FINAL

RADIATION MONITORING REPORT INCLUDING APPENDICES SUMMARY OF RESULTS FOR SUMMER, FALL, AND WINTER 2017 SAMPLING EVENTS

FOR MATERIALS LICENSE SUC-1593, DOCKET NO. 040-09083

May 2018

Submitted By:

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ACRONYMS AND ABBREVIATIONS

DQA	Data Quality Objective
DQO	Data Quality Objective
DU	Depleted Uranium
ERM	Environmental Radiation Monitoring
ERMP	Environmental Radiation Monitoring Program
GIS	Geographic Information System
GPS	Global Positioning System
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
JBLM	Joint Base Lewis-McChord
JBMDL	Joint Base McGuire-Dix-Lakehurst
MDC	Minimum Detectable Concentration
NRC	(U.S.) Nuclear Regulatory Commission
pCi/g	Picocuries per Gram
pCi/L	Picocuries per Liter
PTA	Pohakuloa Training Area
QA	Quality Assurance
QAP	Quality Assurance Plan
QC	Quality Control
RCA	Radiation Control Area
SML	Source Material License
TA	Training Area
TPU	Total Propagated Uncertainty
U-234	Uranium-234
U-235	Uranium-235
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
YTC	Yakima Training Center

1. INTRODUCTION

Environmental radiation monitoring (ERM) activities are being conducted at the following U.S. Army garrisons named in the U.S. Nuclear Regulatory Commission (NRC) source material license (SML) number SUC-1593 (ML16343A164) for the possession of M101 depleted uranium (DU) spotting rounds and fragments:

- Donnelly Training Area (TA), Fort Wainwright, Alaska
- Fort Benning, Georgia
- Fort Bragg, North Carolina
- Fort Campbell, Kentucky
- Fort Carson, Colorado
- Fort Gordon, Georgia
- Fort Hood, Texas
- Fort Hunter Liggett, California
- Fort Jackson, South Carolina
- Fort Knox, Kentucky
- Fort Polk, Louisiana
- Fort Riley, Kansas
- Fort Sill, Oklahoma
- Joint Base Lewis-McChord (JBLM), Washington
- Joint Base McGuire-Dix-Lakehurst (JBMDL), New Jersey
- Pohakuloa Training Area (PTA), Hawaii
- Schofield Barracks, Hawaii
- Yakima Training Center (YTC), Washington.

All monitoring is conducted in accordance with the approved site-specific Environmental Radiation Monitoring Plan (ERMP) and associated Quality Assurance Plan (QAP) (ML16265A221). ERM activities are conducted in response to conditions #18 and #19 in SML SUC-1593. The sampling point for PTA was adjusted to shift the sampling point within the installation boundary, as discussed in the amendment request dated 21 April 2017 (ML17118A184). In addition, Figure 1-2 in the site-specific ERMPs for Fort Polk, Fort Riley, and PTA were revised and the Army submitted an amendment request on 1 June 2017 (ML17158B356) to correct the scaling errors in the figures.

During quarterly sampling events, collocated surface water and sediment samples were collected from points downstream from the radiation control areas (RCAs) to determine if any DU is leaving the RCAs. The locations, selected for consistency with historical sampling activities, were digitized from maps included in historical reports as referenced in the site-specific ERMPs. Geographic information system (GIS) professionals converted hardcopy, scanned images into vector data by tracing the features and capturing the coordinates as points, lines, or polygons. Errors may have occurred during the digitization process and/or locations may differ due to inaccuracies in the handheld geographic positioning system (GPS) units that samplers used to navigate to the locations. Consequently, the locations where the samples were actually collected frequently varied from the locations included in the site-specific ERMPs. When samplers traveled to several locations included in the site-specific ERMPs, the points were situated in woods, fields, or other areas distant from surface water bodies. In these cases, the samplers identified alternate locations as close as possible to the originally planned locations. In other cases, the samplers may have adjusted sampling locations to avoid dangerous ingress and egress routes (e.g., steep shoreline) or to move locations closer to access roads. In all cases, surface water and sediment samples were collected, as intended, downstream from the RCA on the same waterway as planned and

within the boundary of the installation. Sections 2 through 19 describe the variances and illustrate the planned and actual sampling locations.

The radiological analysis results for uranium are used to distinguish natural uranium from DU. Natural uranium is defined by NRC as "…uranium containing the relative concentrations of isotopes found in nature (0.7 percent uranium-235 [U-235], 99.3 percent uranium-238 [U-238], and a trace amount of uranium-234 [U-234] by mass). In terms of radioactivity, however, natural uranium contains approximately 2.2 percent U-235, 48.6 percent U-238, and 49.2 percent U-234…" (NRC 2012a). U-234 and U-238 in natural uranium exhibit secular equilibrium such that they are present at approximately the same activity concentration. Secular equilibrium is disturbed by the extraction of most U-234 together with the U-235 such that the activity exhibited by DU is about 60 percent of that from natural uranium. Hence, DU is defined by NRC as "…uranium with a percentage of U-235 lower than the 0.7 percent (by mass) contained in natural uranium. (The normal residual U-235 content in depleted uranium is 0.2-0.3 percent, with U-238 comprising the remaining 98.7-98.8 percent.)…" (NRC 2012b).

The concentrations of total and isotopic uranium in surface water and sediment are presented in tables included in Sections 2 through 19. All data are reported with a maximum of two significant digits. Data uncertainties are reported with two standard deviations (95 percent confidence level). The sensitivity reflected by the minimum detectable concentration (MDC) varies across samples since it is based on several sample-specific factors, such as sample volume, count time, detector efficiency, and sample tracer yield. The MDC is the smallest concentration of radioactivity in a sample that can be detected with a 5 percent probability of erroneously detecting radioactivity, when in fact none was present (Type I error), and a 5 percent probability of not detecting radioactivity, when in fact it is present (Type II error).

The U-238 to U-234 activity ratio and the weight percent U-235 are used to determine whether a given sample is indicative of natural, depleted, or enriched uranium. U-238/U-234 activity ratios of 3.0 or less are representative of natural uranium, whereas higher ratios are potentially indicative of DU. Activity ratios for U-238/U-234 that exceed 3.0 (including total propagated uncertainty [TPU]) determined through alpha spectrometry are investigated further to validate whether a sample result is representative of DU or natural uranium. These additional investigations of ratios exceeding 3.0 include reanalysis by inductively coupled plasma-mass spectrometry (ICP-MS) to confirm both the total mass of uranium present in the sample and the weight percent U-235. These supplemental data are used to augment U-238/U-234 activity information. Given that both natural uranium and DU are commonly present in environmental samples and that low-activity samples exhibit significant TPU, confirmation that a given sample exhibits DU is often problematic, and confirmation by a secondary analytical method is needed to determine if DU is present. Information relative to U-238/U-234 activity ratios for mixtures of depleted and natural uranium is provided in Appendix A. **None of the U-238/U-234 activity ratios for any samples collected during ERM activities at any of the garrisons listed above exceeded the threshold of 3.0**; therefore, the ICP-MS confirmatory analysis was not completed for any samples.

This report summarizes the methodology, results, and conclusions of the first three quarterly sampling events conducted in May/June, August/September, and November/December 2017. Site-specific results from the surface water and sediment sampling are presented and discussed in Sections 2 through 19. Conclusions and recommendations are summarized in Section 20. References cited are identified in Section 21. The appendices of this report include copies of field logbook pages (Appendices B through S) and the data quality assessment (DQA) (Appendix T). All data were determined to meet data quality objectives (DQOs) and criteria presented in the approved site-specific ERMP.

2. ERM RESULTS FOR DONNELLY TRAINING AREA, FORT WAINWRIGHT, ALASKA

A field sampler under contract with the U.S. Army Corps of Engineers (USACE) prepared for and conducted sampling at the Donnelly TA in Fort Wainwright, Alaska on 25 May and 30 August 2017 in accordance with the site-specific ERMP (Annex 1). On 15 November, a field sampler visited Donnelly TA, but was unable to conduct the sampling due to dangerous ingress and egress routes (i.e., heavy snow cover) and weather (e.g., frozen stream). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the first and second quarterly sampling events. Appendix B contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the first and second quarterly sampling events, collocated surface water and sediment samples were collected from a point downstream from the RCA in Donnelly TA (Figure 2-1). The planned sampling point, SWS-01, is located on the Delta River, at the installation's northern boundary and upstream of the confluence between the Delta River and Jarvis Creek. When the sampler traveled to the location included in the site-specific ERMP, the point was situated in the woods instead of within the Delta River. As a result, the sampler actually collected samples from an alternate location on the shore as close as possible to the originally planned location. As shown in Figure 2-1, the surface water and sediment samples were actually collected approximately 800 feet west of the SWS-01 location shown in the site-specific ERMP. All future sampling will be conducted at the same location that was sampled during the first two quarters shown in Figure 2-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first and second quarters are presented in Tables 2-1 and 2-2, respectively. As stated above, samples could not be collected during the third quarter due to the heavy snow cover and frozen stream. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 2-1 Sampling Locations Donnelly Training Area.mxd

146°9'55"W 145°59'55"W 145°49'55"W 145°39'55"W

64°0'5"N

63°50'5"N

SWS-01

Georgia Range

Donnelly Training Area

Delta Junction

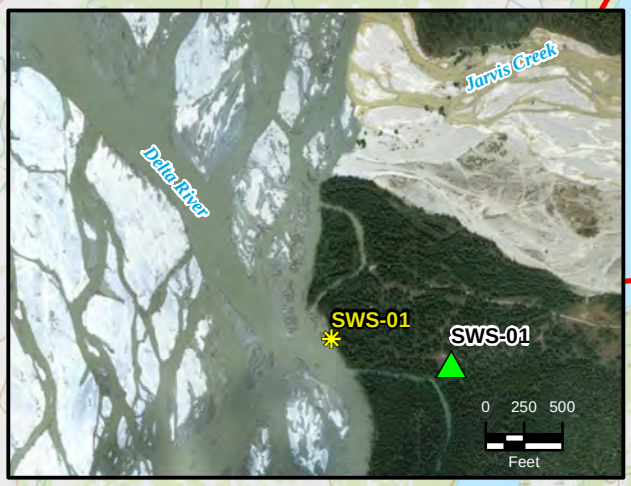
Delta Junction Airport

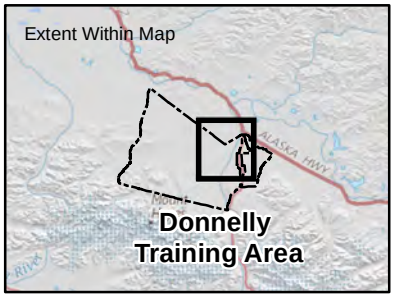
Allen Army Airfield

Fort Greely

Delta River

Jarvis Creek





Legend

- Actual Sample Location
- ORAP Sampling Location Recommended for ERM
- Dudded Impact Area
- Radiation Control Area
- Stream
- Donnelly Training Area Boundary

0 1 2
Miles

NATIONWIDE DU PROGRAM (DAVY CROCKETT) U.S.A

Sampling Locations Donnelly Training Area in Fort Wainwright, Alaska

DATE	FIGURE
3/2/2018	2-1

Table 2-1. Uranium in Surface Water, Donnelly Training Area, Fort Wainwright, Alaska

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
SWS-01*	5/25/2017	0.48	+/-	0.17	J	0.045	+/-	0.053	U	0.28	+/-	0.12	J	0.80	+/-	0.21	0.59	+/-	0.31
SWS-01*	8/30/2017	3.2	+/-	0.3		0.18	+/-	0.07	J	0.36	+/-	0.09	J	3.8	+/-	0.3	0.11	+/-	0.03

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

Table 2-2. Uranium in Sediment, Donnelly Training Area, Fort Wainwright, Alaska

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-01*	5/25/2017	0.27	+/-	0.04	J	0.012	+/-	0.006	J	0.30	+/-	0.05		0.58	+/-	0.06	1.1	+/-	0.3
SWS-01*	8/30/2017	0.51	+/-	0.08	J	0.022	+/-	0.017	U	0.50	+/-	0.07	J	1.0	+/-	0.1	0.97	+/-	0.24

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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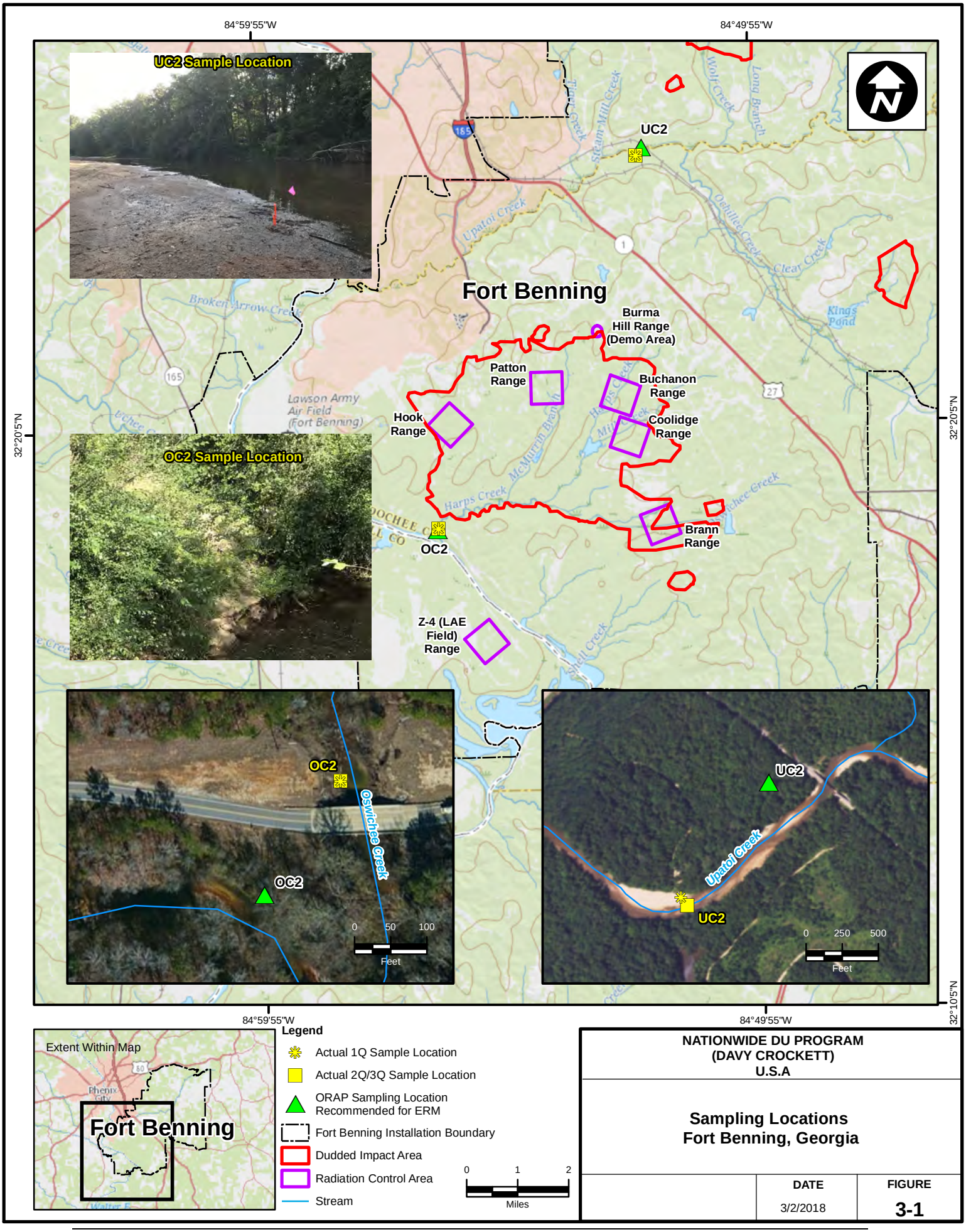
3. ERM RESULTS FOR FORT BENNING, GEORGIA

A field sampler under contract with USACE prepared for and conducted sampling at Fort Benning, Georgia on 25 May, 29 August, and 6 December 2017 in accordance with the site-specific ERMP (Annex 2). Except for flooding encountered during the first quarterly sampling event, no other unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix C contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from two points downstream from the RCAs (Figure 3-1). The first sampling point, OC2, is in Upatoi Creek downstream from the RCAs located in the southern portion of the installation and in the Oswichwee Creek watershed. The second sampling point, UC2, is in Upatoi Creek downstream from the RCAs located in the northern portion of the installation and in the Upatoi Creek watershed. During the first quarterly sampling event, the stream stage of Upatoi Creek was elevated. As shown in Figure 3-1, surface water and sediment samples were collected approximately 180 feet from the planned location for OC2 and samples were collected approximately 1,000 feet from the planned location for UC2. The stream stage was lower during the second and third quarterly sampling event; therefore, the samples for UC2 were collected at a different point on the shoreline. Future sampling will be conducted at the locations shown for sampling in Figure 3-1 and may be modified depending on the location of the shoreline during flooding events.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 3-1 and 3-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 3-1 Sampling Locations Fort Benning Georgia.mxd



NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A

Sampling Locations
Fort Benning, Georgia

DATE	FIGURE
3/2/2018	3-1

Table 3-1. Uranium in Surface Water, Fort Benning, Georgia

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)
OC2	5/25/2017	0.025	+/-	0.018	J	-0.00055	+/-	0.00670	U	0.017	+/-	0.015	U	0.041	+/-	0.024	ND
UC2*	5/25/2017	0.023	+/-	0.013	U	0.0085	+/-	0.0078	U	0.013	+/-	0.009	U	0.044	+/-	0.018	ND
OC2	8/29/2017	2.3	+/-	0.4		0.12	+/-	0.08	J	0.017	+/-	0.052	U	2.4	+/-	0.4	ND
UC2*	8/29/2017	3.5	+/-	0.4		0.16	+/-	0.07	U	0.060	+/-	0.046	U	3.7	+/-	0.4	ND
OC2	12/6/2017	0.097	+/-	0.065	J	0.0021	+/-	0.0293	U	0.012	+/-	0.031	U	0.11	+/-	0.08	ND
UC2*	12/6/2017	0.16	+/-	0.06	J	0.012	+/-	0.016	U	0.013	+/-	0.026	U	0.18	+/-	0.07	ND

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 3-2. Uranium in Sediment, Fort Benning, Georgia

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
OC2	5/25/2017	0.14	+/-	0.04	J	0.0036	+/-	0.0054	U	0.14	+/-	0.04	J	0.28	+/-	0.05	1.0	+/-	0.4
UC2*	5/25/2017	0.20	+/-	0.04	J	0.0047	+/-	0.005	U	0.21	+/-	0.04	J	0.41	+/-	0.05	1.1	+/-	0.3
OC2	8/29/2017	0.32	+/-	0.08	J	0.020	+/-	0.026	U	0.36	+/-	0.09	J	0.70	+/-	0.13	1.1	+/-	0.4
UC2*	8/29/2017	0.12	+/-	0.04	J	0.006	+/-	0.009	U	0.15	+/-	0.04	J	0.28	+/-	0.05	1.15	+/-	0.5
OC2	12/6/2017	0.32	+/-	0.09	J	0.022	+/-	0.025	U	0.28	+/-	0.08	J	0.62	+/-	0.12	0.88	+/-	0.34
UC2*	12/6/2017	0.083	+/-	0.033	UJ	0.0094	+/-	0.0108	U	0.067	+/-	0.027	J	0.16	+/-	0.04	ND		

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

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4. ERM RESULTS FOR FORT BRAGG, NORTH CAROLINA

A field sampler under contract with USACE prepared for and conducted sampling at Fort Bragg, North Carolina on 23 May, 29 August, and 29 November 2017 in accordance with the site-specific ERMP (Annex 3). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix D contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, one collocated surface water and sediment sample was collected downstream from the RCA (Figure 4-1). The planned sampling point, SWS-08, is located on Puppy Creek. When the sampler traveled to the location included in the site-specific ERMP, the location was situated in an open field distant from Puppy Creek. As a result, the sampler actually collected samples from an alternate location on the shore as close as possible to the originally planned location. As shown in Figure 4-1, surface water and sediment samples were collected approximately 1,000 feet from the planned location for SWS-08. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 4-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 4-1 and 4-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

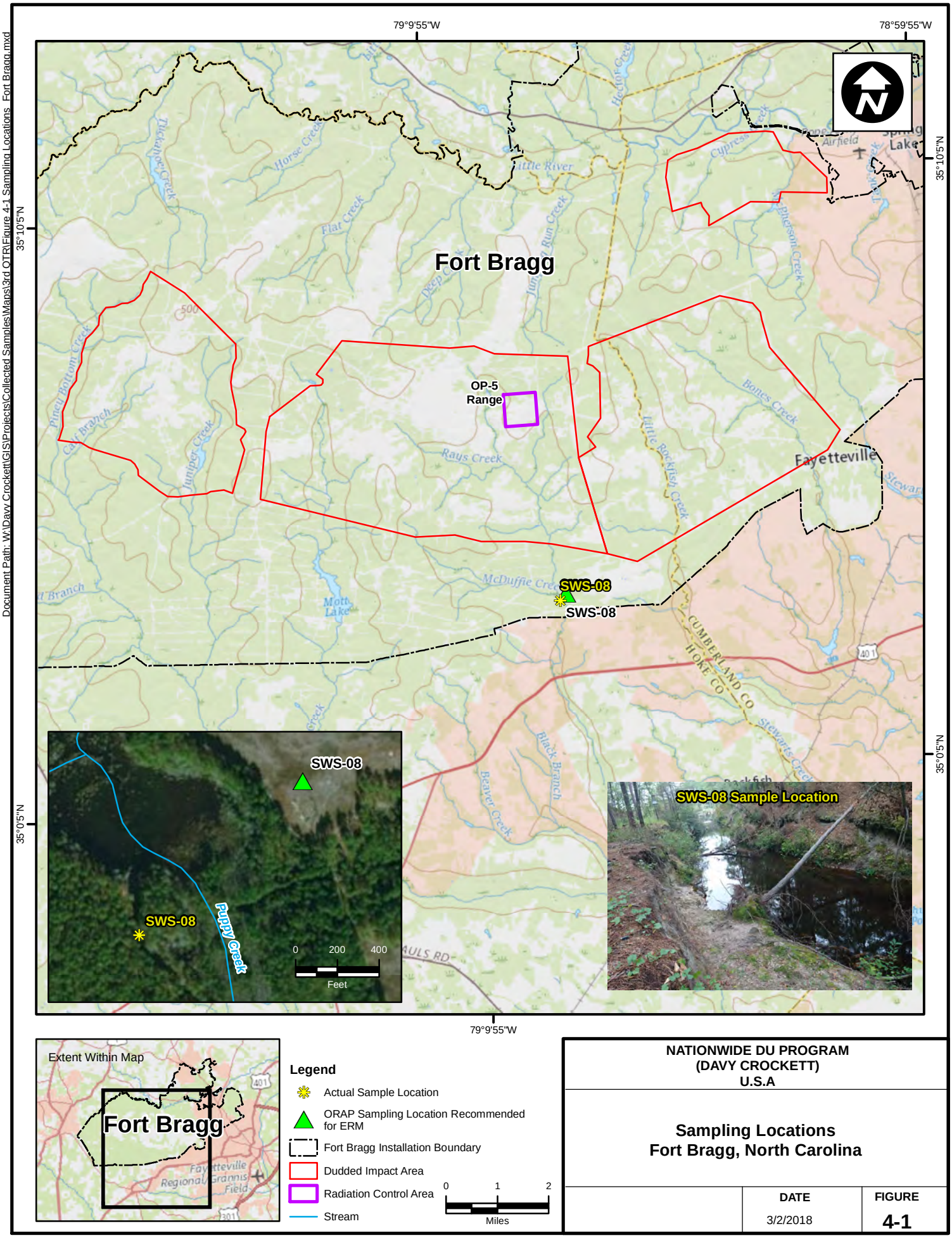
79°9'55"W
78°59'55"W
35°10'5"N
35°0'5"N
Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 4-1 Sampling Locations_Fort Bragg.mxd
Fort Bragg
OP-5
Range
SWS-08
SWS-08
Fayetteville
Puppy Creek
0 200 400
Feet
SWS-08 Sample Location
Extent Within Map
Fort Bragg
Legend
Actual Sample Location
ORAP Sampling Location Recommended for ERM
Fort Bragg Installation Boundary
Dudded Impact Area
Radiation Control Area
Stream
0 1 2
Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Fort Bragg, North Carolina
DATE
3/2/2018
FIGURE
4-1

Table 4-1. Uranium in Surface Water, Fort Bragg, North Carolina

Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)				U-238/U-234 Ratio (unitless)
SWS-08		5/23/2017	0.020	+/-	0.016	J	0.0015	+/-	0.0054	U	0.017	+/-	0.016	U	0.039	+/-	0.023		ND
SWS-08		8/29/2017	0.31	+/-	0.12	J	0.024	+/-	0.034	U	0.030	+/-	0.04	U	0.36	+/-	0.13		ND
SWS-08		11/29/2017	0.35	+/-	0.12	J	-0.0047	+/-	0.0094	U	0.020	+/-	0.033	U	0.37	+/-	0.12		ND

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 4-2. Uranium in Sediment, Fort Bragg, North Carolina

Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-08		5/23/2017	0.42	+/-	0.1	J	0.015	+/-	0.014	J	0.49	+/-	0.11	J	0.93	+/-	0.15	1.2	+/-	0.4
SWS-08		8/29/2017	0.39	+/-	0.1	J	0.010	+/-	0.019	U	0.33	+/-	0.09	J	0.73	+/-	0.13	0.85	+/-	0.31
SWS-08		11/29/2017	0.59	+/-	0.12		0.030	+/-	0.029	U	0.68	+/-	0.13		1.3	+/-	0.2	1.2	+/-	0.3

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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5. ERM RESULTS FOR FORT CAMPBELL, KENTUCKY

A field sampler under contract with USACE prepared for and conducted sampling at Fort Campbell, Kentucky on 26 May, 30 August, and 30 November 2017 in accordance with the site-specific ERMP (Annex 4). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix E contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from one point downstream from the RCA (Figure 5-1). The planned sampling point, SWS-09, was located in Noah's Spring Branch along the installation's northern boundary. When the sampler traveled to the location included in the site-specific ERMP, the point was situated in the roadway. As a result, the sampler actually collected samples from an alternate location as close as possible to the originally planned location on Noah's Spring Branch. As shown in Figure 5-1, surface water and sediment samples were collected approximately 100 feet from the planned location for SWS-09. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 5-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 5-1 and 5-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

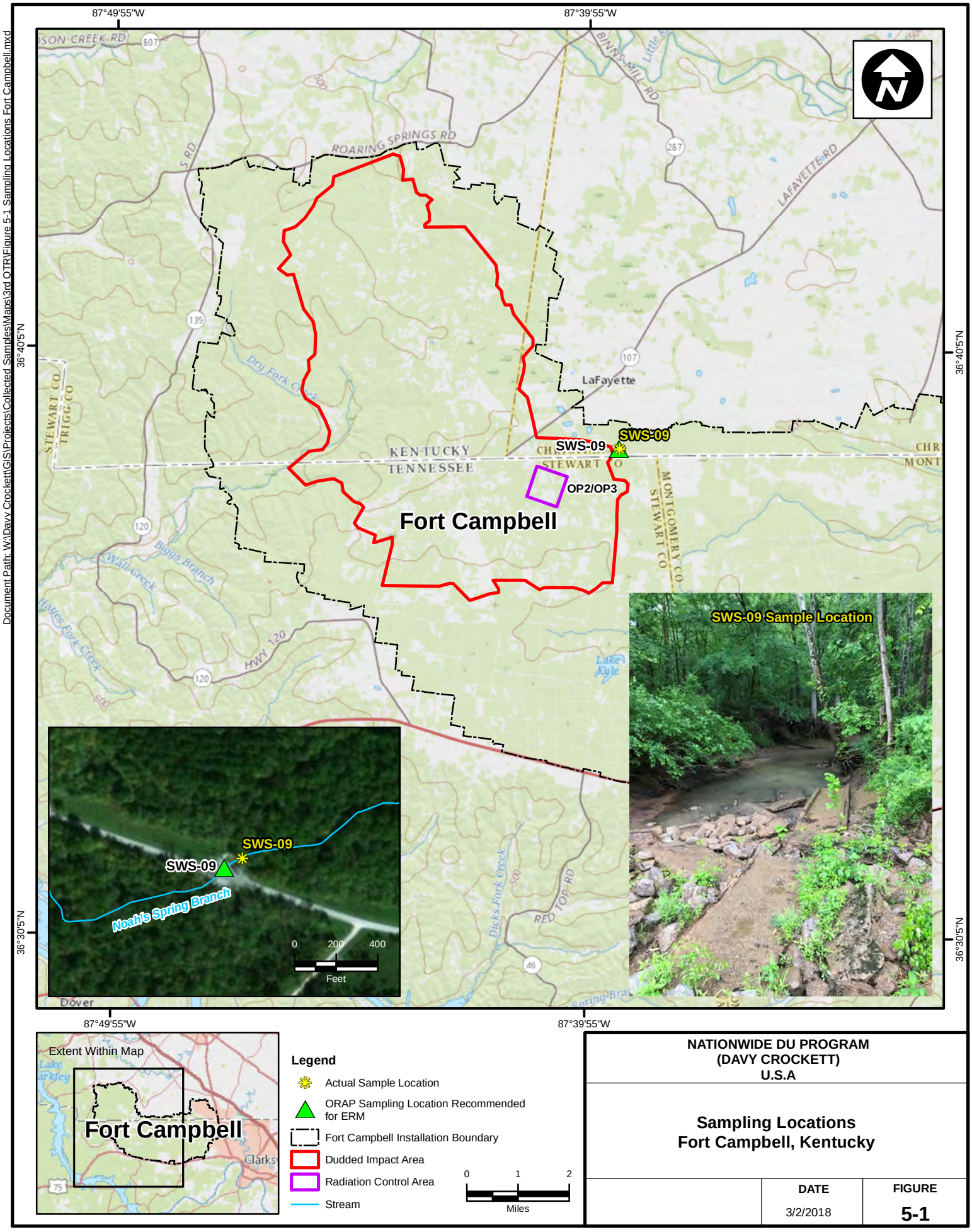
Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 5-1 Sampling Locations Fort Campbell.mxd
87°49'55"W
87°39'55"W
36°40'5"N
36°30'5"N
Fort Campbell
SWS-09
OP2/OP3
KENTUCKY
TENNESSEE
LaFayette
ROARING SPRINGS RD
LAFAYETTE RD
BINNS MILL RD
Dry Fork Creek
Wall Creek
Biggs Branch
Hayes Fork Creek
Lake Kyle
Dicks Fork Creek
RED TOP RD
HWY 120
STEWART CO
TRIGG CO
MONTGOMERY CO
Dover
SWS-09 Sample Location
Noah's Spring Branch
0 200 400
Feet
Extent Within Map
Clarksville
Legend
Actual Sample Location
ORAP Sampling Location Recommended for ERM
Fort Campbell Installation Boundary
Dudded Impact Area
Radiation Control Area
Stream
0 1 2
Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Fort Campbell, Kentucky
DATE
3/2/2018
FIGURE
5-1

Table 5-1. Uranium in Surface Water, Fort Campbell, Kentucky

Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)				U-238/U-234 Ratio (unitless)			
SWS-09		5/26/2017	0.43	+/-	0.14	J	0.015	+/-	0.026	U	0.32	+/-	0.12	J	0.77	+/-	0.19		0.74	+/-	0.37	
SWS-09		8/30/2017	2.0	+/-	0.3	J	0.12	+/-	0.08	J	0.064	+/-	0.06	U	2.2	+/-	0.3		ND			
SWS-09		11/30/2017	0.42	+/-	0.14	J	0.0076	+/-	0.0281	U	0.085	+/-	0.064	J	0.51	+/-	0.16		0.20	+/-	0.17	

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 5-2. Uranium in Sediment, Fort Campbell, Kentucky

Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)				U-238/U-234 Ratio (unitless)			
SWS-09		5/26/2017	0.83	+/-	0.19	J	0.0055	+/-	0.013	U	0.78	+/-	0.18	J	1.6	+/-	0.3		0.94	+/-	0.31	
SWS-09		8/30/2017	0.81	+/-	0.14		0.070	+/-	0.041	J	0.77	+/-	0.14		1.7	+/-	0.2		0.95	+/-	0.24	
SWS-09		11/30/2017	1.1	+/-	0.2		0.061	+/-	0.037	J	0.82	+/-	0.14	J	2.0	+/-	0.2		0.75	+/-	0.17	

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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6. ERM RESULTS FOR FORT CARSON, COLORADO

A field sampler under contract with USACE prepared for and conducted sampling at Fort Carson, Colorado on 24 May, 14 September, and 7 December 2017 in accordance with the site-specific ERMP (Annex 5). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix F contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from two points downstream from the RCAs (Figure 6-1). The first sampling point, SWS-02, is located on the Sand Canyon at the installation's eastern boundary and upstream of the confluence between the Sand Canyon and Fountain Creek. The second sampling point, SWS-03, is located on the unnamed creek, at the installation's eastern boundary and upstream of the confluence between the unnamed creek and Fountain Creek. When the sampler traveled to the locations included in the site-specific ERMP, the points were situated in the brush-covered fields instead of within the unnamed stream. As a result, the sampler actually collected samples from alternate locations on the shore as close as possible to the originally planned locations but at locations that were closer to access roads. As shown in Figure 6-1, surface water and sediment samples were collected approximately 600 feet from the planned location for SWS-02 and by approximately 500 feet for SWS-03. Surface water was present at both locations during the May and December sampling events, but surface water was present for sampling at only one location during the September sampling event. All future sampling will be conducted at the same locations that were sampled during the first three quarters shown in Figure 6-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 6-1 and 6-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

