106	Gamma Spec.	1.4	U,G	U	1.5	2.4
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Sb-124	Gamma Spec.	-0.01	U,G	U	0.2	0.38
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Sb-125	Gamma Spec.	-0.03	U,G	U	0.3	0.56
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Sc-46	Gamma Spec.	-0.17	U,G	U	0.17	0.38
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Th-227	Gamma Spec.	-0.97	U,G	U	0.9	1.79
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Th-228	Alpha Spec.	1.16			0.2	0.03
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Th-230	Alpha Spec.	1.29			0.22	0.07
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Th-232	Alpha Spec.	1.04			0.18	0.02
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Th-234	Gamma Spec.	2.1	U,G	U	1.9	3
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Tl-208	Gamma Spec.	0.26	G	G	0.16	0.21
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	U-234	Alpha Spec.	0.78			0.18	0.04
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	U-235	Gamma Spec.	-0.39	U,G	U	0.58	1.09
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	U-235	Alpha Spec.	0.053	LT	J	0.036	0.03
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	U-238	Alpha Spec.	0.86			0.19	0.03
House 2	BDS-[redacted]G-S003	1701077-19	12/28/2016	Zn-65	Gamma Spec.	-0.5	U,G	U	0.4	0.89
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Ac-228	Gamma Spec.	1.33	G,NQ	UJ	0.73	0.96
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Ag-110m	Gamma Spec.	-0.04	U,G	U	0.13	0.25
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Al-26	Gamma Spec.	-0.05	U,G	U	0.15	0.33
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Am-241	Gamma Spec.	0.23	U,G	U	0.99	1.71
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Be-7	Gamma Spec.	-0.7	U,G	U	1.4	2.8
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Bi-212	Gamma Spec.	1.2	U,G	U	1.9	3.1
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Bi-214	Gamma Spec.	1.03	G,J	J,G	0.4	0.49
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Ce-139	Gamma Spec.	-0.08	U,G	U	0.11	0.2
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Ce-144	Gamma Spec.	-0.42	U,G	U	0.53	1.03
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Co-56	Gamma Spec.	0.35	U,G	U	0.38	0.6

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Co-57	Gamma Spec.	0.032	U,G	U	0.076	0.129
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Co-58	Gamma Spec.	0.04	U,G	U	0.19	0.35
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Co-60	Gamma Spec.	-0.19	U,G	U	0.17	0.38
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Cr-51	Gamma Spec.	-0.9	U,G	U	2.3	4.2
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Cs-134	Gamma Spec.	0	U,G	U	0.22	0.39
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Cs-137	Gamma Spec.	0	U,G	U	0.13	0.24
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Eu-152	Gamma Spec.	-0.08	U,G	U	0.83	1.63
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Eu-154	Gamma Spec.	0.37	U,G	U	0.67	1.16
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Eu-155	Gamma Spec.	-0.14	U,G	U	0.38	0.68
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Fe-59	Gamma Spec.	0.14	U,G	U	0.46	0.83
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	I-131	Gamma Spec.	2.4	U,G	U	2.7	4.3
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	K-40	Gamma Spec.	16.9	G	G	4.2	2.9
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Mn-54	Gamma Spec.	-0.05	U,G	U	0.13	0.26
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Na-22	Gamma Spec.	-0.03	U,G	U	0.13	0.27
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Nb-94	Gamma Spec.	-0.06	U,G	U	0.13	0.26
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Nb-95	Gamma Spec.	0.03	U,G	U	0.17	0.32
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Pa-234m	Gamma Spec.	-12	U,G	U	25	50
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Pb-210	LCS	1.54			0.42	0.25
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Pb-212	Gamma Spec.	1.06	G	G	0.33	0.41
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Pb-214	Gamma Spec.	0.86	G,J	J,G	0.29	0.45
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Ra-226	Gamma Spec.	1.31	G	G	0.35	0.63
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Ru-106	Gamma Spec.	0.8	U,G	U	1.3	2.1
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Sb-124	Gamma Spec.	0.09	U,G	U	0.21	0.36
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Sb-125	Gamma Spec.	0.11	U,G	U	0.31	0.55
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Sc-46	Gamma Spec.	-0.13	U,G	U	0.16	0.35
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Th-227	Gamma Spec.	-0.67	U,G	U	0.95	1.79
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Th-228	Alpha Spec.	1.05			0.19	0.05
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Th-230	Alpha Spec.	1.15			0.21	0.08
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Th-232	Alpha Spec.	1.09			0.2	0.02
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Th-234	Gamma Spec.	-0.9	U,G	U	2.2	3.9
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Tl-208	Gamma Spec.	0.28	G	G	0.15	0.21
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	U-234	Alpha Spec.	0.79			0.18	0.05
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	U-235	Gamma Spec.	-0.43	U,G	U	0.48	0.94
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	U-235	Alpha Spec.	0.04	LT	J	0.032	0.036

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	U-238	Alpha Spec.	0.85			0.19	0.03
House 2	BDS-[redacted]G-S004	1701077-20	12/28/2016	Zn-65	Gamma Spec.	-0.94	U,G	U	0.56	1.16
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Ac-228	Gamma Spec.	1.31	G,TI	J,G	0.75	0.99
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Ag-110m	Gamma Spec.	-0.05	U,G	U	0.12	0.25
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Al-26	Gamma Spec.	-0.11	U,G	U	0.13	0.32
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Am-241	Gamma Spec.	-0.83	U,G	U	0.94	1.87
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Be-7	Gamma Spec.	0.4	U,G	U	1.6	2.8
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Bi-212	Gamma Spec.	0	U,G	U	2.3	4.2
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Bi-214	Gamma Spec.	1.17	G,J	J,G	0.43	0.49
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Ce-139	Gamma Spec.	-0.03	U,G	U	0.1	0.19
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Ce-144	Gamma Spec.	0.63	U,G	U	0.64	1.02
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Co-56	Gamma Spec.	0.48	G,NQ	UJ	0.35	0.47
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Co-57	Gamma Spec.	0.007	U,G	U	0.067	0.122
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Co-58	Gamma Spec.	0	U,G	U	0.15	0.29
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Co-60	Gamma Spec.	-0.03	U,G	U	0.17	0.34
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Cr-51	Gamma Spec.	-0.8	U,G	U	2.1	4
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Cs-134	Gamma Spec.	-0.05	U,G	U	0.17	0.31
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Cs-137	Gamma Spec.	-0.01	U,G	U	0.13	0.25
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Eu-152	Gamma Spec.	0.12	U,G	U	0.68	1.3
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Eu-154	Gamma Spec.	0.44	U,G	U	0.69	1.17
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Eu-155	Gamma Spec.	0.04	U,G	U	0.32	0.57
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Fe-59	Gamma Spec.	-0.27	U,G	U	0.42	0.91
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	I-131	Gamma Spec.	0	U,G	U	2.7	5
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	K-40	Gamma Spec.	11.4	G	G	3.8	4.1
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Mn-54	Gamma Spec.	0.11	U,G	U	0.15	0.25
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Na-22	Gamma Spec.	0.08	U,G	U	0.18	0.31
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Nb-94	Gamma Spec.	-0.04	U,G	U	0.15	0.29
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Nb-95	Gamma Spec.	-0.21	U,G	U	0.2	0.43
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Pa-234m	Gamma Spec.	8	U,G	U	23	42
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Pb-210	LCS	1.41			0.39	0.27
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Pb-212	Gamma Spec.	1.16	G	G	0.32	0.32
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Pb-214	Gamma Spec.	1.3	G,J	J,G	0.37	0.44
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Ra-226	Gamma Spec.	1.65	G	G	0.39	0.56
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Ru-106	Gamma Spec.	-0.2	U,G	U	1.1	2.2

