ADDENDUM TO
QUALITY ASSURANCE PROJECT PLAN REVISION 01
FOR PRE-CERCLIS SCREENING AT
BRIDGETON DUST SITE,
BRIDGETON, MISSOURI

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

Prepared For:

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

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Prepared By:

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

APPROVED BY:

Robert Monnig, PE, START Project Manager	12/29/2016 Date
Ted Faile, PG, CHMM, START Program Manager	12/29/2016 Date
Kathleen Homer, START Quality Assurance Manager	12/29/2016 Date
Tom Mahler, EPA On-Scene Coordinator, Superfund Division	Date
Diane Harris, EPA Quality Assurance Manager	Date

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Region 7 EPA	Tom Mahler, On-Scene Coordinator Diane Harris, Quality Assurance Manager
Region 7 START	Rob Monnig, Project Manager Ted Faile, Program Manager Kathleen Homer, Quality Assurance Manager

ADDENDUMS

This Quality Assurance Project Plan (QAPP) Addendum is intended to be used in conjunction with the approved Quality Assurance Project Plan for Pre-CERCLIS Screening at the Bridgeton Dust site (Tetra Tech 2016), prepared for the U.S. Environmental Protection Agency (EPA) Region 7.

Revision to Table 3 (size of wipe area)

This addendum modifies the wipe sampling procedure by increasing the specified wipe area of 100 square centimeters to an area of 200 square centimeters. This modification increases the ability to detect surface concentrations of radionuclides and provides additional assurance that the data can be compared to EPA Building Preliminary Remedial Goals (BPRG) for residential exposure scenarios that correspond to a one in ten thousand (1E-4) cancer risk. Table 3 of the QAPP has been revised to specify a wipe area of 200 square centimeters. The revised table is included in Attachment A.

Revision to Table 5 Footnote 3

This addendum corrects a typographical error in Table 5, Footnote 3. The BPRG for radium-226 should be listed as 4.56 picoCuries per 100 square centimeters (pCi/100 cm^2). Table 5 of the QAPP has been revised to list the correct value and is included in Attachment A.

REFERENCES

Tetra Tech, Inc. (Tetra Tech). 2016. Quality Assurance Project Plan for Pre-CERCLIS Screening at Bridgeton Dust Site, Bridgeton, Missouri, Revision 01. December 22.

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ATTACHMENT A

AMENDED QAPP TABLES

TABLE 1

ANTICIPATED SAMPLE SUMMARY
INTERIOR SAMPLING
Revised December 29, 2016

Room/Location	Sub Location	Sampling Purpose	Anticipated Distribution of Radionuclides	Selection of Sampling Area	Number of Samples (per residence)	Sample Type	Selection of Samples for Laboratory Analyses	Laboratory Analyses	Evaluation of Results
High-occupancy rooms, e.g., bedrooms, kitchen, living room, etc.	Each wall	Assess presence of radionuclides in dust settled on accessible surfaces within living spaces.	Homogenously distributed within settled dust.	Bias to wall area with above-average dust, e.g., near heating, venting, and air conditioning (HVAC) register	16 - 24	Wipe of 200 square centimeter (cm^2) area	Select the three wipes with highest alpha counts -and- Select the wipe with highest alpha count from each high-occupancy room. -and- Select the wipe with highest alpha count from each entrance.	Isotopic uranium, isotopic thorium, and radium-226	Compare to 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. Detection of radionuclides above BPRGs may indicate CERCLA investigation or response is warranted. Additional sampling would be required to evaluate risk.
	Floor			Bias to floor area with above-average dust, e.g., near HVAC register or corner of floor	4 – 6	Wipe of 200 cm^2 area			
	Accessible dust-laden surface			Accessible dusty surface, e.g., top of dresser or a shelf	4 – 6	Wipe of 200 cm^2 area			
Less frequently occupied rooms, e.g., bathrooms, closets	Each wall			Bias to wall area with above-average dust, e.g., near HVAC register	40	Wipe of 200 cm^2 area			
	Floor			Bias to floor area with above average dust, e.g., near HVAC register or corner of floor	10	Wipe of 200 cm^2 area			
All entrances	Floor near entrance	Assess presence of radionuclides deposited on floor from foot traffic.	Homogenous if presence of radionuclides is related to settled dust; potentially heterogeneous if presence is related to deposition from foot traffic.	Scan area with a Ludlum 43-90 detector and bias sample to area of relatively higher activity. If detector response is homogenous over the area, select area subject to heavy foot traffic.	2-4	Wipe of 200 cm^2 area			
Laundry room	Wall near dryer	Assess presence and potential contribution of radionuclides to settled dust from washing and drying of clothes.	Homogenously distributed within settled dust.	Bias to wall area with above average dust, e.g., near dryer vent	1	Wipe of 200 cm^2 area			
	Floor			Bias to floor area with above average dust, e.g., near dryer	1	Wipe of 200 cm^2 area			
Area of Accumulated Dust	Area with bulk amounts of accumulated dust (e.g., behind furniture or appliances)	Characterize radionuclides in accumulated dust.	Homogenous if presence of radionuclides is related to settled dust	Scan area with a Ludlum 43-90 detector and bias sample to area of relatively higher activity.	1-2	Vacuum cartridge	Submit each sample for laboratory analysis.	Isotopic uranium, isotopic thorium, and radium-226	Results will only be used to characterize radionuclide concentrations and relative ratios. Results will not be comparable to any health-based standards.