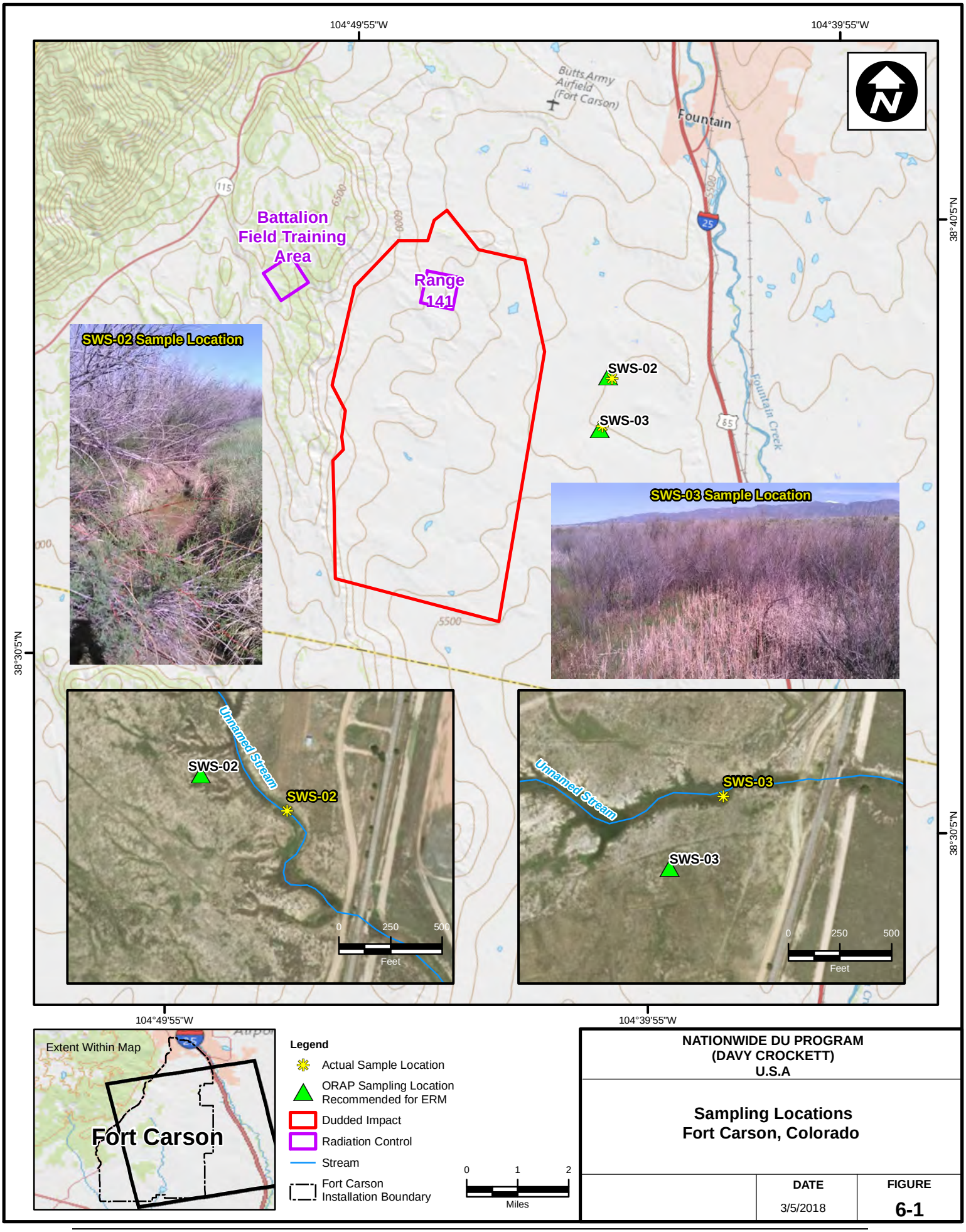
Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 6-1 Sampling Locations Fort Carson.mxd
104°49'55"W
104°39'55"W
38°40'5"N
38°30'5"N
Butts Army Airfield (Fort Carson)
Fountain
Fountain Creek
Battalion Field Training Area
Range 141
SWS-02
SWS-03
SWS-02 Sample Location
SWS-03 Sample Location
Unnamed Stream
0 250 500
Feet
Extent Within Map
Fort Carson
Legend
Actual Sample Location
ORAP Sampling Location Recommended for ERM
Dudded Impact
Radiation Control
Stream
Fort Carson Installation Boundary
0 1 2
Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Fort Carson, Colorado
DATE
3/5/2018
FIGURE
6-1

Table 6-1. Uranium in Surface Water, Fort Carson, Colorado

Sample Location	Date	Uranium 234 (pCi/L)	Uranium 235 (pCi/L)	Uranium 238 (pCi/L)	Total U (pCi/L)	U-238/U-234 Ratio (unitless)
SWS-02*	5/24/2017	7.6 +/- 0.9	0.16 +/- 0.07 J	5.0 +/- 0.7	13 +/- 1	0.66 +/- 0.12
SWS-03	5/24/2017	9.9 +/- 1.5	0.23 +/- 0.09 J	6.5 +/- 1	17 +/- 2	0.66 +/- 0.14
SWS-02	9/14/2017	--- +/- ---	--- +/- ---	--- +/- ---	--- +/- ---	--- +/- ---
SWS-03*	9/14/2017	6.5 +/- 0.5	0.23 +/- 0.08 J	4.5 +/- 0.4	11 +/- 1	0.70 +/- 0.09
SWS-02	12/7/2017	210 +/- 19	6.4 +/- 1.5 J	130 +/- 12.5	350 +/- 23	0.62 +/- 0.08
SWS-03	12/7/2017	10 +/- 1.06	0.31 +/- 0.13 J	6.3 +/- 0.7	17 +/- 1.3	0.63 +/- 0.1

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.

Table 6-2. Uranium in Sediment, Fort Carson, Colorado

Sample Location	Date	Uranium 234 (pCi/g)	Uranium 235 (pCi/g)	Uranium 238 (pCi/g)	Total U (pCi/g)	U-238/U-234 Ratio (unitless)
SWS-02*	5/24/2017	0.44 +/- 0.07 J	0.017 +/- 0.009 J	0.33 +/- 0.05 J	0.78 +/- 0.08	0.75 +/- 0.17
SWS-03	5/24/2017	2.1 +/- 0.3	0.072 +/- 0.027 J	1.5 +/- 0.3	3.7 +/- 0.4	0.71 +/- 0.17
SWS-02	9/14/2017	0.83 +/- 0.14	0.039 +/- 0.03 J	0.77 +/- 0.13	1.6 +/- 0.2	0.93 +/- 0.22
SWS-03*	9/14/2017	2.3 +/- 0.2	0.084 +/- 0.032 J	2.0 +/- 0.2	4.4 +/- 0.3	0.91 +/- 0.12
SWS-02	12/7/2017	0.97 +/- 0.16	0.018 +/- 0.021 J	0.88 +/- 0.15	1.9 +/- 0.2	0.91 +/- 0.21
SWS-03	12/7/2017	2.9 +/- 0.3	0.096 +/- 0.049 J	2.2 +/- 0.3	5.2 +/- 0.4	0.76 +/- 0.13

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.

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7. ERM RESULTS FOR FORT GORDON, GEORGIA

A field sampler under contract with USACE prepared for and conducted sampling at Fort Gordon, Georgia on 23 May, 30 August, and 5 December 2017 in accordance with the site-specific ERMP (Annex 6). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix G contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from one point downstream from the RCA (Figure 7-1). The sampling point, Gut, is located on the Boggy Gut Creek near the installation's southeastern boundary. The entire RCA is located within the Boggy Gut Creek watershed. When the sampler traveled to the location included in the site-specific ERMP, the point was situated in the woods instead of within Boggy Gut Creek. As a result, the sampler actually collected the samples from an alternate location on the shore as close as possible to the originally planned location but at a location that was closer to the access road. As shown in Figure 7-1, surface water and sediment samples were collected approximately 100 to 200 feet from the planned location for Gut. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 7-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 7-1 and 7-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

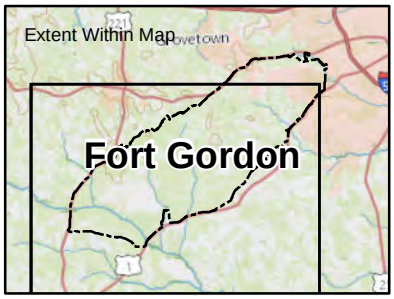
Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 7-1 Fort Gordon Sample Location.mxd

82°19'55"W 82°9'55"W

33°20'5"N

33°10'5"N

Dearing Harlem Headstall Creek Boggy Gut Creek Sandy Run Creek COLUMBIA CO RICHMOND CO Marcum Branch South Prong Creek Horsepen Branch MCDUFFIE CO RICHMOND CO Range E ORAPW1D Gut Rachel Branch Blythe McBean Creek Palmer Branch Raybum Branch Reedy Creek Keysville STAPLETON HWY JEFFERSON CO BURKE CO Little Brushy Creek



Legend

- Actual 1Q Sample Location
- Actual 2Q/3Q Sample Location
- ORAP Sampling Location Recommended for ERM
- Dudded Impact Area
- Radiation Control Area
- Stream
- Fort Gordon Installation Boundary

0 1 2 Miles

NATIONWIDE DU PROGRAM (DAVY CROCKETT) U.S.A

Sampling Locations Fort Gordon, Georgia

DATE	FIGURE
4/11/2018	7-1

Table 7-1. Uranium in Surface Water, Fort Gordon, Georgia

Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)
Gut		5/23/2017	0.0068	+/-	0.0094	U	0.0016	+/-	0.0056	U	0.0068	+/-	0.0094	U	0.015	+/-	0.014	ND
Gut		8/30/2017	0.058	+/-	0.064	U	0.0022	+/-	0.0305	U	0.029	+/-	0.045	U	0.089	+/-	0.084	ND
Gut		12/5/2017	0.092	+/-	0.072	J	-0.0057	+/-	0.0114	U	0.0064	+/-	0.0237	U	0.093	+/-	0.077	ND

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 7-2. Uranium in Sediment, Fort Gordon, Georgia

Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
Gut		5/23/2017	0.022	+/-	0.014	J	0.0022	+/-	0.0044	U	0.024	+/-	0.015	J	0.048	+/-	0.021	1.1	+/-	1
Gut		8/30/2017	0.63	+/-	0.12		0.033	+/-	0.03	J	0.68	+/-	0.13		1.3	+/-	0.2	1.1	+/-	0.3
Gut		12/5/2017	0.44	+/-	0.1	J	0.019	+/-	0.022	J	0.42	+/-	0.1	J	0.88	+/-	0.14	0.95	+/-	0.31

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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8. ERM RESULTS FOR FORT HOOD, TEXAS

A field sampler under contract with USACE prepared for and conducted sampling at Fort Hood, Texas on 7 June, 16 August, and 5 December 2017 in accordance with the site-specific ERMP (Annex 7). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix H contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from two points downstream from the RCA (Figure 8-1). The first sampling point, ERM-01, is located on the Oak Branch at the installation boundary. The second sampling point, ERM-02, is located on Cowhouse Creek at the installation boundary. These locations were selected based on the surface hydrology and potential for DU contribution. When the sampler traveled to the ERM-01 location included in the site-specific ERMP, the point was situated in an upland area away from water bodies. As a result, the sampler actually collected samples from an alternate location on Cowhouse Creek as close as possible to the originally planned location. For location ERM-02, the sampler adjusted the location for sampling to be situated closer to the access road. As shown in Figure 8-1, surface water and sediment samples were collected approximately 5,500 feet from the planned location for ERM-01 and by approximately 630 feet for ERM-02. All future sampling will be conducted at the same locations that were sampled during the first three quarters shown in Figure 8-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 8-1 and 8-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

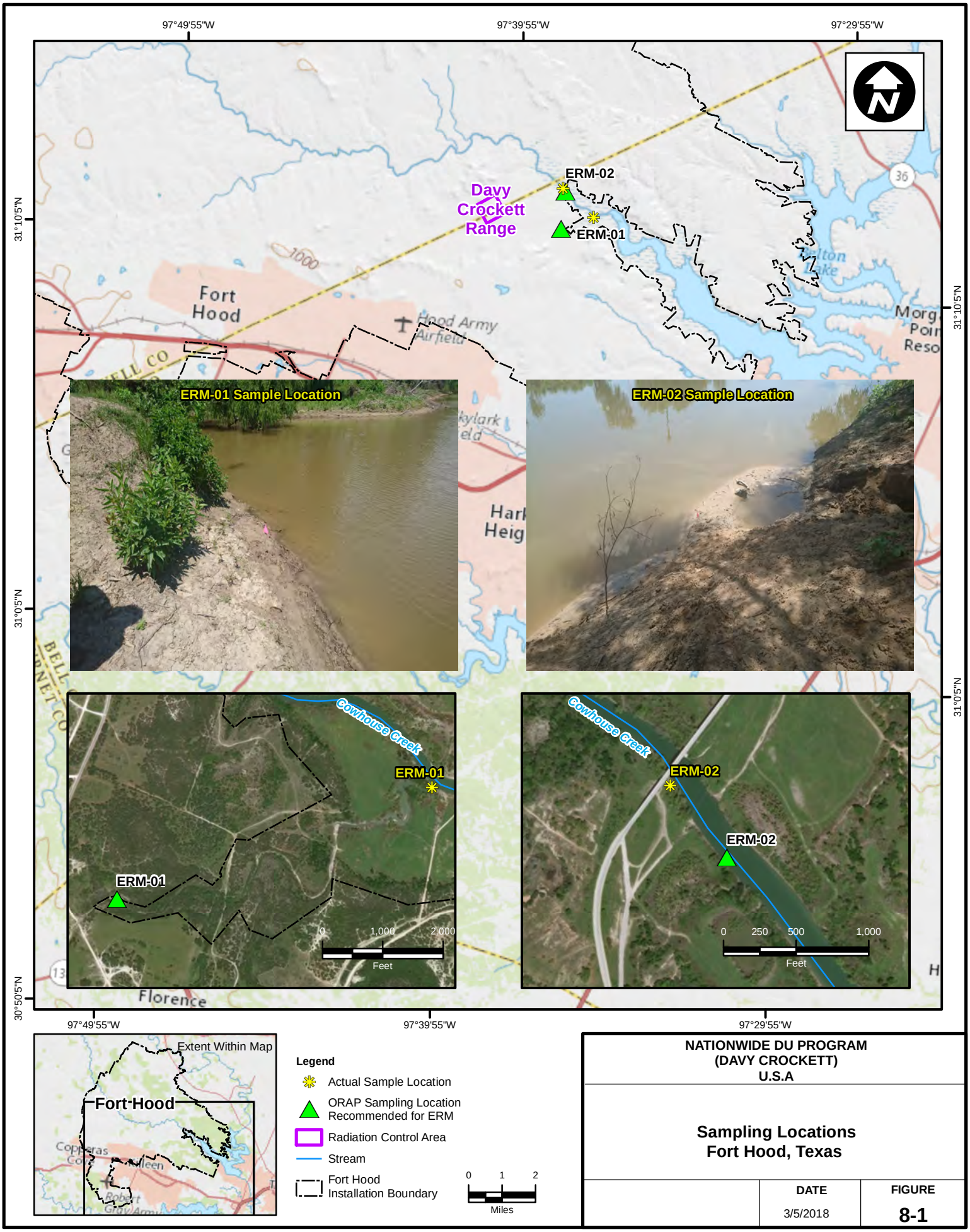
Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 8-1 Fort Hood Sample Locations.mxd
97°49'55"W
97°39'55"W
97°29'55"W
31°10'5"N
31°0'5"N
30°50'5"N
Davy Crockett Range
ERM-02
ERM-01
Fort Hood
Hood Army Airfield
Belton Lake
ERM-01 Sample Location
ERM-02 Sample Location
Cowhouse Creek
ERM-01
ERM-02
0 1,000 2,000 Feet
0 250 500 1,000 Feet
Florence
Extent Within Map
Fort Hood
Legend
Actual Sample Location
ORAP Sampling Location Recommended for ERM
Radiation Control Area
Stream
Fort Hood Installation Boundary
0 1 2 Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Fort Hood, Texas
DATE
3/5/2018
FIGURE
8-1

Table 8-1. Uranium in Surface Water, Fort Hood, Texas

Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
ERM-01		6/7/2017	0.092	+/-	0.061	J	0.017	+/-	0.027	U	0.057	+/-	0.047	J	0.17	+/-	0.08	0.62	+/-	0.66
ERM-02		6/7/2017	0.22	+/-	0.11	J	0.012	+/-	0.028	U	0.23	+/-	0.12	J	0.46	+/-	0.17	1.0	+/-	0.8
ERM-01		8/16/2017	0.24	+/-	0.11	J	0.037	+/-	0.043	J	0.13	+/-	0.08	J	0.41	+/-	0.14	0.54	+/-	0.39
ERM-02		8/16/2017	0.28	+/-	0.11	J	0.0078	+/-	0.0289	U	0.21	+/-	0.1	J	0.50	+/-	0.15	0.75	+/-	0.46
ERM-01		12/5/2017	0.39	+/-	0.13	J	0.0072	+/-	0.0267	U	0.26	+/-	0.1	J	0.66	+/-	0.17	0.67	+/-	0.35
ERM-02		12/5/2017	0.37	+/-	0.13	J	0.0073	+/-	0.0269	U	0.24	+/-	0.1	J	0.62	+/-	0.17	0.65	+/-	0.36

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

Table 8-2. Uranium in Sediment, Fort Hood, Texas

Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
ERM-01		6/7/2017	0.25	+/-	0.07	J	0.012	+/-	0.013	U	0.22	+/-	0.06	J	0.48	+/-	0.09	0.88	+/-	0.34
ERM-02		6/7/2017	0.27	+/-	0.08	J	0.015	+/-	0.016	U	0.27	+/-	0.08	J	0.56	+/-	0.11	1.0	+/-	0.4
ERM-01		8/16/2017	0.39	+/-	0.09	J	0.019	+/-	0.025	U	0.41	+/-	0.1	J	0.82	+/-	0.14	1.1	+/-	0.4
ERM-02		8/16/2017	0.35	+/-	0.08	J	-0.0046	+/-	0.0065	U	0.40	+/-	0.09	J	0.75	+/-	0.12	1.1	+/-	0.4
ERM-01		12/5/2017	0.38	+/-	0.09	J	0.0062	+/-	0.0124	U	0.33	+/-	0.09	J	0.72	+/-	0.13	0.87	+/-	0.31
ERM-02		12/5/2017	0.54	+/-	0.12	J	0.054	+/-	0.041	J	0.47	+/-	0.11	J	1.1	+/-	0.2	0.87	+/-	0.29

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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9. ERM RESULTS FOR FORT HUNTER LIGGETT, CALIFORNIA

A field sampler under contract with USACE prepared for and conducted sampling at Fort Hunter Liggett, California on 25 May, 20 September, and 20 November 2017 in accordance with the site-specific ERMP (Annex 8). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix I contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the three quarterly sampling events in 2017, collocated surface water and sediment samples were collected downstream from the RCAs (Figure 9-1). The planned sampling point, SWS-06, is located on the Nacimiento River before surface water exits the installation boundary, above the Nacimiento Reservoir. During the first quarterly sampling event, the planned location for SWS-06 was inaccessible due to limited roadways and steep terrain. The surface water and sediment samples were collected from an alternate point as close as possible to the original location that could be reached safely, but the sampler did not realize the location was situated beyond Fort Hunter Liggett property boundary until after the sampling coordinates were downloaded and plotted on maps. As shown in Figure 9-1, collocated surface water and sediment samples were collected approximately 3,000 feet from the planned location for SW-06 outside of the installation boundary.