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Sb-124	Gamma Spec.	0.22	U,G	U	0.24	0.38
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Sb-125	Gamma Spec.	-0.13	U,G	U	0.28	0.57
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Sc-46	Gamma Spec.	-0.04	U,G	U	0.15	0.3
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Th-227	Gamma Spec.	0.13	U,G	U	0.96	1.65
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Th-228	Alpha Spec.	1.01			0.19	0.04
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Th-230	Alpha Spec.	1.04			0.19	0.08
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Th-232	Alpha Spec.	0.99			0.18	0.02
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Th-234	Gamma Spec.	-0.3	U,G	U	1.8	3.2
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Tl-208	Gamma Spec.	0.47	G	G	0.19	0.21
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	U-234	Alpha Spec.	0.94			0.21	0.04
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	U-235	Gamma Spec.	-0.3	U,G	U	0.58	1.1
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	U-235	Alpha Spec.	0.053	LT	J	0.039	0.018
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	U-238	Alpha Spec.	0.75			0.18	0.03
House 2	BDS-[redacted]G-S005	1701077-21	12/28/2016	Zn-65	Gamma Spec.	-0.35	U,G	U	0.43	0.88
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Ac-228	Gamma Spec.	0.96	G,TI	G	0.48	0.84
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Ag-110m	Gamma Spec.	0.05	U,G	U	0.13	0.23
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Al-26	Gamma Spec.	0.06	U,G	U	0.1	0.18
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Am-241	Gamma Spec.	-0.15	U,G	U	0.16	0.32
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Be-7	Gamma Spec.	0.3	U,G	U	1.4	2.6
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Bi-212	Gamma Spec.	2.2	U,G	U	1.7	2.3
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Bi-214	Gamma Spec.	0.86	G,J	G	0.4	0.53
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Ce-139	Gamma Spec.	-0.045	U,G	U	0.069	0.137
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Ce-144	Gamma Spec.	0	U,G	U	0.41	0.77
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Co-56	Gamma Spec.	-0.04	U,G	U	0.27	0.55
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Co-57	Gamma Spec.	0.018	U,G	U	0.047	0.083
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Co-58	Gamma Spec.	-0.02	U,G	U	0.15	0.29
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Co-60	Gamma Spec.	0.03	U,G	U	0.13	0.25
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Cr-51	Gamma Spec.	0.4	U,G	U	1.6	2.9
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Cs-134	Gamma Spec.	-0.05	U,G	U	0.12	0.23
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Cs-137	Gamma Spec.	0.12	U,G	U	0.14	0.23
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Eu-152	Gamma Spec.	-0.26	U,G	U	0.57	1.29
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Eu-154	Gamma Spec.	-0.38	U,G	U	0.76	1.57
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Eu-155	Gamma Spec.	0.15	U,G	U	0.22	0.37
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Fe-59	Gamma Spec.	0.06	U,G	U	0.38	0.73

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	I-131	Gamma Spec.	-2.4	U,G	U	2.6	5.3
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	K-40	Gamma Spec.	14	G	G	3.8	2.9
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Mn-54	Gamma Spec.	-0.04	U,G	U	0.12	0.25
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Na-22	Gamma Spec.	0.09	U,G	U	0.14	0.23
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Nb-94	Gamma Spec.	0.03	U,G	U	0.12	0.22
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Nb-95	Gamma Spec.	-0.11	U,G	U	0.17	0.36
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Pa-234m	Gamma Spec.	11	U,G	U	18	30
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Pb-212	Gamma Spec.	0.98	G	G	0.32	0.38
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Pb-214	Gamma Spec.	0.84	G,J	G	0.26	0.35
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Ra-226	Gamma Spec.	1.18	G	G	0.32	0.49
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Ru-106	Gamma Spec.	0.1	U,G	U	1.3	2.3
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Sb-124	Gamma Spec.	-0.15	U,G	U	0.17	0.36
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Sb-125	Gamma Spec.	0.08	U,G	U	0.3	0.54
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Sc-46	Gamma Spec.	-0.09	U,G	U	0.16	0.33
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Th-227	Gamma Spec.	-0.03	U,G	U	0.56	1.01
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Th-234	Gamma Spec.	1.9	U,G	U	1.1	2.4
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Tl-208	Gamma Spec.	0.22	G	G	0.15	0.22
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	U-235	Gamma Spec.	0.04	U,G	U	0.5	0.89
House 2	BDS-[redacted]G-S005 (DUP)	1701077-21	12/28/2016	Zn-65	Gamma Spec.	-0.38	U,G	U	0.33	0.74
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Ac-228	Gamma Spec.	0.75	U,G	U	0.58	1.26
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Ag-110m	Gamma Spec.	-0.06	U,G	U	0.14	0.29
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Al-26	Gamma Spec.	0.01	U,G	U	0.16	0.32
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Am-241	Gamma Spec.	0.2	U,G	U	2	3.7
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Be-7	Gamma Spec.	-0.3	U,G	U	1.7	3.3
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Bi-212	Gamma Spec.	-0.1	U,G	U	2.2	4.2
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Bi-214	Gamma Spec.	1.07	G,J	J,G	0.47	0.58
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Ce-139	Gamma Spec.	-0.019	U,G	U	0.099	0.186
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Ce-144	Gamma Spec.	0.05	U,G	U	0.69	1.25
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Co-56	Gamma Spec.	-0.11	U,G	U	0.39	0.8
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Co-57	Gamma Spec.	0.045	U,G	U	0.092	0.158
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Co-58	Gamma Spec.	0	U,G	U	0.2	0.39
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Co-60	Gamma Spec.	0	U,G	U	0.12	0.26
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Cr-51	Gamma Spec.	0	U,G	U	2.2	4.1
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Cs-134	Gamma Spec.	-0.13	U,G	U	0.15	0.31

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Cs-137	Gamma Spec.	0.01	U,G	U	0.16	0.3
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Eu-152	Gamma Spec.	0.11	U,G	U	0.78	1.52
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Eu-154	Gamma Spec.	0.29	U,G	U	0.64	1.16
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Eu-155	Gamma Spec.	-0.39	U,G	U	0.36	0.75
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Fe-59	Gamma Spec.	0.01	U,G	U	0.52	1.02
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	I-131	Gamma Spec.	1.6	U,G	U	3.2	5.6
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	K-40	Gamma Spec.	9.7	G	G	3.7	4
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Mn-54	Gamma Spec.	-0.07	U,G	U	0.14	0.3
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Na-22	Gamma Spec.	0.11	U,G	U	0.11	0.15
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Nb-94	Gamma Spec.	0.01	U,G	U	0.14	0.26
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Nb-95	Gamma Spec.	-0.12	U,G	U	0.21	0.45
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Pa-234m	Gamma Spec.	6	U,G	U	20	38
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Pb-210	LCS	2.3		J	0.64	0.43
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Pb-212	Gamma Spec.	1.08	G	G	0.37	0.44
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Pb-214	Gamma Spec.	1	G,J	J,G	0.35	0.53
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Ra-226	Gamma Spec.	1.43	G	G	0.4	0.72
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Ru-106	Gamma Spec.	0.1	U,G	U	1.2	2.2
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Sb-124	Gamma Spec.	0.02	U,G	U	0.22	0.41
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Sb-125	Gamma Spec.	-0.1	U,G	U	0.34	0.67
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Sc-46	Gamma Spec.	0.02	U,G	U	0.18	0.35
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Th-227	Gamma Spec.	0.77	U,G	U	0.71	1.1
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Th-228	Alpha Spec.	0.74			0.13	0.03
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Th-230	Alpha Spec.	0.85			0.15	0.06
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Th-232	Alpha Spec.	0.72			0.13	0.01
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Th-234	Gamma Spec.	2.6	U,G	U	2.4	3.8
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Tl-208	Gamma Spec.	0.31	G	G	0.2	0.28
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	U-234	Alpha Spec.	0.69			0.17	0.03
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	U-235	Gamma Spec.	0.2	U,G	U	0.63	1.11
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	U-235	Alpha Spec.	0.033	U	U	0.032	0.041
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	U-238	Alpha Spec.	0.77			0.18	0.01
House 2	BDS-[redacted]G-S006	1701077-22	12/28/2016	Zn-65	Gamma Spec.	0.05	U,G	U	0.35	0.66
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Ac-228	Gamma Spec.	1			0.38	0.61
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Ag-110m	Gamma Spec.	-0.12	U	U	0.11	0.24
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Al-26	Gamma Spec.	-0.09	U	U	0.11	0.27