TABLE 2

ANALYTICAL METHODS
Revised December 29, 2016

Sample Type	Analyses	Radionuclide(s) of Interest	Project Quantitation Goal (PQG)	Rationale for PQG	Analytical Method
Soil	Isotopic thorium	Thorium-230	1 pCi/g	Background[1]	Alpha spectrometry per laboratory SOP[2]
	Isotopic uranium	Uranium-238	1 pCi/g	Background[1]	Alpha spectrometry per laboratory SOP[2]
	Radionuclides in soil by gamma spectrometry scan	Radium-226	1 pCi/g	Background[1]	Gamma spectroscopy per laboratory SOP[2] preceded by 21-day ingrowth of Radium-226 progeny
	Lead-210	Lead-210	1 pCi/g	Background[1]	Gamma spectroscopy or other analytical method to be determined based on laboratory capability to achieve PQG
Wipe	Isotopic thorium	Thorium-230	2 pCi/wipe	10% of 1E-4 cancer risk BPRG[3]	Alpha spectrometry per laboratory SOP[2]
	Isotopic uranium	Uranium-238	2 pCi/wipe	10% of 1E-4 cancer risk BPRG[3]	Alpha spectrometry per laboratory SOP[2]
	Radium-226	Radium-226	0.5 pCi/wipe	10% of 1E-4 cancer risk BPRG[3]	Analytical method to be determined based on laboratory capability to achieve PQG[2]
Bulk dust (vacuum cartridge)	Isotopic thorium	Thorium-230	1 pCi/g	Background[1]	Alpha spectrometry per laboratory SOP[2]
	Isotopic uranium	Uranium-238	1 pCi/g	Background[1]	Alpha spectrometry per laboratory SOP[2]
	Radium-226	Radium-226	1 pCi/g	Background[1]	Analytical method to be determined based on laboratory capability to achieve PQG[2]

Notes:

[1] PQG is sufficient to detect anticipated background soil concentrations.

[2] Laboratory analyses for radionuclides are typically performed in accordance with reference methods, as documented or amended by the laboratories' internal SOPs.

[3] PQG is sufficient to detect the radionuclide BPRG corresponding to a cancer risk of 1 in 10,000 (1E-4). The BPRGs (corresponding to a 1E-4 cancer risk and a 100 cm^2 basis) are 15.8 pCi/100 cm^2 for Uranium-238, 18.8 pCi/100 cm^2 for Thorium-230, and 4.56 pCi/100 cm^2 for Radium-226. The listed PQGs are approximately 10 percent of these values.

BPRG	Building Preliminary Remediation Goal
pCi	picoCurie
pCi/g	picoCurie per gram
SOP	Standard operating procedure