Prior to the second quarterly sampling event, the surface water hydrology and potential for DU contribution from the RCAs was re-evaluated. Two new sampling points, ERM-01 and ERM-02, were selected. Both newly selected locations are located on the appropriate waterways prior to the surface water exiting the installation. During the second and third quarterly sampling events, collocated surface water and sediment samples were collected from two points downstream from the RCAs (Figure 9-1). The first sampling point, ERM-01, is located on the Nacimiento River before surface water exits the installation boundary, upstream of the planned location SWS-06. The second sampling point, ERM-02, is located on El Piojo Creek at the installation boundary. Coordinates of these locations were documented during each quarterly sampling event by the field sampler. Surface water was present at one location, ERM-01, for the September sampling event, but no surface water was present at either location during the November sampling event. All future sampling will be conducted at the same locations that were sampled during the second and third quarters shown in Figure 9-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 9-1 and 9-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 9-1 Fort Hunter Liggett Sample Location.mxd

121°19'55"W

121°9'55"W

35°5'0"N

35°5'5"N

ERM-01 Sampling Location

ERM-02 Sampling Location

Range C8

Range B13

Range B11

Fort Hunter Liggett

ERM-01

ERM-02

SWS-06

SWS-06

SWS-06 Sampling Location

Legend

- Actual 1Q Sample Location
- Actual 2Q/3Q Sample Location
- ORAP Sampling Location Recommended for ERM
- Radiation Control Area
- Stream
- Fort Hunter Liggett Installation Boundary

0 1 2
Miles

NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A

Sampling Locations
Fort Hunter Liggett, California

DATE	FIGURE
3/5/2018	9-1

Table 9-1. Uranium in Surface Water, Fort Hunter Liggett, California

Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
SWS-06		5/25/2017	0.52	+/-	0.12	J	0.022	+/-	0.021	J	0.46	+/-	0.11	J	1.0	+/-	0.2	0.88	+/-	0.29
ERM-01		9/21/2017	0.19	+/-	0.1	J	0.0025	+/-	0.0342	U	0.031	+/-	0.042	U	0.22	+/-	0.11	ND		
ERM-02		9/21/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
ERM-01		11/20/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
ERM-02		11/20/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 9-2. Uranium in Sediment, Fort Hunter Liggett, California

Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-06		5/25/2017	0.31	+/-	0.07	J	0.017	+/-	0.012	J	0.30	+/-	0.07	J	0.63	+/-	0.1	0.97	+/-	0.31
ERM-01		9/21/2017	0.20	+/-	0.07	J	0.044	+/-	0.036	J	0.17	+/-	0.06	J	0.41	+/-	0.1	0.85	+/-	0.41
ERM-02		9/21/2017	0.25	+/-	0.08	J	0.026	+/-	0.026	J	0.31	+/-	0.08	J	0.59	+/-	0.12	1.2	+/-	0.5
ERM-01		11/20/2017	0.27	+/-	0.08	J	0.011	+/-	0.023	U	0.30	+/-	0.08	J	0.58	+/-	0.12	1.1	+/-	0.4
ERM-02		11/20/2017	0.49	+/-	0.11	J	0.041	+/-	0.031	J	0.44	+/-	0.1	J	0.97	+/-	0.15	0.90	+/-	0.29

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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10. ERM RESULTS FOR FORT JACKSON, SOUTH CAROLINA

A field sampler under contract with USACE prepared for and conducted sampling at Fort Jackson, South Carolina on 25 May, 31 August, and 27 November 2017 in accordance with the site-specific ERMP (Annex 9). Except for flooding encountered during the first quarterly sampling event, no unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix J contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from one point downstream from the RCA (Figure 10-1). The planned sampling point, CC3, is located on Colonels Creek southeast of the RCA. During the first quarterly sampling event, the stream stage of Colonels Creek was elevated and the samples were collected in the location shown in Figure 10-1. Since the steam stage returned to normal for the second and third quarterly sampling events, the sampler traveled to a location upstream in order to collect the surface water sample as close as possible to the originally planned location. As shown in Figure 10-1, surface water and sediment samples were collected approximately 300 feet from the planned location for CC3. All future sampling will be conducted at the same location that was sampled during the second and third quarters shown in Figure 10-1, but the sampling location may be modified during flood events.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 10-1 and 10-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

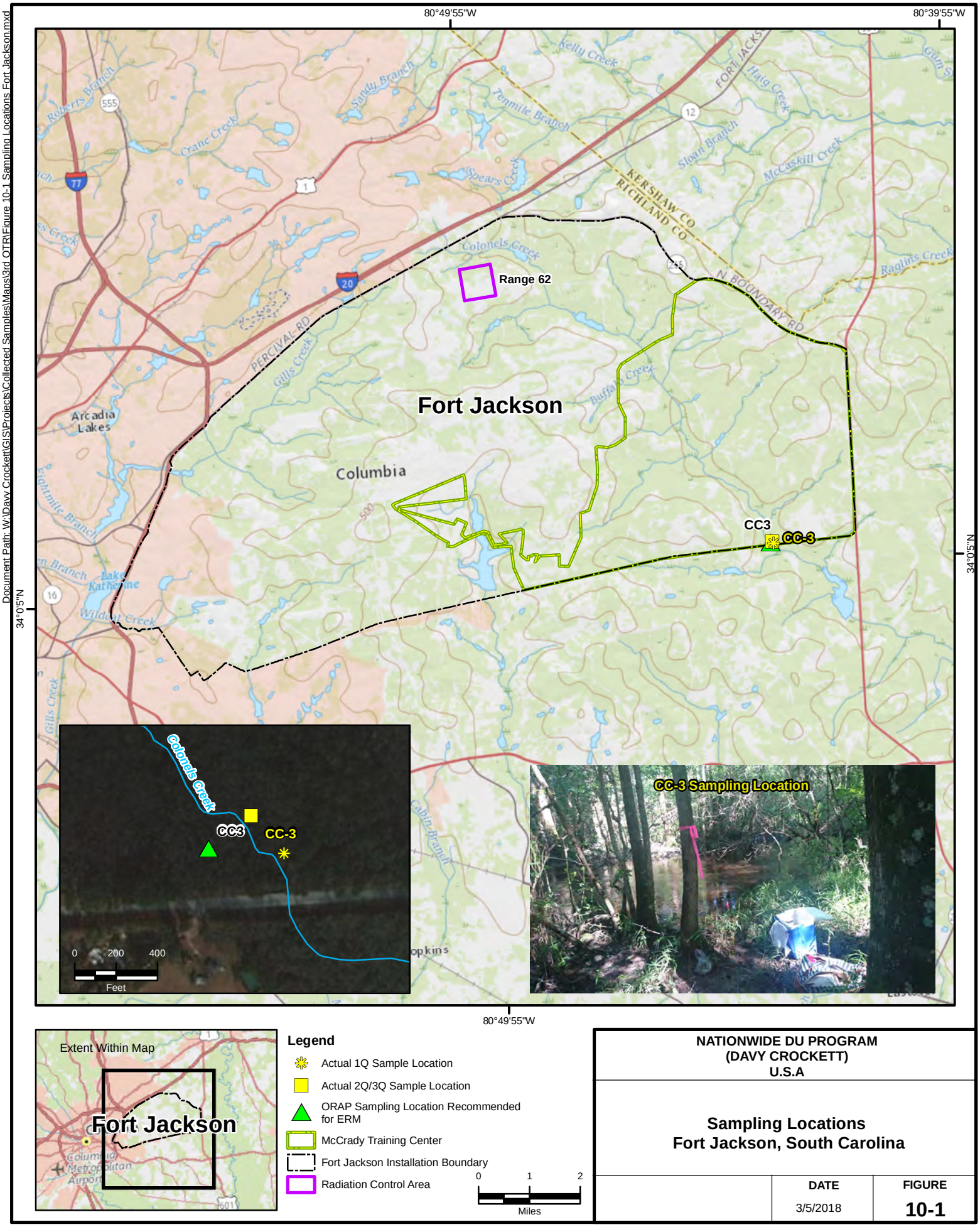
Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 10-1 Sampling Locations Fort Jackson.mxd
80°49'55"W
80°39'55"W
34°0'5"N
Range 62
Fort Jackson
Columbia
Arcadia Lakes
KERSHAW CO
RICHLAND CO
N BOUNDARY RD
PERCIVAL RD
Colonels Creek
Gills Creek
Buffalo Creek
Raglins Creek
Sandy Branch
Crane Creek
Spears Creek
Pennile Branch
Sloan Branch
McCaskill Creek
Haig Creek
Kelly Creek
Wildcat Creek
Eightmile Branch
Cabin Branch
CC3
CC-3
Colonels Creek
CC3
CC-3
0 200 400
Feet
CC-3 Sampling Location
Extent Within Map
Fort Jackson
Legend
Actual 1Q Sample Location
Actual 2Q/3Q Sample Location
ORAP Sampling Location Recommended for ERM
McCrady Training Center
Fort Jackson Installation Boundary
Radiation Control Area
0 1 2
Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Fort Jackson, South Carolina
DATE
3/5/2018
FIGURE
10-1

Table 10-1. Uranium in Surface Water, Fort Jackson, South Carolina

Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)
CC-3		5/25/2017	0.047	+/-	0.044	J	0.0085	+/-	0.02	U	0.0039	+/-	0.02	U	0.059	+/-	0.052	ND
CC-3		8/31/2017	0.17	+/-	0.09	J	0.0072	+/-	0.0267	U	0.031	+/-	0.041	U	0.21	+/-	0.1	ND
CC-3		11/27/2017	0.18	+/-	0.1	J	0.045	+/-	0.056	U	0.011	+/-	0.03	U	0.24	+/-	0.12	ND

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 10-2. Uranium in Sediment, Fort Jackson, South Carolina

Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
CC-3		5/25/2017	0.27	+/-	0.08	J	0.012	+/-	0.015	U	0.31	+/-	0.09	J	0.59	+/-	0.12	1.1	+/-	0.5
CC-3		8/31/2017	0.57	+/-	0.11		0.011	+/-	0.016	U	0.50	+/-	0.1	J	1.1	+/-	0.2	0.88	+/-	0.25
CC-3		11/27/2017	0.66	+/-	0.12		0.018	+/-	0.023	U	0.69	+/-	0.13		1.4	+/-	0.2	1.0	+/-	0.3

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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11. ERM RESULTS FOR FORT KNOX, KENTUCKY

A field sampler under contract with USACE prepared for and conducted sampling at Fort Knox, Kentucky on 24 May, 29 August, and 29 November 2017 in accordance with the site-specific ERMP (Annex 10). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix K contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from one point downstream from the RCAs (Figure 11-1). The planned sampling point, SWS-03, is located on the Salt River at the installation's northern boundary, upstream from mixing with inflow from the Ohio River. When the sampler traveled to the location included in the site-specific ERMP, the point was situated in the woods instead of within the Salt River. As a result, the sampler actually collected samples from an alternate location on the shore and closer to the access road close to the originally planned location. As shown in Figure 11-1, surface water and sediment samples were collected approximately 2,300 feet from the planned location for SWS-03. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 11-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 11-1 and 11-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 11-1 Sampling Locations Fort Knox.mxd

85°59'55"W 85°49'55"W

38°0'5"N

37°50'5"N

Ohio River
West Point
SWS-03
SWS-03
Lawley Range
O'Brien Range
Garvin Range
Muldraugh
Godman Army Airfield
Fort Knox
Arms Knob Range NE
Arms Knob Range SW
HARDIN CO
BULLITT CO
MEADE CO
HARDIN CO
KNOB CREEK RD
OLD MILL RD
RIVER RD
Salt River
Rolling Fork
Pond Creek
Curry Branch
Dry Branch
Flat Lick
Otter Creek
Mosquito Creek

Legend

- Actual Sample Location
- ORAP Sampling Location Recommended for ERM
- Radiation Control Area
- Stream
- Fort Knox Installation Boundary

0 1 2
Miles

NATIONWIDE DU PROGRAM (DAVY CROCKETT) U.S.A

Sampling Locations Fort Knox, Kentucky

DATE	FIGURE
3/5/2018	11-1

Table 11-1. Uranium in Surface Water, Fort Knox, Kentucky

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
SWS-03	5/24/2017	0.18	+/-	0.05	J	0.011	+/-	0.011	U	0.14	+/-	0.04	J	0.33	+/-	0.07	0.78	+/-	0.33
SWS-03	8/29/2017	2.4	+/-	0.3		0.073	+/-	0.046	J	0.30	+/-	0.08	J	2.8	+/-	0.3	0.13	+/-	0.04
SWS-03	11/29/2017	0.25	+/-	0.11	J	0.015	+/-	0.04	U	0.16	+/-	0.08	J	0.43	+/-	0.14	0.64	+/-	0.42

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

Table 11-2. Uranium in Sediment, Fort Knox, Kentucky

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-03	5/24/2017	0.25	+/-	0.06	J	0.0097	+/-	0.01	U	0.13	+/-	0.04	J	0.39	+/-	0.08	0.52	+/-	0.21
SWS-03	8/29/2017	0.83	+/-	0.14		0.038	+/-	0.031	J	0.93	+/-	0.15		1.8	+/-	0.2	1.1	+/-	0.3
SWS-03	11/29/2017	0.73	+/-	0.14		0.047	+/-	0.038	J	0.79	+/-	0.14	J	1.6	+/-	0.2	1.1	+/-	0.3

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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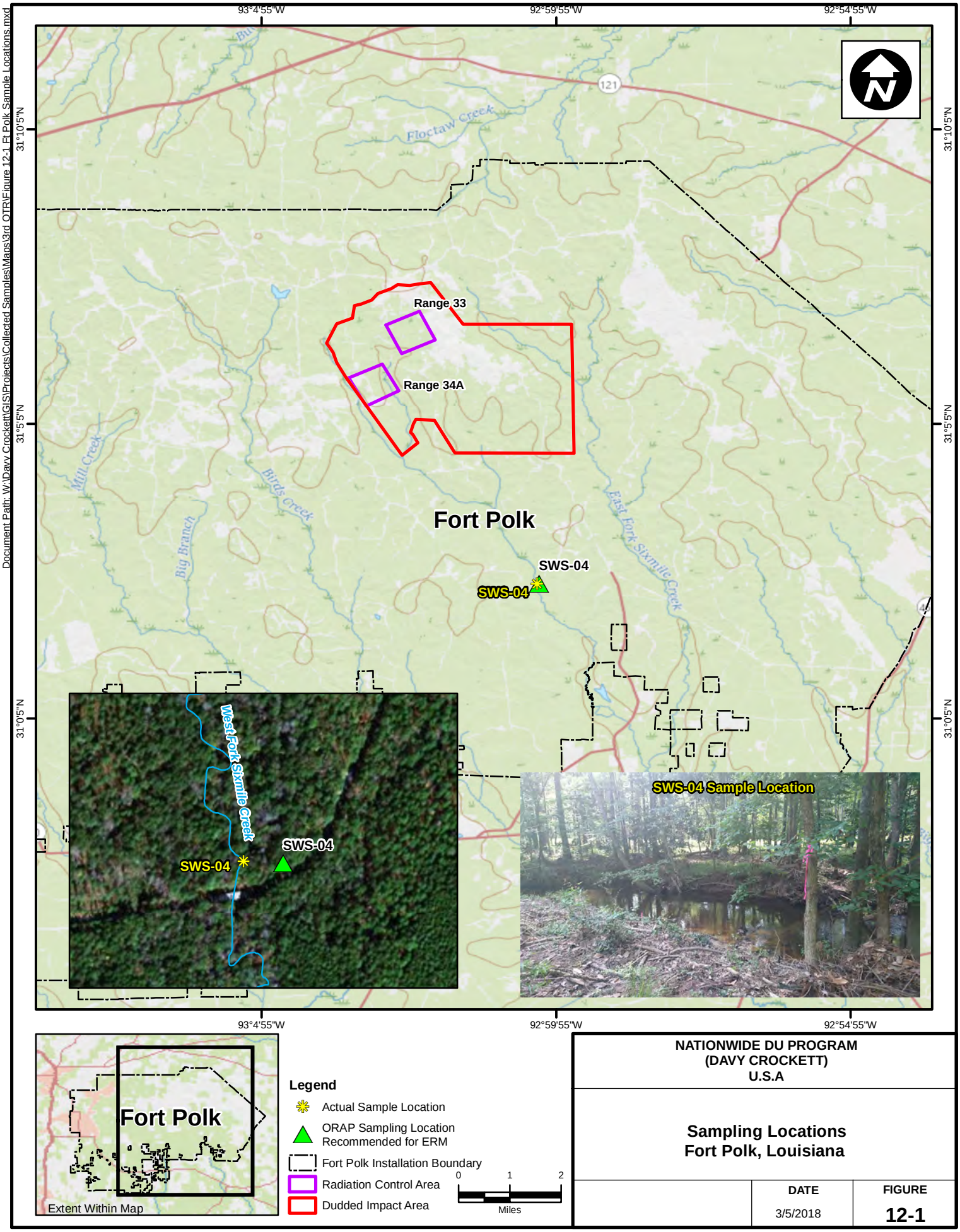
12. ERM RESULTS FOR FORT POLK, LOUISIANA

A field sampler under contract with USACE prepared for and conducted sampling at Fort Polk, Louisiana on 9 June, 14 August, and 7 December 2017 in accordance with the site-specific ERMP (Annex 11). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix L contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from one point downstream from the RCAs (Figure 12-1). Surface water was present for the August and December sampling events, but no surface water was present during the June sampling event. The planned sampling point, SWS-04, is located on West Fork Sixmile Creek at the installation's southern boundary. When the sampler traveled to the location included in the site-specific ERMP, the point was situated in the woods instead of within West Fork Sixmile Creek. As a result, the sampler actually collected samples from an alternate location on the shore as close as possible to the originally planned location. As shown in Figure 12-1, surface water and sediment samples were collected approximately 300 feet from the planned location for SWS-04. Surface water was present during the August and December sampling events, but no surface water was present during the June sampling event. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 12-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 12-1 and 12-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.



NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A

Sampling Locations
Fort Polk, Louisiana

DATE	FIGURE
3/5/2018	12-1

Table 12-1. Uranium in Surface Water, Fort Polk, Louisiana

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
SWS-04	6/9/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-04	8/14/2017	0.13	+/-	0.08	J	0.00	+/-	0	U	0.065	+/-	0.054	J	0.20	+/-	0.09	0.50	+/-	0.51
SWS-04	12/7/2017	0.096	+/-	0.064	J	0.012	+/-	0.025	U	0.018	+/-	0.038	U	0.13	+/-	0.08	ND		

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 12-2. Uranium in Sediment, Fort Polk, Louisiana

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-04	6/9/2017	0.048	+/-	0.029	J	-0.00049	+/-	0.0082	U	0.039	+/-	0.027	J	0.087	+/-	0.04	0.81	+/-	0.75
SWS-04	8/14/2017	0.11	+/-	0.05	J	0.019	+/-	0.022	U	0.12	+/-	0.05	J	0.25	+/-	0.07	1.1	+/-	0.6
SWS-04	12/7/2017	0.17	+/-	0.06	J	0.017	+/-	0.02	J	0.13	+/-	0.05	J	0.32	+/-	0.08	0.76	+/-	0.4

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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13. ERM RESULTS FOR FORT RILEY, KANSAS

A field sampler under contract with USACE prepared for and conducted sampling at Fort Riley, Kansas on 22 May, 12 September, and 21 November 2017 in accordance with the site-specific ERMP (Annex 12). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix M contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from two points downstream from the RCAs (Figure 13-1). The planned first sampling point, SC-1, is located on Sevenmile Creek, downstream from the Ranges 27A and 27B RCA and the southern portion of the Range 29 RCA. The sampling location SC-1 is located upstream of the Kansas River and at the installation boundary. The second planned sampling point, HC-1, is located on Honey Creek, downstream from the northern portion of the Range 29 RCA. The sampling location HC-1 was located immediately upstream of the confluence with Wildcat Creek and within the installation boundary. When the sampler traveled to the locations included in the site-specific ERMP, the points were situated in the woods away from Sevenmile Creek (SC-1) and Honey Creek (HC-1). As a result, the sampler actually collected samples from an alternate location on the shore as close as possible to the originally planned location. As shown in Figure 13-1, surface water and sediment samples were collected approximately 100 feet from the planned location for SC-1 and by approximately 200 feet for HC-1. All future sampling will be conducted at the same locations that were sampled during the first three quarters shown in Figure 13-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 13-1 and 13-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 13-1 Ft Riley Sample Locations.mxd

96°49'55"W 96°39'55"W

39°10'5"N 39°0'5"N

HC-1

Range 29

Fort Riley

Ranges 27A & 27B

Milford

Farm Creek

Sevenmile Creek

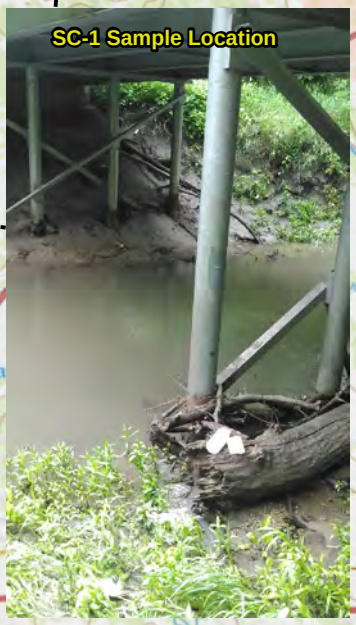
SC-1

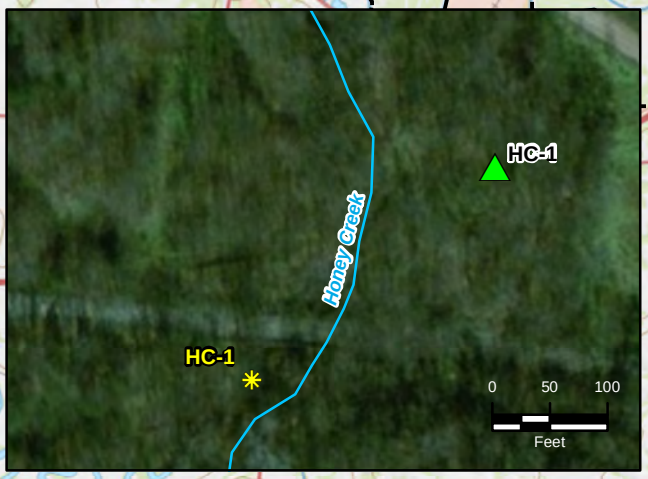
Ogden

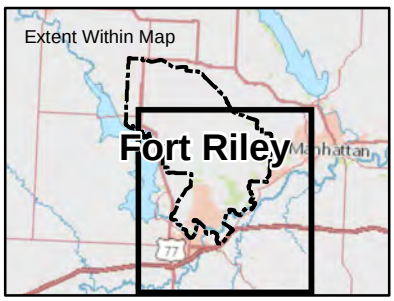
Marshall Army Airfield

HC-1 Sample Location

SC-1 Sample Location







Legend

- Actual Sample Location
- ORAP Sampling Location Recommended for ERM
- Fort Riley Installation Boundary
- Dudded Impact Area
- Radiation Control Area

0 1 2
Miles

NATIONWIDE DU PROGRAM (DAVY CROCKETT) U.S.A

Sampling Locations Fort Riley, Kansas

DATE	FIGURE
3/5/2018	13-1

Table 13-1. Uranium in Surface Water, Fort Riley, Kansas

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)				U-238/U-234 Ratio (unitless)			
HC-1	5/22/2017	0.80	+/-	0.14		0.019	+/-	0.015	J	0.63	+/-	0.12		1.4	+/-	0.2		0.79	+/-	0.2	
SC-1	5/22/2017	0.85	+/-	0.15		0.022	+/-	0.017	J	0.77	+/-	0.14		1.6	+/-	0.2		0.91	+/-	0.23	
HC-1	9/12/2017	0.94	+/-	0.21		0.057	+/-	0.057	U	0.74	+/-	0.19		1.7	+/-	0.3		0.79	+/-	0.27	
SC-1	9/12/2017	0.99	+/-	0.22		0.084	+/-	0.069		0.69	+/-	0.18		1.8	+/-	0.3		0.70	+/-	0.24	
HC-1	11/21/2017	1.0	+/-	0.2	J	0.0020	+/-	0.0283	U	0.64	+/-	0.17	J	1.6	+/-	0.3		0.64	+/-	0.22	
SC-1*	11/21/2017	1.5	+/-	0.2		0.046	+/-	0.038	U	0.75	+/-	0.13	J	2.3	+/-	0.2		0.53	+/-	0.12	

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

Table 13-2. Uranium in Sediment, Fort Riley, Kansas

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)				U-238/U-234 Ratio (unitless)			
HC-1	5/22/2017	0.20	+/-	0.05	J	0.0017	+/-	0.0038	U	0.14	+/-	0.04	J	0.34	+/-	0.06		0.70	+/-	0.26	
SC-1	5/22/2017	0.20	+/-	0.05	J	0.0019	+/-	0.0042	U	0.16	+/-	0.04	J	0.36	+/-	0.07		0.80	+/-	0.3	
HC-1	9/12/2017	0.65	+/-	0.12		0.024	+/-	0.024		0.65	+/-	0.12		1.3	+/-	0.2		1.0	+/-	0.3	
SC-1	9/12/2017	0.45	+/-	0.1		0.012	+/-	0.017	U	0.45	+/-	0.1		0.91	+/-	0.14		1.0	+/-	0.3	
HC-1	11/21/2017	0.79	+/-	0.14		0.051	+/-	0.037	J	0.79	+/-	0.14		1.6	+/-	0.2		1.0	+/-	0.2	
SC-1*	11/21/2017	0.57	+/-	0.08	J	0.043	+/-	0.023	U	0.60	+/-	0.08		1.2	+/-	0.1		1.0	+/-	0.2	

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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14. ERM RESULTS FOR FORT SILL, OKLAHOMA

A field sampler under contract with USACE prepared for and conducted sampling at Fort Sill, Oklahoma on 7 June, 7 September, and 29 November 2017 in accordance with the site-specific ERMP (Annex 13). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix N contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from one point downstream from the RCA (Figure 14-1). The planned sampling point, SWS-06A, is located on the East Branch of Wolf Creek downgradient from the part of the West Range where the RCA is located. When the sampler traveled to the location included in the site-specific ERMP, the point was not situated on a water body. Consequently, the sampler actually collected the samples from an alternate location as close as possible to the originally planned location. As shown in Figure 14-1, surface water and sediment samples were collected approximately 150 feet from the planned location for SWS-06A. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 14-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 14-1 and 14-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 14-1 Fort Sill Sample Location.mxd

98°39'55"W

98°29'55"W

34°40'5"N

Fort Sill

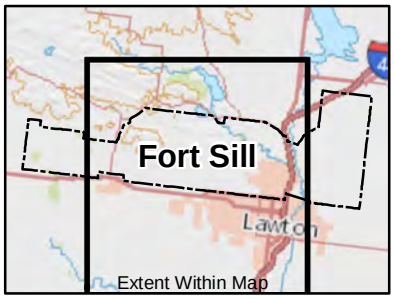
FP 182/West Range

SWS-06A

SWS-06A

Lawton

98°29'55"W



Legend

- Actual Sample Location
- ORAP Sampling Location Recommended for ERM
- Radiation Control Area
- Stream
- Fort Sill Installation Boundary

0 1 2
Miles

NATIONWIDE DU PROGRAM (DAVY CROCKETT) U.S.A

Sampling Locations Fort Sill, Oklahoma

DATE	FIGURE
3/5/2018	14-1

Table 14-1. Uranium in Surface Water, Fort Sill, Oklahoma

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
SWS-06A	6/7/2017	0.53	+/-	0.17	J	0.027	+/-	0.038	U	0.39	+/-	0.14	J	0.95	+/-	0.22	0.74	+/-	0.35
SWS-06A	9/7/2017	0.26	+/-	0.11	J	0.014	+/-	0.037	U	0.18	+/-	0.09	J	0.45	+/-	0.15	0.69	+/-	0.45
SWS-06A*	11/29/2017	0.78	+/-	0.12	J	0.019	+/-	0.027	U	0.24	+/-	0.07	J	1.0	+/-	0.1	0.4	+/-	0.1

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

Table 14-2. Uranium in Sediment, Fort Sill, Oklahoma

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-06A	6/7/2017	0.23	+/-	0.06	J	0.0058	+/-	0.0088	U	0.16	+/-	0.05	J	0.40	+/-	0.08	0.70	+/-	0.29
SWS-06A	9/7/2017	0.41	+/-	0.1	J	0.038	+/-	0.031	J	0.39	+/-	0.1	J	0.84	+/-	0.14	0.95	+/-	0.33
SWS-06A*	11/29/2017	0.47	+/-	0.07	J	0.011	+/-	0.017	U	0.43	+/-	0.07	J	0.9	+/-	0.1	0.9	+/-	0.2

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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15. ERM RESULTS FOR JOINT BASE LEWIS-McCHORD, WASHINGTON

A field sampler under contract with USACE prepared for and conducted sampling at JBLM, Washington on 22 May, 14 September, and 4 December 2017 in accordance with the site-specific ERMP (Annex 14). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix O contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from one point downstream from the RCAs (Figure 15-1). The planned sampling point, AIA-SP02, is located in a waterway from the RCAs to the Nisqually Clear Creek Fish Hatchery and to the Nisqually River. The point was inaccessible due to dense vegetation and a steep grade. After plotting the location following the sampling event, the U.S. Army escort and sampler identified an alternate location that was closer to the originally planned location and was safer to access. As shown in Figure 15-1, surface water and sediment samples were collected approximately 1,720 feet from the planned location for AIA-SP02 during the first quarterly sampling event and by approximately 319 feet from the planned location for AIA-SP02 during the second and third quarterly sampling events. All future sampling will be conducted at the same location that was sampled during the second and third quarters shown in Figure 15-1.

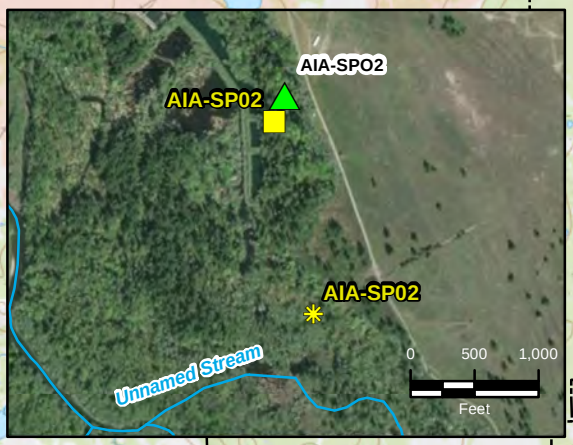
The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 15-1 and 15-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 15-1 JB Lewis-McChord Sample Location.mxd

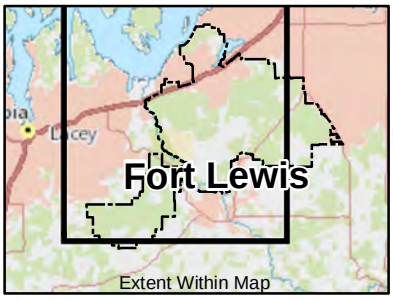
122°49'55"W 122°39'55"W 122°29'55"W

47°10'5"N

47°0'5"N



Steilacoom
Lakewood
Anderson Island
Ketron Island
McChord Field (Joint Base Lewis-McChord)
McChord AFB
North Fort Lewis
DuPont
Fort Lewis
Gray Army Airfield (Joint Base Lewis-McChord)
AIA-SPO2
AIA-SP02
Range 52
OP9
OP8
Fort Lewis
Roy
North Yelm
Yelm



Legend

- Actual 1Q Sample Location
- Actual 2Q/3Q Sample Location
- ORAP Sampling Location Recommended for ERM
- Joint Base Lewis-McChord Installation Boundary
- Dudded Impact Area
- Radiation Control Area

0 1 2 Miles

NATIONWIDE DU PROGRAM (DAVY CROCKETT) U.S.A

Sampling Locations Joint Base Lewis-McChord, Washington

DATE	FIGURE
3/5/2018	15-1

Table 15-1. Uranium in Surface Water, JBLM, Washington

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)
AIA-SP02	5/22/2017	0.028	+/-	0.017	J	0.0015	+/-	0.0053	U	0.0054	+/-	0.0089	U	0.035	+/-	0.02	ND
AIA-SP02	9/14/2017	0.27	+/-	0.11	J	-0.0053	+/-	0.0106	U	0.016	+/-	0.03	U	0.28	+/-	0.12	ND
AIA-SP02	12/4/2017	0.065	+/-	0.053	J	0.011	+/-	0.023	U	0.033	+/-	0.037	U	0.11	+/-	0.07	ND