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Am-241	Gamma Spec.	0.28	U	U	0.76	1.31
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Be-7	Gamma Spec.	-0.5	U	U	1.4	2.6
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Bi-212	Gamma Spec.	1.3	U	U	1.6	2.6
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Bi-214	Gamma Spec.	1.33	J	J	0.4	0.43
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Ce-139	Gamma Spec.	0.004	U	U	0.078	0.14
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Ce-144	Gamma Spec.	0.2	U	U	0.53	0.91
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Co-56	Gamma Spec.	0.34	U	U	0.37	0.59
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Co-57	Gamma Spec.	-0.026	U	U	0.054	0.104
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Co-58	Gamma Spec.	-0.06	U	U	0.14	0.28
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Co-60	Gamma Spec.	0.03	U	U	0.13	0.24
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Cr-51	Gamma Spec.	0.4	U	U	1.6	2.8
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Cs-134	Gamma Spec.	-0.03	U	U	0.1	0.2
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Cs-137	Gamma Spec.	0.22	NQ	UJ	0.12	0.14
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Eu-152	Gamma Spec.	-0.03	U	U	0.58	1.13
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Eu-154	Gamma Spec.	-0.18	U	U	0.57	1.16
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Eu-155	Gamma Spec.	0.04	U	U	0.26	0.45
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Fe-59	Gamma Spec.	-0.17	U	U	0.33	0.7
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	I-131	Gamma Spec.	-0.4	U	U	2.1	4
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	K-40	Gamma Spec.	16.3			3.6	2.4
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Mn-54	Gamma Spec.	0.02	U	U	0.1	0.19
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Na-22	Gamma Spec.	0.05	U	U	0.15	0.27
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Nb-94	Gamma Spec.	0.07	U	U	0.12	0.19
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Nb-95	Gamma Spec.	-0.07	U	U	0.15	0.3
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Pa-234m	Gamma Spec.	-9	U	U	17	35
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Pb-210	LCS	6.4			1.6	0.2
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Pb-212	Gamma Spec.	1.16			0.32	0.36
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Pb-214	Gamma Spec.	1.23	J	J	0.31	0.37
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Ra-226	Gamma Spec.	1.66			0.35	0.46
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Ru-106	Gamma Spec.	-0.3	U	U	1.1	2
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Sb-124	Gamma Spec.	-0.11	U	U	0.15	0.31
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Sb-125	Gamma Spec.	0.13	U	U	0.23	0.39
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Sc-46	Gamma Spec.	0.04	U	U	0.13	0.23
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Th-227	Gamma Spec.	0.4	U	U	1	1.6
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Th-228	Alpha Spec.	1.3			0.23	0.05

TABLE K-1
DETAILED SOIL SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Th-230	Alpha Spec.	1.17			0.21	0.08
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Th-232	Alpha Spec.	1.16			0.21	0.01
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Th-234	Gamma Spec.	2	U	U	1.7	2.8
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Tl-208	Gamma Spec.	0.36			0.17	0.22
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	U-234	Alpha Spec.	0.86			0.19	0.04
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	U-235	Gamma Spec.	-0.1	U	U	0.49	0.9
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	U-235	Alpha Spec.	0.051	LT	J	0.035	0.029
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	U-238	Alpha Spec.	0.95			0.2	0.03
House 2	BDS-[redacted]G-S007	1701077-23	12/28/2016	Zn-65	Gamma Spec.	-0.42	U	U	0.38	0.78

Notes

LCS	Liquid scintillation counting
MDC	Minimum detectable concentration
pCi/g	picoCuries per gram
TPU	Total propagated uncertainty (two sigma)

Data Qualifiers

G	Sample density differs by more than 15% of laboratory control sample density.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
LT	Result is less than requested minimum detectable concentration (MDC), greater than sample specific MDC.
M	Requested MDC not met.
M3	The requested MDC was not met, but the reported activity is greater than the reported MDC.
NQ	The nuclide is not detected or supported at any level above the reported MDC.
TI	Nuclide identification is tentative.
U	Result is less than the sample specific MDC

TABLE K-2
DETAILED WIPE SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/wipe)	Laboratory Qualifier	TPU (pCi/wipe)	MDC (pCi/wipe)	Wipe Area (cm2)	Result (pCi/cm2)	Validation Qualifier	TPU (pCi/cm2)	MDC (pCi/cm2)
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	Ra-226	Ra Emanation	0.06	U	0.13	0.23	200	3.00E-04	U	0.00065	0.00115
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	Th-228	Alpha Spec.	0.07	U,M	0.13	0.22	200	0.00035	U	0.00065	0.0011
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	Th-228	Alpha Spec.	0.07	U,M	0.13	0.22	200	0.00035	U	0.00065	0.0011
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	Th-230	Alpha Spec.	-0.19	U,M	0.15	0.29	200	-0.00095	U	0.00075	0.00145
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	Th-230	Alpha Spec.	-0.19	U,M	0.15	0.29	200	-0.00095	U	0.00075	0.00145
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	Th-232	Alpha Spec.	0.031	U	0.044	0.071	200	0.000155	U	0.00022	0.000355
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	Th-232	Alpha Spec.	0.031	U	0.044	0.071	200	0.000155	U	0.00022	0.000355
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	U-234	Alpha Spec.	0.073	U	0.059	0.078	200	0.000365	U	0.000295	0.00039
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	U-235	Alpha Spec.	0	U	0.042	0.063	200	0	U	0.00021	0.000315
House 1	BDS-[redacted]W001	1701082-1	12/27/2016	U-238	Alpha Spec.	0.036	U	0.039	0.054	200	0.00018	U	0.000195	0.00027
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	Ra-226	Ra Emanation	0.038	U	0.092	0.175	200	0.00019	U	0.00046	0.000875
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	Th-228	Alpha Spec.	0.04	U,M	0.11	0.2	200	2.00E-04	U	0.00055	0.001
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	Th-228	Alpha Spec.	0.04	U,M	0.11	0.2	200	2.00E-04	U	0.00055	0.001
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	Th-230	Alpha Spec.	-0.2	U,M	0.15	0.29	200	-0.001	U	0.00075	0.00145
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	Th-230	Alpha Spec.	-0.2	U,M	0.15	0.29	200	-0.001	U	0.00075	0.00145
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	Th-232	Alpha Spec.	0.015	U	0.037	0.055	200	7.50E-05	U	0.000185	0.000275
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	Th-232	Alpha Spec.	0.015	U	0.037	0.055	200	7.50E-05	U	0.000185	0.000275
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	U-234	Alpha Spec.	0.056	U	0.054	0.081	200	0.00028	U	0.00027	0.000405
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	U-235	Alpha Spec.	0	U	0.036	0.053	200	0	U	0.00018	0.000265
House 1	BDS-[redacted]W002	1701082-2	12/27/2016	U-238	Alpha Spec.	0.012	U	0.035	0.066	200	6.00E-05	U	0.000175	0.00033
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	Ra-226	Ra Emanation	-0.02	U	0.11	0.24	200	-1.00E-04	U	0.00055	0.0012
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	Th-228	Alpha Spec.	0.03	U,M	0.13	0.23	200	0.00015	U	0.00065	0.00115
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	Th-228	Alpha Spec.	0.03	U,M	0.13	0.23	200	0.00015	U	0.00065	0.00115
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	Th-230	Alpha Spec.	-0.17	U,M	0.16	0.31	200	-0.00085	U	8.00E-04	0.00155
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	Th-230	Alpha Spec.	-0.17	U,M	0.16	0.31	200	-0.00085	U	8.00E-04	0.00155
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	Th-232	Alpha Spec.	0.024	U	0.043	0.075	200	0.00012	U	0.000215	0.000375
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	Th-232	Alpha Spec.	0.024	U	0.043	0.075	200	0.00012	U	0.000215	0.000375
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	U-234	Alpha Spec.	0.168		0.075	0.05	200	0.00084	J	0.000375	0.00025
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	U-235	Alpha Spec.	0.032	U	0.039	0.058	200	0.00016	U	0.000195	0.00029
House 1	BDS-[redacted]W006	1701082-3	12/27/2016	U-238	Alpha Spec.	0.02	LT	0.033	0.018	200	1.00E-04		0.000165	9.00E-05
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	Ra-226	Ra Emanation	-0.02	U	0.14	0.29	200	-1.00E-04	U	7.00E-04	0.00145
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	Th-228	Alpha Spec.	-0.07	U,M	0.12	0.23	200	-0.00035	U	6.00E-04	0.00115
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	Th-228	Alpha Spec.	-0.07	U,M	0.12	0.23	200	-0.00035	U	6.00E-04	0.00115
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	Th-230	Alpha Spec.	-0.05	U,M	0.15	0.28	200	-0.00025	U	0.00075	0.0014
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	Th-230	Alpha Spec.	-0.05	U,M	0.15	0.28	200	-0.00025	U	0.00075	0.0014
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	Th-232	Alpha Spec.	0.007	U	0.037	0.055	200	3.50E-05	U	0.000185	0.000275
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	Th-232	Alpha Spec.	0.007	U	0.037	0.055	200	3.50E-05	U	0.000185	0.000275
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	U-234	Alpha Spec.	0.095	LT	0.062	0.073	200	0.000475	J	0.00031	0.000365
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	U-235	Alpha Spec.	0.008	U	0.039	0.074	200	4.00E-05	U	0.000195	0.00037
House 1	BDS-[redacted]W014	1701082-4	12/27/2016	U-238	Alpha Spec.	0.007	U	0.041	0.082	200	3.50E-05	U	0.000205	0.00041
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	Ra-226	Ra Emanation	0	U	0.16	0.32	200	0	U	8.00E-04	0.0016
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	Th-228	Alpha Spec.	0.02	U,M	0.13	0.24	200	1.00E-04	U	0.00065	0.0012
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	Th-228	Alpha Spec.	0.02	U,M	0.13	0.24	200	1.00E-04	U	0.00065	0.0012
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	Th-230	Alpha Spec.	-0.1	U,M	0.16	0.29	200	-5.00E-04	U	8.00E-04	0.00145
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	Th-230	Alpha Spec.	-0.1	U,M	0.16	0.29	200	-5.00E-04	U	8.00E-04	0.00145
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	Th-232	Alpha Spec.	0	U	0.045	0.096	200	0	U	0.000225	0.00048
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	Th-232	Alpha Spec.	0	U	0.045	0.096	200	0	U	0.000225	0.00048
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	U-234	Alpha Spec.	0.051	U	0.049	0.069	200	0.000255	U	0.000245	0.000345
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	U-235	Alpha Spec.	0.015	U	0.037	0.02	200	7.50E-05	U	0.000185	1.00E-04
House 1	BDS-[redacted]W019	1701082-5	12/27/2016	U-238	Alpha Spec.	0.019	U	0.032	0.047	200	9.50E-05	U	0.00016	0.000235
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	Ra-226	Ra Emanation	0	U	0.093	0.177	200	0	U	0.000465	0.000885
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	Th-228	Alpha Spec.	0	U,M	0.12	0.23	200	0	U	6.00E-04	0.00115
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	Th-228	Alpha Spec.	0	U,M	0.12	0.23	200	0	U	6.00E-04	0.00115
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	Th-230	Alpha Spec.	-0.1	U,M	0.15	0.29	200	-5.00E-04	U	0.00075	0.00145