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 15-2. Uranium in Sediment, JBLM, Washington

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
AIA-SP02	5/22/2017	0.13	+/-	0.04	J	0.0045	+/-	0.0064	U	0.13	+/-	0.04	J	0.26	+/-	0.06	1.0	+/-	0.4
AIA-SP02	9/14/2017	0.25	+/-	0.08	J	0.014	+/-	0.02	U	0.19	+/-	0.07	J	0.45	+/-	0.11	0.76	+/-	0.36
AIA-SP02	12/4/2017	0.31	+/-	0.08	J	0.013	+/-	0.019	U	0.28	+/-	0.08	J	0.60	+/-	0.12	0.90	+/-	0.36

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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16. ERM RESULTS FOR JOINT BASE McGUIRE-DIX-LAKEHURST, NEW JERSEY

A field sampler under contract with USACE prepared for and conducted sampling at JBMDL, New Jersey on 5 June, 22 August, and 21 November 2017 in accordance with the site-specific ERMP (Annex 16). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix P contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from two points downstream from the RCA (Figure 16-1). The first sampling point, SWS-13, is located just upstream of Brindle Lake on a stream that drains the southeastern portion of the RCA. The second sampling point, SWS-14, is located just outside the western boundary of the RCA on a stream that drains the west-central portion of the RCA. When the sampler traveled to the locations included in the site-specific ERMP, the points were situated in the woods instead of within the unnamed streams selected for sampling. As a result, the sampler actually collected samples from alternate locations on the shore as close as possible to the originally planned locations. As shown in Figure 16-1, surface water and sediment samples were collected approximately 500 feet from the planned location for SWS-13 and by approximately 1,000 feet from the planned location for SWS-14. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 16-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 16-1 and 16-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd OTR\Figure 16-1 JBMDL Sample Locations.mxd

74°39'55"W 74°29'55"W

40°0'5"N

39°50'5"N

SWS-13 SWS-13

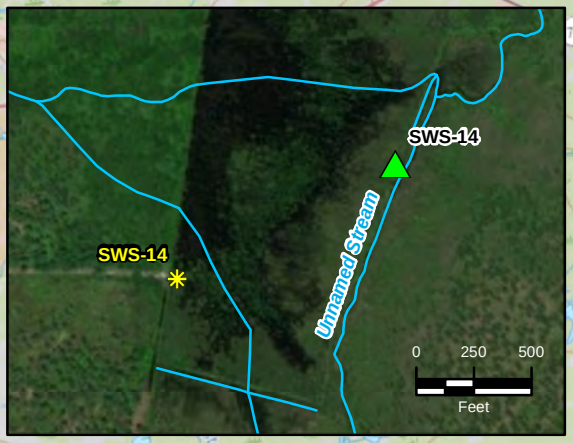
Frankford Arsenal Range

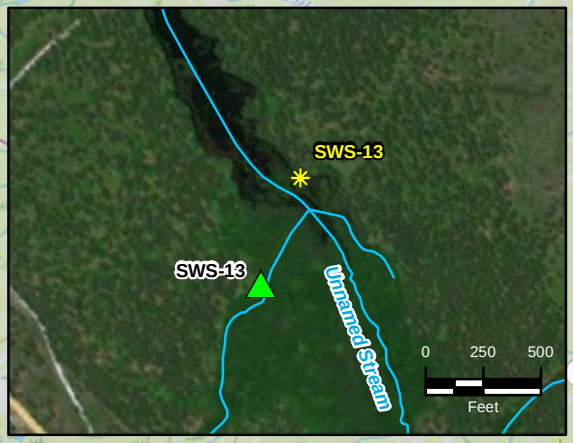
SWS-14 SWS-14

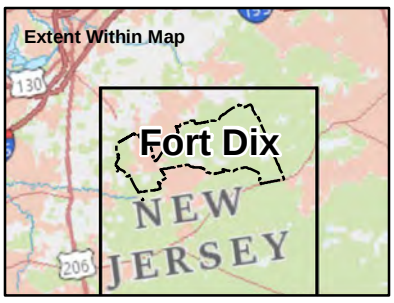
Fort Dix

SWS-14 Sample Location

SWS-13 Sample Location







Legend

- Actual Sample Location
- ORAP Sampling Location Recommended for ERM
- Fort Dix Installation Boundary
- Radiation Control Area

0 1 2
Miles

NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A

Sampling Locations
Joint Base
McGuire-Dix-Lakehurst, New Jersey

	DATE	FIGURE
	3/5/2018	16-1

Table 16-1. Uranium in Surface Water, JBMDL, New Jersey

Sample Location	Date	Uranium 234 (pCi/L)	Uranium 235 (pCi/L)	Uranium 238 (pCi/L)	Total U (pCi/L)	U-238/U-234 Ratio (unitless)
SWS-13	6/5/2017	0.081 +/- 0.045 J	0.011 +/- 0.016 U	0.077 +/- 0.044 J	0.17 +/- 0.06	0.95 +/- 0.76
SWS-14	6/5/2017	0.012 +/- 0.017 U	0.00 +/- 0 U	0.011 +/- 0.017 U	0.023 +/- 0.027	ND
SWS-13	8/22/2017	0.14 +/- 0.08 J	0.00 +/- 0 U	0.066 +/- 0.058 U	0.21 +/- 0.1	ND
SWS-14	8/22/2017	0.24 +/- 0.1 J	0.0019 +/- 0.0266 U	0.0092 +/- 0.0184 U	0.25 +/- 0.11	ND
SWS-13	11/21/2017	0.11 +/- 0.06 J	0.00 +/- 0 U	0.025 +/- 0.031 U	0.14 +/- 0.07	ND
SWS-14	11/21/2017	0.26 +/- 0.11 J	0.026 +/- 0.037 U	0.0079 +/- 0.0333 U	0.29 +/- 0.12	ND

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 16-2. Uranium in Sediment, JBMDL, New Jersey

Sample Location	Date	Uranium 234 (pCi/g)	Uranium 235 (pCi/g)	Uranium 238 (pCi/g)	Total U (pCi/g)	U-238/U-234 Ratio (unitless)
SWS-13	6/5/2017	0.33 +/- 0.09 J	0.028 +/- 0.024 J	0.64 +/- 0.15 J	1.0 +/- 0.2	1.9 +/- 0.7
SWS-14	6/5/2017	0.061 +/- 0.036 J	0.0042 +/- 0.0096 U	0.080 +/- 0.041 J	0.15 +/- 0.06	1.3 +/- 1
SWS-13	8/22/2017	0.26 +/- 0.08 J	0.0080 +/- 0.0232 U	0.28 +/- 0.08 J	0.55 +/- 0.11	1.1 +/- 0.4
SWS-14	8/22/2017	0.20 +/- 0.06 J	0.0052 +/- 0.0103 U	0.12 +/- 0.05 J	0.33 +/- 0.08	0.60 +/- 0.3
SWS-13	11/21/2017	0.28 +/- 0.08 J	0.020 +/- 0.026 U	0.41 +/- 0.1 J	0.71 +/- 0.13	1.5 +/- 0.5
SWS-14	11/21/2017	0.11 +/- 0.05 J	0.0074 +/- 0.0214 U	0.085 +/- 0.049 J	0.20 +/- 0.08	0.77 +/- 0.58

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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17. ERM RESULTS FOR POHAKULOA TRAINING AREA, HAWAII

A field sampler under contract with USACE prepared for and conducted sampling at PTA, Hawaii on 14 June, 6 September, and 28 November 2017 in accordance with the site-specific ERMP (Annex 17). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix Q contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated sediment samples were collected from one point downstream from the RCAs (Figure 17-1), but no surface water was present for sampling during any of the quarterly events. The sampling point, ERM-01, is located at an intermittent stream at the installation's northern boundary, downstream from the RCAs. When the sampler traveled to the location included in the site-specific ERMP, the point was outside of the installation boundary. As a result, the sampler actually collected the sediment samples from an alternate location as close as possible to the originally planned location. As shown in Figure 17-1, sediment samples were collected approximately 1,900 feet from the planned location for ERM-01. All future sampling will be conducted at the same location that was sampled during the first three quarters shown in Figure 17-1.

The concentrations of total and isotopic uranium in sediment are presented in Tables 17-1. Since all sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

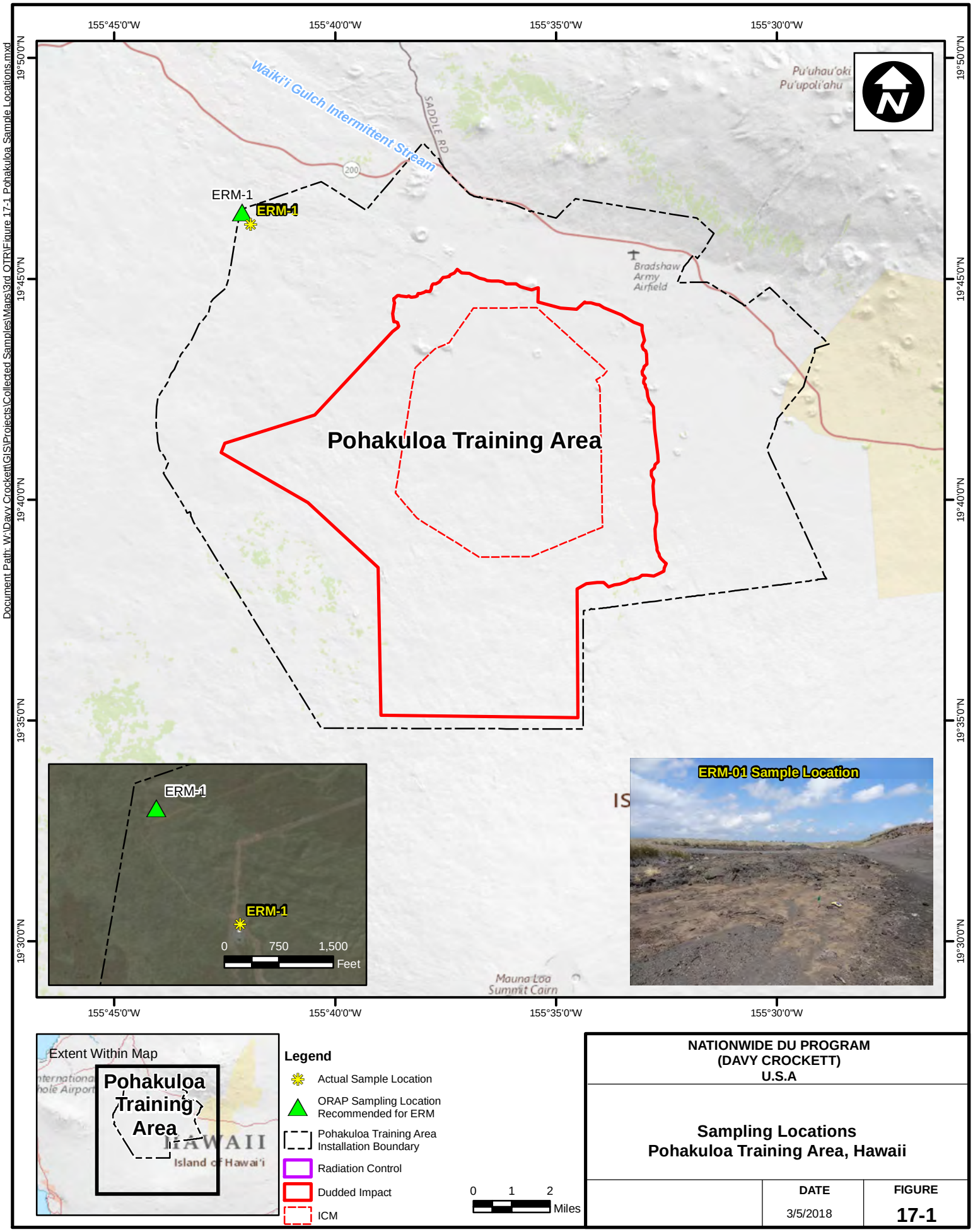
Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 17-1 Pohakuloa Sample Locations.mxd
155°45'0"W
155°40'0"W
155°35'0"W
155°30'0"W
19°50'0"N
19°45'0"N
19°40'0"N
19°35'0"N
19°30'0"N
Waiki'i Gulch Intermittent Stream
SADDLE RD
200
Pu'uhau'oki
Pu'upoli'ahu
Bradshaw Army Airfield
ERM-1
ERM-1
Pohakuloa Training Area
ERM-1
ERM-1
0
750
1,500
Feet
ERM-01 Sample Location
Mauna Loa Summit Cairn
Extent Within Map
Pohakuloa Training Area
HAWAII
Island of Hawai'i
Legend
Actual Sample Location
ORAP Sampling Location Recommended for ERM
Pohakuloa Training Area Installation Boundary
Radiation Control
Dudded Impact
ICM
0
1
2
Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Pohakuloa Training Area, Hawaii
DATE
3/5/2018
FIGURE
17-1

Table 17-1. Uranium in Sediment, PTA, Hawaii

Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
ERM-01		6/14/2017	0.19	+/-	0.07	J	0.0057	+/-	0.012	U	0.074	+/-	0.043	J	0.27	+/-	0.09	0.39	+/-	0.27
ERM-01		9/6/2017	0.23	+/-	0.07	J	0.013	+/-	0.018	U	0.16	+/-	0.06	J	0.40	+/-	0.1	0.70	+/-	0.34
ERM-01		11/28/2017	0.15	+/-	0.05	J	0.014	+/-	0.02	U	0.17	+/-	0.06	J	0.33	+/-	0.08	1.1	+/-	0.6

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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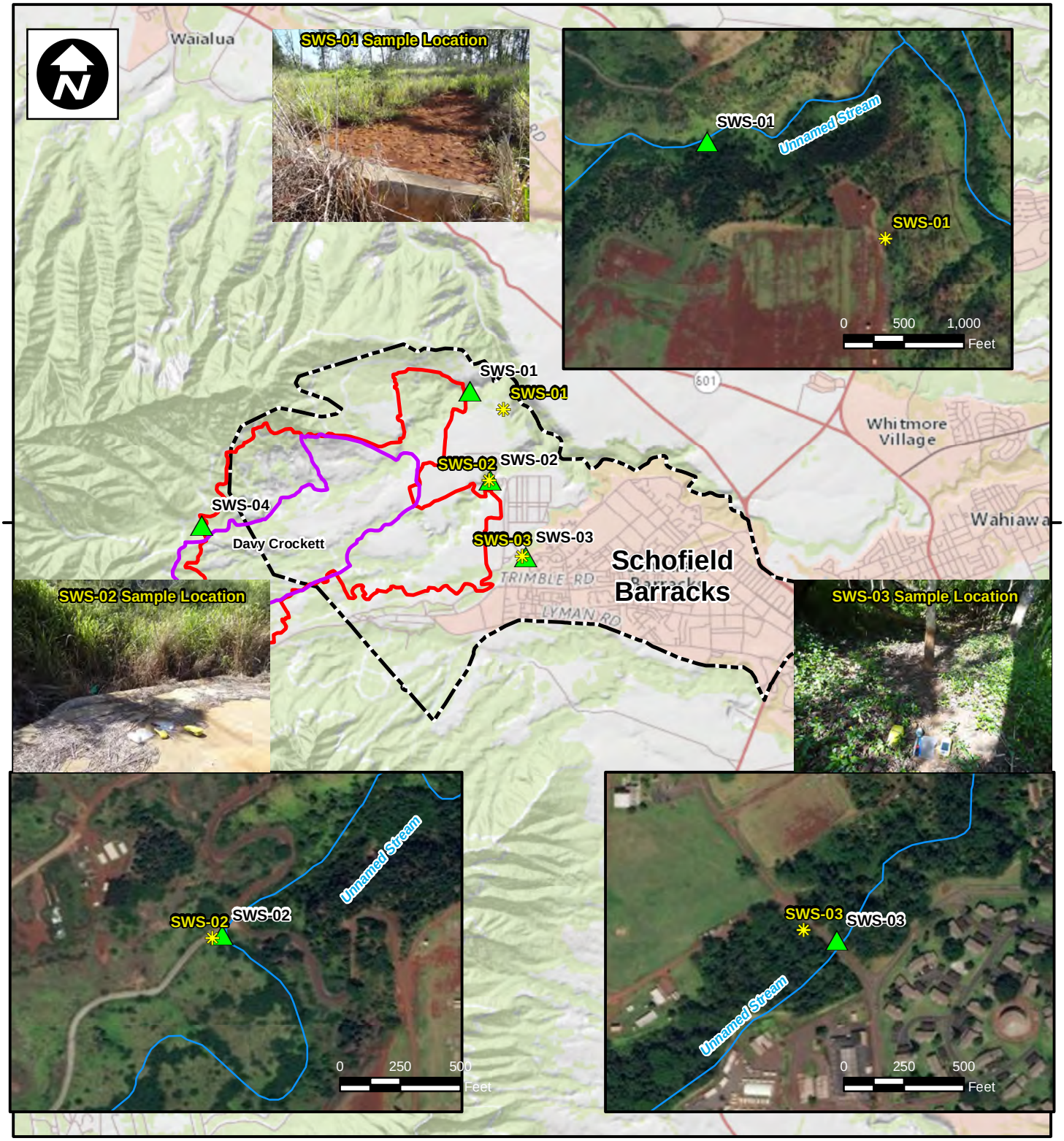
18. ERM RESULTS FOR SCHOFIELD BARRACKS, HAWAII