TABLE K-2
DETAILED WIPE SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/wipe)	Laboratory Qualifier	TPU (pCi/wipe)	MDC (pCi/wipe)	Wipe Area (cm2)	Result (pCi/cm2)	Validation Qualifier	TPU (pCi/cm2)	MDC (pCi/cm2)
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	Th-230	Alpha Spec.	-0.1	U,M	0.15	0.29	200	-5.00E-04	U	0.00075	0.00145
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	Th-232	Alpha Spec.	0.008	U	0.038	0.072	200	4.00E-05	U	0.00019	0.00036
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	Th-232	Alpha Spec.	0.008	U	0.038	0.072	200	4.00E-05	U	0.00019	0.00036
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	U-234	Alpha Spec.	0.062	LT	0.047	0.058	200	0.00031	J	0.000235	0.00029
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	U-235	Alpha Spec.	0.022	U	0.048	0.088	200	0.00011	U	0.00024	0.00044
House 1	BDS-[redacted]W021	1701082-6	12/27/2016	U-238	Alpha Spec.	0.025	U	0.043	0.074	200	0.000125	U	0.000215	0.00037
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	Ra-226	Ra Emanation	0	U	0.092	0.174	200	0	U	0.00046	0.00087
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	Th-228	Alpha Spec.	-0.05	U,M	0.11	0.21	200	-0.00025	U	0.00055	0.00105
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	Th-228	Alpha Spec.	-0.05	U,M	0.11	0.21	200	-0.00025	U	0.00055	0.00105
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	Th-230	Alpha Spec.	0.03	U,M	0.16	0.28	200	0.00015	U	8.00E-04	0.0014
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	Th-230	Alpha Spec.	0.03	U,M	0.16	0.28	200	0.00015	U	8.00E-04	0.0014
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	Th-232	Alpha Spec.	0.007	U	0.038	0.078	200	3.50E-05	U	0.00019	0.00039
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	Th-232	Alpha Spec.	0.007	U	0.038	0.078	200	3.50E-05	U	0.00019	0.00039
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	U-234	Alpha Spec.	0.064	U	0.059	0.085	200	0.00032	U	0.000295	0.000425
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	U-235	Alpha Spec.	0	U	0.041	0.089	200	0	U	0.000205	0.000445
House 1	BDS-[redacted]W034	1701082-7	12/28/2016	U-238	Alpha Spec.	0.049	LT	0.038	0.019	200	0.000245		0.00019	9.50E-05
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	Ra-226	Ra Emanation	-0.02	U	0.1	0.23	200	-1.00E-04	U	5.00E-04	0.00115
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	Th-228	Alpha Spec.	0.05	U,M	0.12	0.21	200	0.00025	U	6.00E-04	0.00105
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	Th-228	Alpha Spec.	0.05	U,M	0.12	0.21	200	0.00025	U	6.00E-04	0.00105
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	Th-230	Alpha Spec.	-0.14	U,M	0.15	0.29	200	-7.00E-04	U	0.00075	0.00145
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	Th-230	Alpha Spec.	-0.14	U,M	0.15	0.29	200	-7.00E-04	U	0.00075	0.00145
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	Th-232	Alpha Spec.	0.015	U	0.037	0.07	200	7.50E-05	U	0.000185	0.00035
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	Th-232	Alpha Spec.	0.015	U	0.037	0.07	200	7.50E-05	U	0.000185	0.00035
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	U-234	Alpha Spec.	0.129		0.066	0.06	200	0.000645	J	0.00033	3.00E-04
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	U-235	Alpha Spec.	0.023	LT	0.037	0.02	200	0.000115		0.000185	1.00E-04
House 1	BDS-[redacted]W036	1701082-8	12/28/2016	U-238	Alpha Spec.	0.006	U	0.039	0.077	200	3.00E-05	U	0.000195	0.000385
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	Ra-226	Ra Emanation	0	U	0.11	0.25	200	0	U	0.00055	0.00125
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	Th-228	Alpha Spec.	-0.007	U,M	0.099	0.183	200	-3.50E-05	U	0.000495	0.000915
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	Th-228	Alpha Spec.	-0.007	U,M	0.099	0.183	200	-3.50E-05	U	0.000495	0.000915
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	Th-230	Alpha Spec.	0.04	U,M	0.16	0.27	200	2.00E-04	U	8.00E-04	0.00135
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	Th-230	Alpha Spec.	0.04	U,M	0.16	0.27	200	2.00E-04	U	8.00E-04	0.00135
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	Th-232	Alpha Spec.	0	U	0.034	0.074	200	0	U	0.00017	0.00037
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	Th-232	Alpha Spec.	0	U	0.034	0.074	200	0	U	0.00017	0.00037
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	U-234	Alpha Spec.	0	U	0.036	0.076	200	0	U	0.00018	0.00038
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	U-235	Alpha Spec.	0.059	LT	0.043	0.02	200	0.000295		0.000215	1.00E-04
House 1	BDS-[redacted]W048	1701082-9	12/28/2016	U-238	Alpha Spec.	0.006	U	0.038	0.076	200	3.00E-05	U	0.00019	0.00038
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	Ra-226	Ra Emanation	0.02	U	0.15	0.3	200	1.00E-04	U	0.00075	0.0015
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	Th-228	Alpha Spec.	0	U,M	0.095	0.176	200	0	U	0.000475	0.00088
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	Th-228	Alpha Spec.	0	U,M	0.095	0.176	200	0	U	0.000475	0.00088
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	Th-230	Alpha Spec.	-0.01	U,M	0.16	0.28	200	-5.00E-05	U	8.00E-04	0.0014
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	Th-230	Alpha Spec.	-0.01	U,M	0.16	0.28	200	-5.00E-05	U	8.00E-04	0.0014
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	Th-232	Alpha Spec.	0.02	U	0.033	0.049	200	1.00E-04	U	0.000165	0.000245
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	Th-232	Alpha Spec.	0.02	U	0.033	0.049	200	1.00E-04	U	0.000165	0.000245
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	U-234	Alpha Spec.	0.052	U	0.046	0.06	200	0.00026	U	0.00023	3.00E-04
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	U-235	Alpha Spec.	0.023	LT	0.037	0.021	200	0.000115		0.000185	0.000105
House 1	BDS-[redacted]W049	1701082-10	12/28/2016	U-238	Alpha Spec.	0.019	U	0.034	0.06	200	9.50E-05	U	0.00017	3.00E-04
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	Ra-226	Ra Emanation	-0.04	U	0.11	0.26	200	-2.00E-04	U	0.00055	0.0013
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	Th-228	Alpha Spec.	-0.02	U,M	0.11	0.2	200	-1.00E-04	U	0.00055	0.001
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	Th-228	Alpha Spec.	-0.02	U,M	0.11	0.2	200	-1.00E-04	U	0.00055	0.001
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	Th-230	Alpha Spec.	-0.03	U,M	0.15	0.28	200	-0.00015	U	0.00075	0.0014
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	Th-230	Alpha Spec.	-0.03	U,M	0.15	0.28	200	-0.00015	U	0.00075	0.0014
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	Th-232	Alpha Spec.	0.044	LT	0.037	0.02	200	0.00022		0.000185	1.00E-04
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	Th-232	Alpha Spec.	0.044	LT	0.037	0.02	200	0.00022		0.000185	1.00E-04
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	U-234	Alpha Spec.	0.114		0.06	0.056	200	0.00057	J	3.00E-04	0.00028