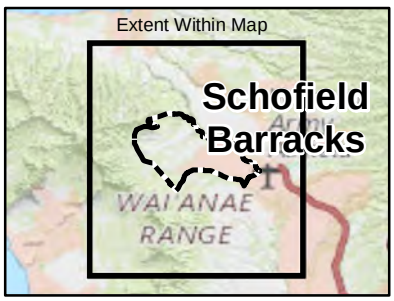
A field sampler under contract with USACE prepared for and conducted sampling at Schofield Barracks, Hawaii on 15 June, 7 September, and 29 November 2017 in accordance with the site-specific ERMP (Annex 18). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix R contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from three points downstream from the RCA (Figure 18-1). The first sampling point, SWS-01, is located on Haleauau Gulch near the installation boundary. The second sampling point, SWS-02, is located on Mohiakea Gulch near the installation boundary. The third sampling point, SWS-03, also is located on Waikoloa Gulch near the installation boundary. When the sampler traveled to the locations included in the site-specific ERMP, the points were situated in the fields away from water bodies. As a result, the sampler actually collected samples from alternate locations as close as possible to the originally planned locations. As shown in Figure 18-1, surface water and sediment samples were collected approximately 1,600 feet from the planned location for SWS-01, approximately 35 feet from the planned location for SWS-02 and approximately 140 feet from the planned location for SWS-03. Surface water was present at two of three locations, SWS-01 and SWS-03, for the June sampling event. No surface water was present at any locations during the September and November sampling events. All future sampling will be conducted at the same locations that were sampled during the first three quarters shown in Figure 18-1.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 18-1 and 18-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd OTR\Figure 18-1 Schofield Barracks - Sample Locations.mxd





Legend

- Actual Sample Location
- ORAP Sampling Location Recommended for ERM
- Schofield Barracks Military Reservation Installation Boundary
- Radiation Control Area
- Dudded Impact Area
- Stream

0 2,500 5,000 Feet

NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A

Sampling Locations
Schofield Barracks, Hawaii

	DATE	FIGURE
	3/5/2018	**18-1**

Table 18-1. Uranium in Surface Water, Schofield Barracks, Hawaii

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
SWS-01	6/15/2017	0.18	+/-	0.12	J	0.050	+/-	0.061	U	0.080	+/-	0.079	U	0.31	+/-	0.16	ND		
SWS-02	6/15/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-03	6/15/2017	0.024	+/-	0.039	U	-0.0016	+/-	0.027	U	-0.0016	+/-	0.027	U	0.021	+/-	0.055	ND		
SWS-01	9/7/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-02	9/7/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-03	9/7/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-01	11/29/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-02	11/29/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-03	11/29/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 18-2. Uranium in Sediment, Schofield Barracks, Hawaii

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-01	6/15/2017	0.38	+/-	0.1	J	0.0048	+/-	0.0097	U	0.33	+/-	0.09	J	0.71	+/-	0.14	0.87	+/-	0.34
SWS-02	6/15/2017	0.20	+/-	0.06	J	-0.00052	+/-	0.0086	U	0.20	+/-	0.06	J	0.40	+/-	0.09	1.0	+/-	0.5
SWS-03	6/15/2017	0.34	+/-	0.09	J	0.0032	+/-	0.0073	U	0.30	+/-	0.08	J	0.64	+/-	0.12	0.88	+/-	0.33
SWS-01	9/7/2017	0.78	+/-	0.14		0.011	+/-	0.024	U	0.65	+/-	0.13		1.4	+/-	0.2	0.83	+/-	0.23
SWS-02	9/7/2017	0.59	+/-	0.12	J	0.031	+/-	0.028	J	0.59	+/-	0.12		1.2	+/-	0.2	1.0	+/-	0.3
SWS-03	9/7/2017	0.30	+/-	0.08	J	0.033	+/-	0.03	J	0.24	+/-	0.07	J	0.57	+/-	0.11	0.80	+/-	0.32
SWS-01	11/29/2017	0.71	+/-	0.13		0.036	+/-	0.029	J	0.81	+/-	0.14		1.6	+/-	0.2	1.1	+/-	0.3
SWS-02	11/29/2017	0.31	+/-	0.08	J	0.023	+/-	0.023	J	0.27	+/-	0.08	J	0.60	+/-	0.11	0.87	+/-	0.33
SWS-03	11/29/2017	0.61	+/-	0.12	J	0.043	+/-	0.035		0.48	+/-	0.11	J	1.1	+/-	0.2	0.79	+/-	0.24

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

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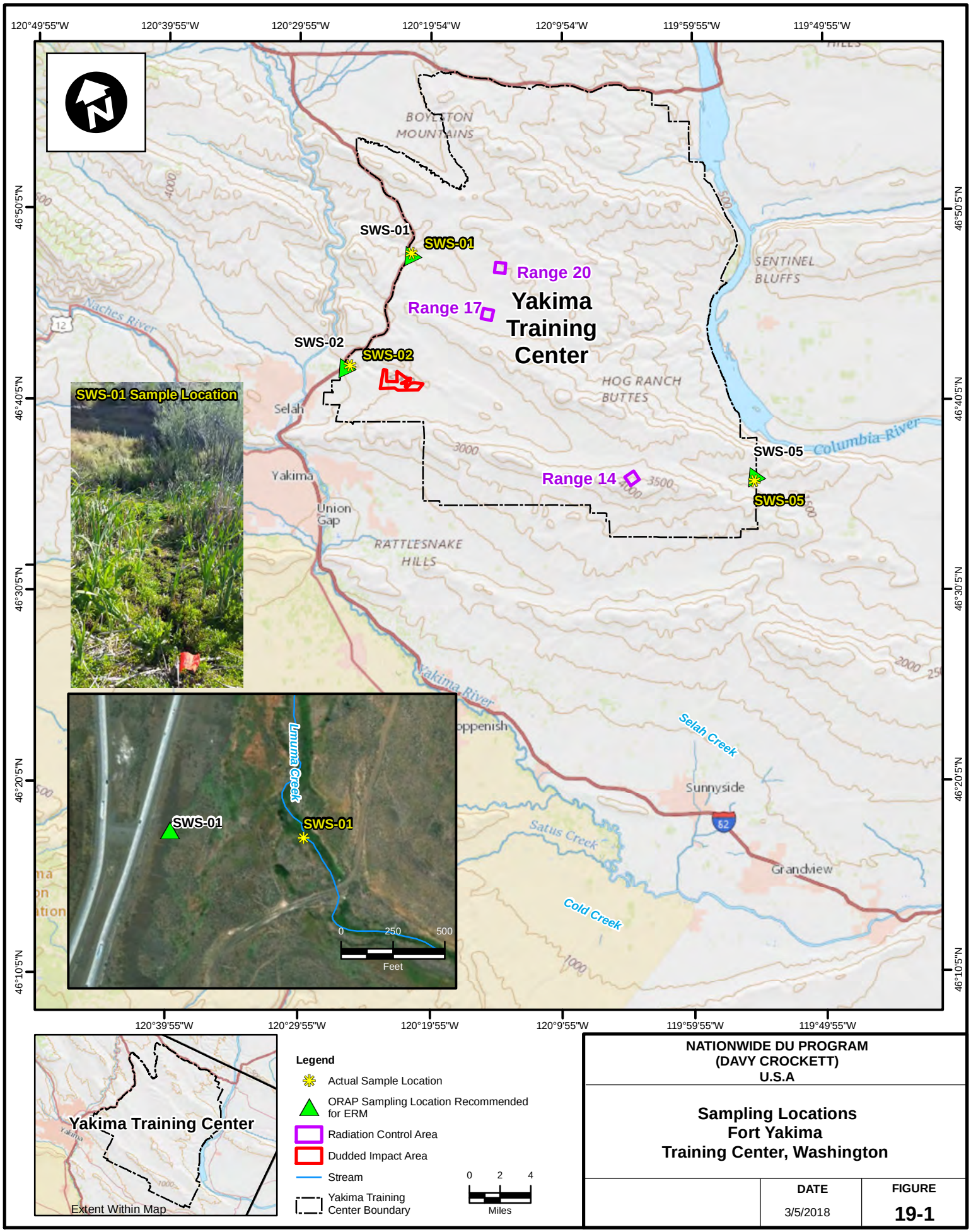
19. ERM RESULTS FOR YAKIMA TRAINING CENTER, WASHINGTON

A field sampler under contract with USACE prepared for and conducted sampling at YTC, Washington on 24 May, 23 August, and 29 November 2017 in accordance with the site-specific ERMP (Annex 15). No unusual or abnormal conditions (e.g., soil or water discoloration, odd odors, elevated radiation levels) were observed during the sampling events. Appendix S contains a copy of the field logbook pages, which document ERM field activities during the sampling efforts.

During the quarterly sampling events, collocated surface water and sediment samples were collected from three points downstream from the RCAs (Figures 19-1 and 19-2). Surface water was not present at one of three locations for the August sampling event, but surface water was present at all three locations during the May and November sampling events. The first sampling point, SWS-01, is located on Lmuma Creek in the Upper Yakima River watershed downstream from Ranges 17 and 20 RCAs where Lmuma Creek exits the installation. The second sampling point, SWS-02, is located on Selah Creek in the Upper Yakima watershed downstream from Ranges 14, 17, and 20 RCAs where Selah Creek exits the installation. The third sampling point, SWS-05, is located on Selah Creek downstream from RCA Range 14 where Selah Creek exits the installation to the Columbia River. In all the cases, samples were collected, as intended, downstream from RCAs on the same waterway as planned and within the boundary of YTC. However, when the sampler traveled to the locations included in the site-specific ERMP, the points were not located on the intended waterway. The sampler actually collected samples from alternate locations on the shore as close as possible to the originally planned locations. As shown in Figures 19-1 and 19-2, surface water and sediment samples were collected approximately 600 feet from the planned location for SWS-01 and approximately 2,000 feet from the planned location for SWS-02 and SWS-05. Surface water was not present at one of three locations, SWS-02, for the August sampling event, but surface water was present at all three locations during the May and November sampling events. All future sampling will be conducted at the same locations that were sampled during the first three quarters shown in Figures 19-1 and 19-2.

The concentrations of total and isotopic uranium in surface water and sediment samples collected during the first three quarters are presented in Tables 19-1 and 19-2, respectively. Since all surface water and sediment samples exhibited U-238/U-234 activity ratios of less than the investigation level of 3.0, confirmatory analysis by ICP-MS was not needed.


Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 19-1 Yakima Sample Location.mxd
120°49'55"W
120°39'55"W
120°29'55"W
120°19'54"W
120°9'54"W
119°59'55"W
119°49'55"W
46°50'5"N
46°40'5"N
46°30'5"N
46°20'5"N
46°10'5"N
BOYLSTON MOUNTAINS
SENTINEL BLUFFS
HOG RANCH BUTTES
RATTLESNAKE HILLS
Naches River
Columbia River
Yakima River
Selah Creek
Satus Creek
Cold Creek
Lmuma Creek
Selah
Yakima
Union Gap
Sunnyside
Grandview
SWS-01
SWS-02
SWS-05
Range 20
Range 17
Range 14
Yakima Training Center
SWS-01 Sample Location
0
250
500
Feet
Yakima Training Center
Extent Within Map
Legend
Actual Sample Location
ORAP Sampling Location Recommended for ERM
Radiation Control Area
Dudded Impact Area
Stream
Yakima Training Center Boundary
0
2
4
Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Fort Yakima
Training Center, Washington
DATE
3/5/2018
FIGURE
19-1

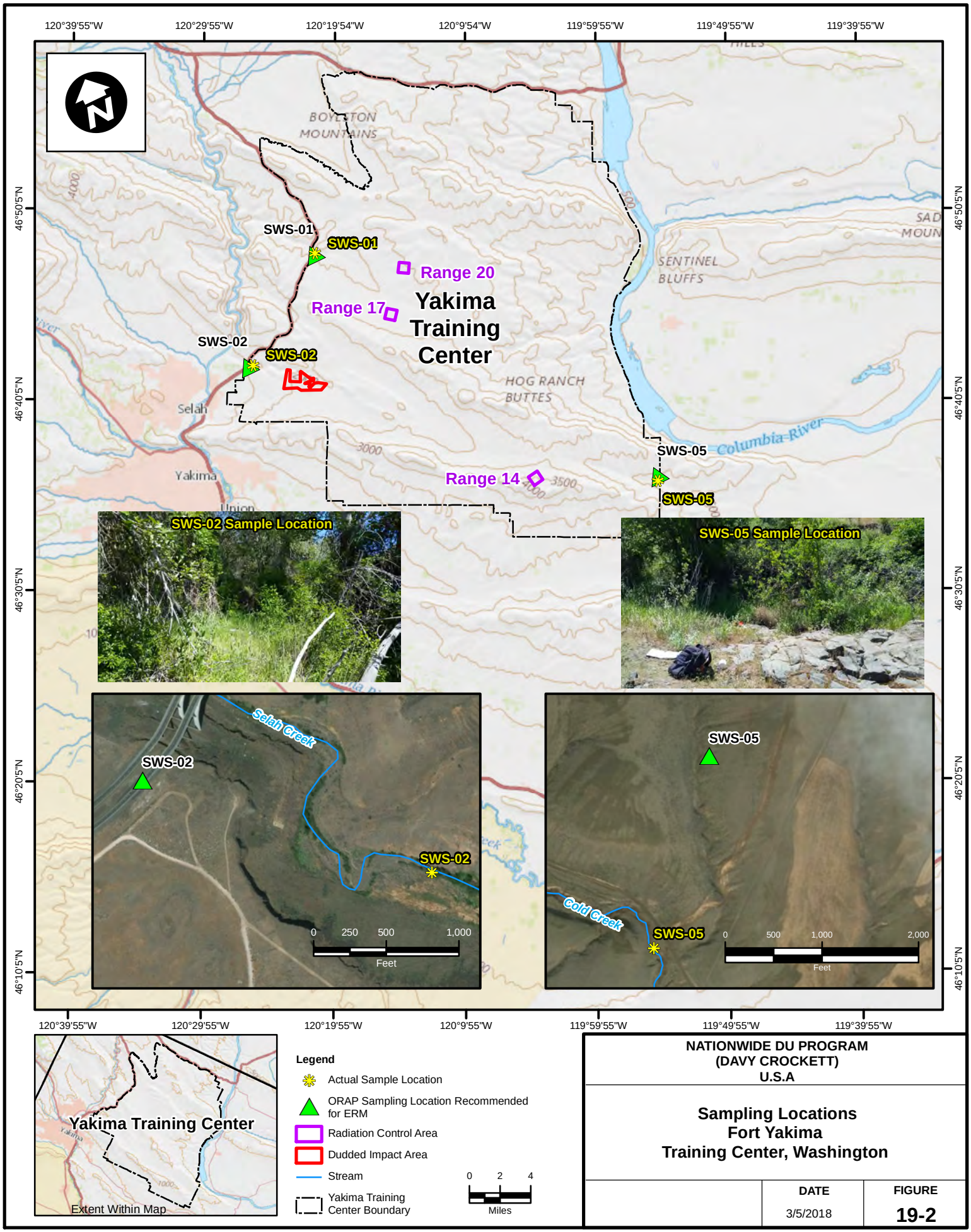

Document Path: W:\Davy Crockett\GIS\Projects\Collected Samples\Maps\3rd QTR\Figure 19-2 Yakima Sample Location.mxd
120°39'55"W
120°29'55"W
120°19'54"W
120°9'54"W
119°59'55"W
119°49'55"W
119°39'55"W
46°50'5"N
46°40'5"N
46°30'5"N
46°20'5"N
46°10'5"N
BOYLSTON MOUNTAINS
SENTINEL BLUFFS
HOG RANCH BUTTES
Columbia River
Selah
Yakima
Union
SWS-01
SWS-02
SWS-05
Range 20
Range 17
Range 14
Yakima Training Center
SWS-02 Sample Location
SWS-05 Sample Location
Selah Creek
Cold Creek
0 250 500 1,000
Feet
0 500 1,000 2,000
Feet
Yakima Training Center
Extent Within Map
Legend
Actual Sample Location
ORAP Sampling Location Recommended for ERM
Radiation Control Area
Dudded Impact Area
Stream
Yakima Training Center Boundary
0 2 4
Miles
NATIONWIDE DU PROGRAM
(DAVY CROCKETT)
U.S.A
Sampling Locations
Fort Yakima
Training Center, Washington
DATE
3/5/2018
FIGURE
19-2