TABLE K-2
DETAILED WIPE SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/wipe)	Laboratory Qualifier	TPU (pCi/wipe)	MDC (pCi/wipe)	Wipe Area (cm2)	Result (pCi/cm2)	Validation Qualifier	TPU (pCi/cm2)	MDC (pCi/cm2)
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	U-235	Alpha Spec.	0.021	U	0.035	0.052	200	0.000105	U	0.000175	0.00026
House 1	BDS-[redacted]W052	1701082-11	12/28/2016	U-238	Alpha Spec.	0.036	U	0.042	0.064	200	0.00018	U	0.00021	0.00032
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	Ra-226	Ra Emanation	0.02	U	0.1	0.21	200	1.00E-04	U	5.00E-04	0.00105
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	Th-228	Alpha Spec.	-0.04	U,M	0.11	0.22	200	-2.00E-04	U	0.00055	0.0011
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	Th-228	Alpha Spec.	-0.04	U,M	0.11	0.22	200	-2.00E-04	U	0.00055	0.0011
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	Th-230	Alpha Spec.	-0.08	U,M	0.15	0.27	200	-4.00E-04	U	0.00075	0.00135
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	Th-230	Alpha Spec.	-0.08	U,M	0.15	0.27	200	-4.00E-04	U	0.00075	0.00135
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	Th-232	Alpha Spec.	0.014	U	0.035	0.052	200	7.00E-05	U	0.000175	0.00026
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	Th-232	Alpha Spec.	0.014	U	0.035	0.052	200	7.00E-05	U	0.000175	0.00026
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	U-234	Alpha Spec.	0.075	LT	0.056	0.061	200	0.000375	J	0.00028	0.000305
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	U-235	Alpha Spec.	0.01	U	0.048	0.026	200	5.00E-05	U	0.00024	0.00013
House 1	BDS-[redacted]W058	1701082-12	12/28/2016	U-238	Alpha Spec.	0	U	0.047	0.1	200	0	U	0.000235	5.00E-04
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	Ra-226	Ra Emanation	-0.04	U	0.11	0.26	200	-2.00E-04	U	0.00055	0.0013
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	Th-228	Alpha Spec.	0.019	U,M	0.085	0.153	200	9.50E-05	U	0.000425	0.000765
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	Th-228	Alpha Spec.	0.019	U,M	0.085	0.153	200	9.50E-05	U	0.000425	0.000765
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	Th-230	Alpha Spec.	0.1	U,M	0.15	0.26	200	5.00E-04	U	0.00075	0.0013
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	Th-230	Alpha Spec.	0.1	U,M	0.15	0.26	200	5.00E-04	U	0.00075	0.0013
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	Th-232	Alpha Spec.	0.025	LT	0.031	0.017	200	0.000125		0.000155	8.50E-05
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	Th-232	Alpha Spec.	0.025	LT	0.031	0.017	200	0.000125		0.000155	8.50E-05
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	U-234	Alpha Spec.	0.109		0.06	0.05	200	0.000545	J	3.00E-04	0.00025
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	U-235	Alpha Spec.	0.008	U	0.039	0.022	200	4.00E-05	U	0.000195	0.00011
House 1	BDS-[redacted]W061	1701082-13	12/28/2016	U-238	Alpha Spec.	0.034	U	0.036	0.05	200	0.00017	U	0.00018	0.00025
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	Ra-226	Ra Emanation	0.02	U	0.12	0.24	200	1.00E-04	U	6.00E-04	0.0012
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	Th-228	Alpha Spec.	0.055	U,M	0.088	0.148	200	0.000275	U	0.00044	0.00074
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	Th-228	Alpha Spec.	0.055	U,M	0.088	0.148	200	0.000275	U	0.00044	0.00074
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	Th-230	Alpha Spec.	-0.22	U,M	0.15	0.29	200	-0.0011	U	0.00075	0.00145
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	Th-230	Alpha Spec.	-0.22	U,M	0.15	0.29	200	-0.0011	U	0.00075	0.00145
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	Th-232	Alpha Spec.	0.023	U	0.05	0.091	200	0.000115	U	0.00025	0.000455
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	Th-232	Alpha Spec.	0.023	U	0.05	0.091	200	0.000115	U	0.00025	0.000455
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	U-234	Alpha Spec.	0.069	LT	0.053	0.067	200	0.000345	J	0.000265	0.000335
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	U-235	Alpha Spec.	0.029	LT	0.036	0.02	200	0.000145		0.00018	1.00E-04
House 1	BDS-[redacted]W074	1701082-14	12/28/2016	U-238	Alpha Spec.	0.037	U	0.04	0.058	200	0.000185	U	2.00E-04	0.00029
House 2	BDS-[redacted]W001	1701077-1	12/29/2016	Ra-226	Ra Emanation	0.28	LT	0.14	0.13	200	0.0014		7.00E-04	0.00065
House 2	BDS-[redacted]W001	1701077-1	12/29/2016	Th-228	Alpha Spec.	0.09	U,M	0.14	0.24	200	0.00045	U	7.00E-04	0.0012
House 2	BDS-[redacted]W001	1701077-1	12/29/2016	Th-230	Alpha Spec.	0.05	U,M	0.19	0.32	200	0.00025	U	0.00095	0.0016
House 2	BDS-[redacted]W001	1701077-1	12/29/2016	Th-232	Alpha Spec.	0.018	U	0.052	0.098	200	9.00E-05	U	0.00026	0.00049
House 2	BDS-[redacted]W001	1701077-1	12/29/2016	U-234	Alpha Spec.	0.076	LT	0.051	0.051	200	0.00038	J	0.000255	0.000255
House 2	BDS-[redacted]W001	1701077-1	12/29/2016	U-235	Alpha Spec.	0.016	U	0.04	0.022	200	8.00E-05	U	2.00E-04	0.00011
House 2	BDS-[redacted]W001	1701077-1	12/29/2016	U-238	Alpha Spec.	0.021	U	0.034	0.051	200	0.000105	U	0.00017	0.000255
House 2	BDS-[redacted]W003	1701077-2	12/29/2016	Ra-226	Ra Emanation	0.048	U	0.096	0.167	200	0.00024	U	0.00048	0.000835
House 2	BDS-[redacted]W003	1701077-2	12/29/2016	Th-228	Alpha Spec.	0.05	U,M	0.12	0.22	200	0.00025	U	6.00E-04	0.0011
House 2	BDS-[redacted]W003	1701077-2	12/29/2016	Th-230	Alpha Spec.	-0.01	U,M	0.16	0.28	200	-5.00E-05	U	8.00E-04	0.0014
House 2	BDS-[redacted]W003	1701077-2	12/29/2016	Th-232	Alpha Spec.	0.029	U	0.036	0.054	200	0.000145	U	0.00018	0.00027
House 2	BDS-[redacted]W003	1701077-2	12/29/2016	U-234	Alpha Spec.	0.128		0.068	0.069	200	0.00064		0.00034	0.000345
House 2	BDS-[redacted]W003	1701077-2	12/29/2016	U-235	Alpha Spec.	0.023	LT	0.037	0.02	200	0.000115	J	0.000185	1.00E-04
House 2	BDS-[redacted]W003	1701077-2	12/29/2016	U-238	Alpha Spec.	0	U	0.031	0.06	200	0	U	0.000155	3.00E-04
House 2	BDS-[redacted]W004	1701077-3	12/29/2016	Ra-226	Ra Emanation	0.047	U	0.068	0.11	200	0.000235	U	0.00034	0.00055
House 2	BDS-[redacted]W004	1701077-3	12/29/2016	Th-228	Alpha Spec.	-0.07	U,M	0.12	0.22	200	-0.00035	U	6.00E-04	0.0011
House 2	BDS-[redacted]W004	1701077-3	12/29/2016	Th-230	Alpha Spec.	-0.03	U,M	0.14	0.26	200	-0.00015	U	7.00E-04	0.0013
House 2	BDS-[redacted]W004	1701077-3	12/29/2016	Th-232	Alpha Spec.	0.044	U	0.046	0.068	200	0.00022	U	0.00023	0.00034
House 2	BDS-[redacted]W004	1701077-3	12/29/2016	U-234	Alpha Spec.	0.115		0.061	0.056	200	0.000575		0.000305	0.00028
House 2	BDS-[redacted]W004	1701077-3	12/29/2016	U-235	Alpha Spec.	0.014	U	0.035	0.052	200	7.00E-05	U	0.000175	0.00026
House 2	BDS-[redacted]W004	1701077-3	12/29/2016	U-238	Alpha Spec.	0.054	U	0.047	0.065	200	0.00027	U	0.000235	0.000325
House 2	BDS-[redacted]W005	1701077-4	12/29/2016	Ra-226	Ra Emanation	0.01	U	0.086	0.165	200	5.00E-05	U	0.00043	0.000825

TABLE K-2
DETAILED WIPE SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/wipe)	Laboratory Qualifier	TPU (pCi/wipe)	MDC (pCi/wipe)	Wipe Area (cm2)	Result (pCi/cm2)	Validation Qualifier	TPU (pCi/cm2)	MDC (pCi/cm2)
House 2	BDS-[redacted]W005	1701077-4	12/29/2016	Th-228	Alpha Spec.	0.02	U,M	0.12	0.21	200	1.00E-04	U	6.00E-04	0.00105
House 2	BDS-[redacted]W005	1701077-4	12/29/2016	Th-230	Alpha Spec.	-0.22	U,M	0.15	0.29	200	-0.0011	U	0.00075	0.00145
House 2	BDS-[redacted]W005	1701077-4	12/29/2016	Th-232	Alpha Spec.	0.008	U	0.037	0.07	200	4.00E-05	U	0.000185	0.00035
House 2	BDS-[redacted]W005	1701077-4	12/29/2016	U-234	Alpha Spec.	0.026	U	0.037	0.06	200	0.00013	U	0.000185	3.00E-04
House 2	BDS-[redacted]W005	1701077-4	12/29/2016	U-235	Alpha Spec.	0.03	U	0.037	0.056	200	0.00015	U	0.000185	0.00028
House 2	BDS-[redacted]W005	1701077-4	12/29/2016	U-238	Alpha Spec.	0	U	0.041	0.084	200	0	U	0.000205	0.00042
House 2	BDS-[redacted]W006	1701077-5	12/29/2016	Ra-226	Ra Emanation	0.08	U	0.12	0.19	200	4.00E-04	U	6.00E-04	0.00095
House 2	BDS-[redacted]W006	1701077-5	12/29/2016	Th-228	Alpha Spec.	-0.01	U,M	0.13	0.23	200	-5.00E-05	U	0.00065	0.00115
House 2	BDS-[redacted]W006	1701077-5	12/29/2016	Th-230	Alpha Spec.	0	U,M	0.17	0.3	200	0	U	0.00085	0.0015
House 2	BDS-[redacted]W006	1701077-5	12/29/2016	Th-232	Alpha Spec.	0.023	U	0.038	0.057	200	0.000115	U	0.00019	0.000285
House 2	BDS-[redacted]W006	1701077-5	12/29/2016	U-234	Alpha Spec.	0.069	LT	0.05	0.058	200	0.000345	J	0.00025	0.00029
House 2	BDS-[redacted]W006	1701077-5	12/29/2016	U-235	Alpha Spec.	0.015	U	0.036	0.069	200	7.50E-05	U	0.00018	0.000345
House 2	BDS-[redacted]W006	1701077-5	12/29/2016	U-238	Alpha Spec.	0	U	0.036	0.075	200	0	U	0.00018	0.000375
House 2	BDS-[redacted]W007	1701077-6	12/29/2016	Ra-226	Ra Emanation	0.081	U	0.096	0.153	200	0.000405	U	0.00048	0.000765
House 2	BDS-[redacted]W007	1701077-6	12/29/2016	Th-228	Alpha Spec.	0.1	U,M	0.12	0.19	200	5.00E-04	U	6.00E-04	0.00095
House 2	BDS-[redacted]W007	1701077-6	12/29/2016	Th-230	Alpha Spec.	-0.09	U,M	0.16	0.29	200	-0.00045	U	8.00E-04	0.00145
House 2	BDS-[redacted]W007	1701077-6	12/29/2016	Th-232	Alpha Spec.	0.016	U	0.044	0.084	200	8.00E-05	U	0.00022	0.00042
House 2	BDS-[redacted]W007	1701077-6	12/29/2016	U-234	Alpha Spec.	0.04	U	0.042	0.061	200	2.00E-04	U	0.00021	0.000305
House 2	BDS-[redacted]W007	1701077-6	12/29/2016	U-235	Alpha Spec.	-0.016	U	0.038	0.093	200	-8.00E-05	U	0.00019	0.000465
House 2	BDS-[redacted]W007	1701077-6	12/29/2016	U-238	Alpha Spec.	0.033	U	0.04	0.061	200	0.000165	U	2.00E-04	0.000305
House 2	BDS-[redacted]W010	1701077-7	12/29/2016	Ra-226	Ra Emanation	0.23	LT	0.12	0.14	200	0.00115		6.00E-04	7.00E-04
House 2	BDS-[redacted]W010	1701077-7	12/29/2016	Th-228	Alpha Spec.	-0.02	U,M	0.14	0.25	200	-1.00E-04	U	7.00E-04	0.00125
House 2	BDS-[redacted]W010	1701077-7	12/29/2016	Th-230	Alpha Spec.	-0.1	U,M	0.15	0.29	200	-5.00E-04	U	0.00075	0.00145
House 2	BDS-[redacted]W010	1701077-7	12/29/2016	Th-232	Alpha Spec.	0.031	LT	0.039	0.021	200	0.000155	J	0.000195	0.000105
House 2	BDS-[redacted]W010	1701077-7	12/29/2016	U-234	Alpha Spec.	0.078	LT	0.046	0.018	200	0.00039		0.00023	9.00E-05
House 2	BDS-[redacted]W010	1701077-7	12/29/2016	U-235	Alpha Spec.	0.03	LT	0.038	0.021	200	0.00015	J	0.00019	0.000105
House 2	BDS-[redacted]W010	1701077-7	12/29/2016	U-238	Alpha Spec.	0	U	0.041	0.085	200	0	U	0.000205	0.000425
House 2	BDS-[redacted]W016	1701077-8	12/29/2016	Ra-226	Ra Emanation	0.22	LT	0.13	0.16	200	0.0011		0.00065	8.00E-04
House 2	BDS-[redacted]W016	1701077-8	12/29/2016	Th-228	Alpha Spec.	-0.01	U,M	0.11	0.21	200	-5.00E-05	U	0.00055	0.00105
House 2	BDS-[redacted]W016	1701077-8	12/29/2016	Th-230	Alpha Spec.	-0.2	U,M	0.14	0.28	200	-0.001	U	7.00E-04	0.0014
House 2	BDS-[redacted]W016	1701077-8	12/29/2016	Th-232	Alpha Spec.	0.036	U	0.044	0.067	200	0.00018	U	0.00022	0.000335
House 2	BDS-[redacted]W016	1701077-8	12/29/2016	U-234	Alpha Spec.	0.032	U	0.049	0.083	200	0.00016	U	0.000245	0.000415
House 2	BDS-[redacted]W016	1701077-8	12/29/2016	U-235	Alpha Spec.	0.007	U	0.036	0.055	200	3.50E-05	U	0.00018	0.000275
House 2	BDS-[redacted]W016	1701077-8	12/29/2016	U-238	Alpha Spec.	0.038	U	0.036	0.046	200	0.00019	U	0.00018	0.00023
House 2	BDS-[redacted]W024	1701077-9	12/29/2016	Ra-226	Ra Emanation	0.035	U	0.091	0.165	200	0.000175	U	0.000455	0.000825
House 2	BDS-[redacted]W024	1701077-9	12/29/2016	Th-228	Alpha Spec.	0.12	U,M	0.12	0.19	200	6.00E-04	U	6.00E-04	0.00095
House 2	BDS-[redacted]W024	1701077-9	12/29/2016	Th-230	Alpha Spec.	0.2	U,M	0.18	0.29	200	0.001	U	9.00E-04	0.00145
House 2	BDS-[redacted]W024	1701077-9	12/29/2016	Th-232	Alpha Spec.	0.09	LT	0.058	0.055	200	0.00045	J	0.00029	0.000275
House 2	BDS-[redacted]W024	1701077-9	12/29/2016	U-234	Alpha Spec.	0.041	U,M	0.065	0.109	200	0.000205	U	0.000325	0.000545
House 2	BDS-[redacted]W024	1701077-9	12/29/2016	U-235	Alpha Spec.	-0.008	U	0.04	0.075	200	-4.00E-05	U	2.00E-04	0.000375
House 2	BDS-[redacted]W024	1701077-9	12/29/2016	U-238	Alpha Spec.	0.014	U	0.034	0.064	200	7.00E-05	U	0.00017	0.00032
House 2	BDS-[redacted]W034	1701077-10	12/29/2016	Ra-226	Ra Emanation	0	U	0.072	0.15	200	0	U	0.00036	0.00075
House 2	BDS-[redacted]W034	1701077-10	12/29/2016	Th-228	Alpha Spec.	-0.01	U,M	0.12	0.22	200	-5.00E-05	U	6.00E-04	0.0011
House 2	BDS-[redacted]W034	1701077-10	12/29/2016	Th-230	Alpha Spec.	-0.12	U,M	0.16	0.29	200	-6.00E-04	U	8.00E-04	0.00145
House 2	BDS-[redacted]W034	1701077-10	12/29/2016	Th-232	Alpha Spec.	0.022	U	0.04	0.069	200	0.00011	U	2.00E-04	0.000345
House 2	BDS-[redacted]W034	1701077-10	12/29/2016	U-234	Alpha Spec.	0.067	U	0.055	0.072	200	0.000335	U	0.000275	0.00036
House 2	BDS-[redacted]W034	1701077-10	12/29/2016	U-235	Alpha Spec.	0.008	U	0.039	0.021	200	4.00E-05	U	0.000195	0.000105
House 2	BDS-[redacted]W034	1701077-10	12/29/2016	U-238	Alpha Spec.	0.04	U	0.038	0.049	200	2.00E-04	U	0.00019	0.000245
House 2	BDS-[redacted]W036	1701077-11	12/29/2016	Ra-226	Ra Emanation	-0.032	U	0.084	0.18	200	-0.00016	U	0.00042	9.00E-04
House 2	BDS-[redacted]W036	1701077-11	12/29/2016	Th-228	Alpha Spec.	-0.04	U,M	0.12	0.22	200	-2.00E-04	U	6.00E-04	0.0011
House 2	BDS-[redacted]W036	1701077-11	12/29/2016	Th-230	Alpha Spec.	-0.06	U,M	0.15	0.28	200	-3.00E-04	U	0.00075	0.0014
House 2	BDS-[redacted]W036	1701077-11	12/29/2016	Th-232	Alpha Spec.	0.007	U	0.035	0.053	200	3.50E-05	U	0.000175	0.000265
House 2	BDS-[redacted]W036	1701077-11	12/29/2016	U-234	Alpha Spec.	0.027	U	0.033	0.05	200	0.000135	U	0.000165	0.00025
House 2	BDS-[redacted]W036	1701077-11	12/29/2016	U-235	Alpha Spec.	0.016	U	0.039	0.074	200	8.00E-05	U	0.000195	0.00037

TABLE K-2
DETAILED WIPE SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/wipe)	Laboratory Qualifier	TPU (pCi/wipe)	MDC (pCi/wipe)	Wipe Area (cm2)	Result (pCi/cm2)	Validation Qualifier	TPU (pCi/cm2)	MDC (pCi/cm2)
House 2	BDS-[redacted]W036	1701077-11	12/29/2016	U-238	Alpha Spec.	0.027	LT	0.033	0.018	200	0.000135	U	0.000165	9.00E-05
House 2	BDS-[redacted]W042	1701077-12	12/29/2016	Ra-226	Ra Emanation	-0.01	U	0.083	0.167	200	-5.00E-05	U	0.000415	0.000835
House 2	BDS-[redacted]W042	1701077-12	12/29/2016	Th-228	Alpha Spec.	-0.02	U,M	0.12	0.23	200	-1.00E-04	U	6.00E-04	0.00115
House 2	BDS-[redacted]W042	1701077-12	12/29/2016	Th-230	Alpha Spec.	-0.03	U,M	0.16	0.29	200	-0.00015	U	8.00E-04	0.00145
House 2	BDS-[redacted]W042	1701077-12	12/29/2016	Th-232	Alpha Spec.	-0.008	U	0.041	0.093	200	-4.00E-05	U	0.000205	0.000465
House 2	BDS-[redacted]W042	1701077-12	12/29/2016	U-234	Alpha Spec.	0.021	U	0.045	0.082	200	0.000105	U	0.000225	0.00041
House 2	BDS-[redacted]W042	1701077-12	12/29/2016	U-235	Alpha Spec.	0.016	U	0.039	0.059	200	8.00E-05	U	0.000195	0.000295
House 2	BDS-[redacted]W042	1701077-12	12/29/2016	U-238	Alpha Spec.	0.027	U	0.039	0.063	200	0.000135	U	0.000195	0.000315
House 2	BDS-[redacted]W055	1701077-13	12/29/2016	Ra-226	Ra Emanation	0.012	U	0.088	0.171	200	6.00E-05	U	0.00044	0.000855
House 2	BDS-[redacted]W055	1701077-13	12/29/2016	Th-228	Alpha Spec.	0.04	U,M	0.14	0.24	200	2.00E-04	U	7.00E-04	0.0012
House 2	BDS-[redacted]W055	1701077-13	12/29/2016	Th-230	Alpha Spec.	-0.11	U,M	0.16	0.3	200	-0.00055	U	8.00E-04	0.0015
House 2	BDS-[redacted]W055	1701077-13	12/29/2016	Th-232	Alpha Spec.	0	U	0.041	0.078	200	0	U	0.000205	0.00039
House 2	BDS-[redacted]W055	1701077-13	12/29/2016	U-234	Alpha Spec.	0.039	U	0.042	0.061	200	0.000195	U	0.00021	0.000305
House 2	BDS-[redacted]W055	1701077-13	12/29/2016	U-235	Alpha Spec.	0.008	U	0.038	0.057	200	4.00E-05	U	0.00019	0.000285
House 2	BDS-[redacted]W055	1701077-13	12/29/2016	U-238	Alpha Spec.	0.026	U	0.042	0.07	200	0.00013	U	0.00021	0.00035
House 2	BDS-[redacted]W061	1701077-14	12/29/2016	Ra-226	Ra Emanation	0.071	U	0.063	0.082	200	0.000355	U	0.000315	0.00041
House 2	BDS-[redacted]W061	1701077-14	12/29/2016	Th-228	Alpha Spec.	0.04	U,M	0.12	0.21	200	2.00E-04	U	6.00E-04	0.00105
House 2	BDS-[redacted]W061	1701077-14	12/29/2016	Th-230	Alpha Spec.	-0.02	U,M	0.16	0.28	200	-1.00E-04	U	8.00E-04	0.0014
House 2	BDS-[redacted]W061	1701077-14	12/29/2016	Th-232	Alpha Spec.	0	U	0.037	0.082	200	0	U	0.000185	0.00041
House 2	BDS-[redacted]W061	1701077-14	12/29/2016	U-234	Alpha Spec.	0.073	U	0.062	0.087	200	0.000365	U	0.00031	0.000435
House 2	BDS-[redacted]W061	1701077-14	12/29/2016	U-235	Alpha Spec.	0	U	0.038	0.084	200	0	U	0.00019	0.00042
House 2	BDS-[redacted]W061	1701077-14	12/29/2016	U-238	Alpha Spec.	0.033	U	0.04	0.061	200	0.000165	U	2.00E-04	0.000305

Notes

cm^2	square centimeter
MDC	Minimum detectable concentration
pCi	picoCuries
TPU	Total propagated uncertainty (two sigma)

Data Qualifiers

LT	Result is less than requested minimum detectable concentration (MDC), greater than sample specific MDC.
M	Requested MDC not met.
U	Result is less than the sample specific MDC

TABLE K-3
DETAILED BULK DUST SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	U-238	Alpha Spec.	0.248		J	0.066	0.029
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	U-234	Alpha Spec.	0.267		J	0.068	0.025
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	Th-230	Alpha Spec.	0.27	M3		0.1	0.13
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	Th-230	Alpha Spec.	0.27	M3		0.1	0.13
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	Ra-226	Ra Emanation	0.061	U	U	0.064	0.094
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	Th-232	Alpha Spec.	0.182			0.059	0.026
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	Th-232	Alpha Spec.	0.182			0.059	0.026
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	Th-228	Alpha Spec.	0.281			0.087	0.072
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	Th-228	Alpha Spec.	0.281			0.087	0.072
House 1	BDS-[redacted]BD01	1701082-22	12/28/2016	U-235	Alpha Spec.	0.042	LT		0.026	0.024
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	U-238	Alpha Spec.	0.231		J	0.078	0.057
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	U-234	Alpha Spec.	0.366		J	0.099	0.04
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	Th-230	Alpha Spec.	0.21	M3		0.13	0.19
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	Th-230	Alpha Spec.	0.21	M3		0.13	0.19
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	Ra-226	Ra Emanation	0.105	U	U	0.093	0.126
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	Th-232	Alpha Spec.	0.214			0.078	0.05
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	Th-232	Alpha Spec.	0.214			0.078	0.05
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	Th-228	Alpha Spec.	0.26	M3		0.1	0.11
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	Th-228	Alpha Spec.	0.26	M3		0.1	0.11
House 1	BDS-[redacted]BD02	1701082-23	12/28/2016	U-235	Alpha Spec.	0.005	U	U	0.025	0.038
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	U-238	Alpha Spec.	0.054	LT		0.043	0.05
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	U-234	Alpha Spec.	0.155		J	0.076	0.072
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	Th-230	Alpha Spec.	0.04	U,M	U	0.17	0.3
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	Th-230	Alpha Spec.	0.04	U,M	U	0.17	0.3
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	Ra-226	Ra Emanation	0.019	U	U	0.094	0.141
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	Th-232	Alpha Spec.	0.016	U	U	0.039	0.074
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	Th-232	Alpha Spec.	0.016	U	U	0.039	0.074
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	Th-228	Alpha Spec.	0	U,M	U	0.094	0.177
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	Th-228	Alpha Spec.	0	U,M	U	0.094	0.177
House 1	BDS-[redacted]FB	1701082-24	12/28/2016	U-235	Alpha Spec.	0.04	U	U	0.042	0.058
House 2	BDS-[redacted]BD01	1701077-15	12/29/2016	U-238	Alpha Spec.	0.127			0.06	0.059
House 2	BDS-[redacted]BD01	1701077-15	12/29/2016	U-234	Alpha Spec.	0.147		J	0.061	0.045
House 2	BDS-[redacted]BD01	1701077-15	12/29/2016	Th-230	Alpha Spec.	1.8	M3		0.35	0.19
House 2	BDS-[redacted]BD01	1701077-15	12/29/2016	Ra-226	Ra Emanation	0.121	U	U	0.093	0.128
House 2	BDS-[redacted]BD01	1701077-15	12/29/2016	Th-232	Alpha Spec.	9.9			1.6	0
House 2	BDS-[redacted]BD01	1701077-15	12/29/2016	Th-228	Alpha Spec.	9.8	M3		1.6	0.1

TABLE K-3
DETAILED BULK DUST SAMPLING RESULTS
BRIDGETON DUST SITE, BRIDGETON, MISSOURI

House	Sample Name	Laboratory ID	Date Collected	Analyte	Analytical Method	Result (pCi/g)	Laboratory Qualifier	Validation Qualifier	TPU (pCi/g)	MDC (pCi/g)
House 2	BDS-[redacted]BD01	1701077-15	12/29/2016	U-235	Alpha Spec.	0.017	LT		0.028	0.016
House 2	BDS-[redacted]FB	1701077-16	12/29/2016	U-238	Alpha Spec.	0.028	U	U	0.035	0.052
House 2	BDS-[redacted]FB	1701077-16	12/29/2016	U-234	Alpha Spec.	0.085	LT		0.055	0.052
House 2	BDS-[redacted]FB	1701077-16	12/29/2016	Th-230	Alpha Spec.	0.04	U,M	U	0.16	0.28
House 2	BDS-[redacted]FB	1701077-16	12/29/2016	Ra-226	Ra Emanation	-0.03	U	U	0.05	0.121
House 2	BDS-[redacted]FB	1701077-16	12/29/2016	Th-232	Alpha Spec.	0.014	U	U	0.041	0.077
House 2	BDS-[redacted]FB	1701077-16	12/29/2016	Th-228	Alpha Spec.	-0.02	U,M	U	0.1	0.19
House 2	BDS-[redacted]FB	1701077-16	12/29/2016	U-235	Alpha Spec.	0.017	U	U	0.041	0.077

Notes

MDC	Minimum detectable concentration
pCi/g	picoCuries per gram
TPU	Total propagated uncertainty (two sigma)

Data Qualifiers

J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
LT	Result is less than requested minimum detectable concentration (MDC), greater than sample specific MDC.
M	Requested MDC not met.
M3	The requested MDC was not met, but the reported activity is greater than the reported MDC.
U	Result is less than the sample specific MDC

APPENDIX L

BMAC STUDY DATA

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.