Table 19-1. Uranium in Surface Water, YTC, Washington

Sample Location	Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
SWS-01	5/24/2017	0.56	+/-	0.11		0.020	+/-	0.014	J	0.16	+/-	0.05	J	0.74	+/-	0.12	0.29	+/-	0.1
SWS-02	5/24/2017	0.53	+/-	0.11	J	0.016	+/-	0.014	J	0.25	+/-	0.06	J	0.80	+/-	0.13	0.47	+/-	0.15
SWS-05	5/24/2017	0.20	+/-	0.05	J	0.0079	+/-	0.0095	U	0.13	+/-	0.04	J	0.34	+/-	0.07	0.65	+/-	0.27
SWS-01	8/23/2017	90	+/-	7.79		3.2	+/-	0.5		0.54	+/-	0.16	J	94	+/-	7.81	0.0060	+/-	0.0018
SWS-02	8/23/2017	---	+/-	---		---	+/-	---		---	+/-	---		---	+/-	---	---	+/-	---
SWS-05	8/23/2017	3.1	+/-	0.4		0.063	+/-	0.057	J	0.25	+/-	0.1	J	3.4	+/-	0.5	0.081	+/-	0.035
SWS-01	11/29/2017	0.75	+/-	0.18	J	0.024	+/-	0.034	U	0.31	+/-	0.12	J	1.1	+/-	0.2	0.41	+/-	0.18
SWS-02	11/29/2017	0.91	+/-	0.2	J	0.068	+/-	0.056	J	0.52	+/-	0.14	J	1.5	+/-	0.3	0.57	+/-	0.2
SWS-05	11/29/2017	0.40	+/-	0.13	J	0.023	+/-	0.032	U	0.29	+/-	0.11	J	0.71	+/-	0.17	0.73	+/-	0.35

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

Table 19-2. Uranium in Sediment, YTC, Washington

Sample Location	Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
SWS-01	5/24/2017	3.6	+/-	0.6		0.064	+/-	0.028	J	1.6	+/-	0.3		5.3	+/-	0.6	0.44	+/-	0.11
SWS-02	5/24/2017	1.3	+/-	0.2		0.037	+/-	0.02	J	0.68	+/-	0.13		2.0	+/-	0.3	0.52	+/-	0.13
SWS-05	5/24/2017	0.22	+/-	0.06	J	0.0065	+/-	0.0083	U	0.16	+/-	0.05	J	0.39	+/-	0.07	0.73	+/-	0.28
SWS-01	8/23/2017	1.1	+/-	0.2		0.042	+/-	0.037	U	0.62	+/-	0.12		1.8	+/-	0.2	0.56	+/-	0.14
SWS-02	8/23/2017	1.9	+/-	0.2		0.042	+/-	0.036	U	1.1	+/-	0.2		3.0	+/-	0.3	0.58	+/-	0.12
SWS-05	8/23/2017	0.62	+/-	0.12		0.021	+/-	0.032	U	0.52	+/-	0.11	J	1.2	+/-	0.2	0.84	+/-	0.24
SWS-01	11/29/2017	5.5	+/-	0.6		0.15	+/-	0.06	J	2.3	+/-	0.3		8.0	+/-	0.6	0.42	+/-	0.07
SWS-02	11/29/2017	0.62	+/-	0.12		0.037	+/-	0.03	J	0.42	+/-	0.1	J	1.1	+/-	0.2	0.68	+/-	0.21
SWS-05	11/29/2017	0.39	+/-	0.09	J	0.017	+/-	0.02	J	0.35	+/-	0.09	J	0.76	+/-	0.13	0.90	+/-	0.31

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.

20. CONCLUSIONS AND RECOMMENDATIONS

The May/June, August/September, and November/December 2017 sampling events were conducted in accordance with the approved site-specific ERMP and QAP (ML16265A221). DU was not detected in any environmental media sample based on interpretation of U-238 to U-234 activity ratios, as specified in the ERMP. Since none of the U-238/U-234 activity ratios in any samples exceeded 3.0, no further investigation was needed to validate whether a sample result was representative of DU or natural uranium.

As noted in Sections 2 through 19 and Tables 20-1 through 20-6, these results support the conclusion that total uranium concentrations are compliant with applicable criteria and DU is not leaving any RCAs.

In conclusion, no action levels defined in the U.S. Army's license were exceeded, and future environmental monitoring will continue to be completed in accordance with the approved ERMP.

Table 20-1. Summary of Sampling Results for Uranium in Surface Water (Spring 2017)

Installation	Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
Donnelly TA, AK	SWS-01	*	5/25/2017	0.48	±	0.17	J	0.045	±	0.053	U	0.28	±	0.12	J	0.80	±	0.21	0.59	±	0.31
Fort Benning, GA	OC2		5/25/2017	0.025	±	0.018	J	-0.00055	±	0.00670	U	0.017	±	0.015	U	0.041	±	0.024	ND		
	UC2	*	5/25/2017	0.023	±	0.013	U	0.0085	±	0.0078	U	0.013	±	0.009	U	0.044	±	0.018	ND		
Fort Bragg, NC	SWS-08		5/23/2017	0.020	±	0.016	J	0.0015	±	0.0054	U	0.017	±	0.016	U	0.039	±	0.023	ND		
Fort Campbell, KY	SWS-09	*	5/26/2017	0.43	±	0.14	J	0.015	±	0.026	U	0.32	±	0.12	J	0.77	±	0.19	0.74	±	0.37
Fort Carson, CO	SWS-02		5/24/2017	7.6	±	0.9		0.16	±	0.07	J	5.0	±	0.7		13	±	1	0.66	±	0.12
	SWS-03		5/24/2017	9.9	±	1.5		0.23	±	0.09	J	6.5	±	1.0		17	±	2	0.66	±	0.14
Fort Gordon, GA	Gut		5/23/2017	0.0068	±	0.0094	U	0.0016	±	0.0056	U	0.0068	±	0.0094	U	0.015	±	0.014	ND		
Fort Hood, TX	ERM-01		6/7/2017	0.092	±	0.061	J	0.017	±	0.027	U	0.057	±	0.047	J	0.17	±	0.08	0.62	±	0.66
	ERM-02		6/7/2017	0.22	±	0.11	J	0.012	±	0.028	U	0.23	±	0.12	J	0.46	±	0.17	1.0	±	0.8
Fort Hunter-Liggett, CA	SWS-06		5/25/2017	0.52	±	0.12	J	0.022	±	0.021	J	0.46	±	0.11	J	1.0	±	0.2	0.88	±	0.29
Fort Jackson, SC	CC-3		5/25/2017	0.047	±	0.044	J	0.0085	±	0.0200	U	0.0039	±	0.0200	U	0.059	±	0.052	ND		
Fort Knox, KY	SWS-03		5/24/2017	0.18	±	0.05	J	0.011	±	0.011	U	0.14	±	0.04	J	0.33	±	0.07	0.78	±	0.33
Fort Polk, LA	SWS-04		6/9/2017	---	±	---		---	±	---		---	±	---		---	±	---	---	±	---
Fort Riley, KS	HC-1		5/22/2017	0.80	±	0.14		0.019	±	0.015	J	0.63	±	0.12		1.4	±	0.2	0.79	±	0.20
	SC-1		5/22/2017	0.85	±	0.15		0.022	±	0.017	J	0.77	±	0.14		1.6	±	0.2	0.91	±	0.23
Fort Sill, OK	SWS-06A		6/7/2017	0.53	±	0.17	J	0.027	±	0.038	U	0.39	±	0.14	J	0.95	±	0.22	0.74	±	0.35
JBLM WA	AIA-SP02		5/22/2017	0.028	±	0.017	J	0.0015	±	0.0053	U	0.0054	±	0.0089	U	0.035	±	0.020	ND		
YTC, WA	SWS-01		5/24/2017	0.56	±	0.11		0.020	±	0.014	J	0.16	±	0.05	J	0.74	±	0.12	0.29	±	0.10
	SWS-02		5/24/2017	0.53	±	0.11	J	0.016	±	0.014	J	0.25	±	0.06	J	0.80	±	0.13	0.47	±	0.15
	SWS-05		5/24/2017	0.20	±	0.05	J	0.0079	±	0.0095	U	0.13	±	0.04	J	0.34	±	0.07	0.65	±	0.27
JBMDL, NJ	SWS-13		6/5/2017	0.081	±	0.045	J	0.011	±	0.016	U	0.077	±	0.044	J	0.17	±	0.06	0.95	±	0.76
	SWS-14		6/5/2017	0.012	±	0.017	U	0.0	±	0.0	U	0.011	±	0.017	U	0.023	±	0.027	ND		
PTA, HI	ERM-01		6/14/2017	---	±	---		---	±	---		---	±	---		---	±	---	---	±	---
Schofield Barracks, HI	SWS-01		6/15/2017	0.18	±	0.12	J	0.050	±	0.061	U	0.080	±	0.079	U	0.31	±	0.16	ND		
	SWS-02		6/15/2017	---	±	---		---	±	---		---	±	---		---	±	---	---	±	---
	SWS-03		6/15/2017	0.024	±	0.039	U	-0.0016	±	0.0270	U	-0.0016	±	0.0270	U	0.021	±	0.055	ND		

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 20-2. Summary of Sampling Results for Uranium in Sediment (Spring 2017)

Installation	Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless		
Donnelly TA, AK	SWS-01	*	5/25/2017	0.27	±	0.04	J	0.012	±	0.006	J	0.30	±	0.05		0.58	±	0.06	1.1	±	0.3
Fort Benning, GA	OC2		5/25/2017	0.14	±	0.04	J	0.0036	±	0.0054	U	0.14	±	0.04	J	0.28	±	0.05	1.0	±	0.4
	UC2	*	5/25/2017	0.20	±	0.04	J	0.0047	±	0.0051	U	0.21	±	0.04	J	0.41	±	0.05	1.1	±	0.3
Fort Bragg, NC	SWS-08		5/23/2017	0.42	±	0.10	J	0.015	±	0.014	J	0.49	±	0.11	J	0.93	±	0.15	1.2	±	0.4
Fort Campbell, KY	SWS-09	*	5/26/2017	0.83	±	0.19	J	0.0055	±	0.0130	U	0.78	±	0.18	J	1.6	±	0.3	0.94	±	0.31
Fort Carson, CO	SWS-02		5/24/2017	0.44	±	0.07	J	0.017	±	0.009	J	0.33	±	0.05	J	0.78	±	0.08	0.75	±	0.17
	SWS-03		5/24/2017	2.1	±	0.3		0.072	±	0.027	J	1.5	±	0.3		3.7	±	0.4	0.71	±	0.17
Fort Gordon, GA	Gut		5/23/2017	0.022	±	0.014	J	0.0022	±	0.0044	U	0.024	±	0.015	J	0.048	±	0.021	1.1	±	1
Fort Hood, TX	ERM-01		6/7/2017	0.25	±	0.07	J	0.012	±	0.013	U	0.22	±	0.06	J	0.48	±	0.09	0.88	±	0.34
	ERM-02		6/7/2017	0.27	±	0.08	J	0.015	±	0.016	U	0.27	±	0.08	J	0.56	±	0.11	1.0	±	0.4
Fort Hunter-Liggett, CA	SWS-06		5/25/2017	0.31	±	0.07	J	0.017	±	0.012	J	0.30	±	0.07	J	0.63	±	0.1	0.97	±	0.31
Fort Jackson, SC	CC-3		5/25/2017	0.27	±	0.08	J	0.012	±	0.015	U	0.31	±	0.09	J	0.59	±	0.12	1.1	±	0.5
Fort Knox, KY	SWS-03		5/24/2017	0.25	±	0.06	J	0.0097	±	0.0100	U	0.13	±	0.04	J	0.39	±	0.08	0.52	±	0.21
Fort Polk, LA	SWS-04		6/9/2017	0.048	±	0.029	J	-0.00049	±	0.00820	U	0.039	±	0.027	J	0.087	±	0.04	0.81	±	0.75
Fort Riley, KS	HC-1		5/22/2017	0.20	±	0.05	J	0.0017	±	0.0038	U	0.14	±	0.04	J	0.34	±	0.06	0.70	±	0.26
	SC-1		5/22/2017	0.20	±	0.05	J	0.0019	±	0.0042	U	0.16	±	0.04	J	0.36	±	0.07	0.80	±	0.3
Fort Sill, OK	SWS-06A		6/7/2017	0.23	±	0.06	J	0.0058	±	0.0088	U	0.16	±	0.05	J	0.40	±	0.08	0.70	±	0.29
JBLM WA	AIA-SP02		5/22/2017	0.13	±	0.04	J	0.0045	±	0.0064	U	0.13	±	0.04	J	0.26	±	0.06	1.0	±	0.4
YTC, WA	SWS-01		5/24/2017	3.6	±	0.6		0.064	±	0.028	J	1.6	±	0.3		5.3	±	0.6	0.44	±	0.11
	SWS-02		5/24/2017	1.3	±	0.2		0.037	±	0.020	J	0.68	±	0.13		2.0	±	0.3	0.52	±	0.13
	SWS-05		5/24/2017	0.22	±	0.06	J	0.0065	±	0.0083	U	0.16	±	0.05	J	0.39	±	0.07	0.73	±	0.28
JBMDL, NJ	SWS-13		6/5/2017	0.33	±	0.09	J	0.028	±	0.024	J	0.64	±	0.15	J	1.0	±	0.2	1.9	±	0.7
	SWS-14		6/5/2017	0.061	±	0.036	J	0.0042	±	0.0096	U	0.08	±	0.04	J	0.15	±	0.06	1.3	±	1
PTA, HI	ERM-01		6/14/2017	0.19	±	0.07	J	0.0057	±	0.0120	U	0.074	±	0.043	J	0.27	±	0.09	0.39	±	0.27
Schofield Barracks, HI	SWS-01		6/15/2017	0.38	±	0.10	J	0.0048	±	0.0097	U	0.33	±	0.09	J	0.71	±	0.14	0.87	±	0.34
	SWS-02		6/15/2017	0.20	±	0.06	J	-0.00052	±	0.00860	U	0.20	±	0.06	J	0.40	±	0.09	1.0	±	0.5
	SWS-03		6/15/2017	0.34	±	0.09	J	0.0032	±	0.0073	U	0.30	±	0.08	J	0.64	±	0.12	0.88	±	0.33

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 20-3. Summary of Sampling Results for Uranium in Surface Water (Summer 2017)

Installation	Sample Location		Date	Uranium 234 (pCi/L)			Uranium 235 (pCi/L)			Uranium 238 (pCi/L)			Total U (pCi/L)			U-238/U-234 Ratio (unitless)		
Donnelly TA, AK	SWS-01	*	8/30/2017	3.2	±	0.3	0.18	±	0.07 J	0.36	±	0.09 J	3.8	±	0.3	0.11	±	0.03
Fort Benning, GA	OC2		8/29/2017	2.3	±	0.4	0.12	±	0.08 J	0.017	±	0.052 U	2.4	±	0.4	ND		
	UC2	*	8/29/2017	3.5	±	0.4	0.16	±	0.07 U	0.060	±	0.046 U	3.7	±	0.4	ND		
Fort Bragg, NC	SWS-08		8/29/2017	0.31	±	0.12 J	0.024	±	0.034 U	0.030	±	0.040 U	0.36	±	0.13	ND		
Fort Campbell, KY	SWS-09		8/30/2017	2.0	±	0.3 J	0.12	±	0.08 J	0.064	±	0.060 U	2.2	±	0.3	ND		
Fort Carson, CO	SWS-02		9/14/2017	---	±	---	---	±	---	---	±	---	---	±	---	---	±	---
	SWS-03	*	9/14/2017	6.5	±	0.5	0.23	±	0.08 J	4.5	±	0.4	11	±	1	0.70	±	0.09
Fort Gordon, GA	Gut		8/30/2017	0.058	±	0.064 U	0.0022	±	0.0305 U	0.029	±	0.045 U	0.089	±	0.084	ND		
Fort Hood, TX	ERM-01		8/16/2017	0.24	±	0.11 J	0.037	±	0.043 J	0.13	±	0.08 J	0.41	±	0.14	0.54	±	0.39
	ERM-02		8/16/2017	0.28	±	0.11 J	0.0078	±	0.0289 U	0.21	±	0.10 J	0.50	±	0.15	0.75	±	0.46
Fort Hunter-Liggett, CA	ERM-01		9/21/2017	0.19	±	0.10 J	0.0025	±	0.0342 U	0.031	±	0.042 U	0.22	±	0.11	ND		
	ERM-02		9/21/2017	---	±	---	---	±	---	---	±	---	---	±	---	---	±	---
Fort Jackson, SC	CC-3		8/31/2017	0.17	±	0.09 J	0.0072	±	0.0267 U	0.031	±	0.041 U	0.21	±	0.10	ND		
Fort Knox, KY	SWS-03		8/29/2017	2.4	±	0.3	0.073	±	0.046 J	0.30	±	0.08 J	2.8	±	0.3	0.13	±	0.04
Fort Polk, LA	SWS-04		8/14/2017	0.13	±	0.08 J	0.0	±	0.0 U	0.065	±	0.054 J	0.20	±	0.09	0.50	±	0.51
Fort Riley, KS	HC-1		9/12/2017	0.94	±	0.21	0.057	±	0.057 U	0.74	±	0.19	1.7	±	0.3	0.79	±	0.27
	SC-1		9/12/2017	0.99	±	0.22	0.084	±	0.069	0.69	±	0.18	1.8	±	0.3	0.70	±	0.24
Fort Sill, OK	SWS-06A		9/7/2017	0.26	±	0.11 J	0.014	±	0.037 U	0.18	±	0.09 J	0.45	±	0.15	0.69	±	0.45
JBLM WA	AIA-SP02			0.27	±	0.11 J	-0.0053	±	0.0106 U	0.016	±	0.030 U	0.28	±	0.12	ND		
YTC, WA	SWS-01		8/23/2017	90	±	8	3.2	±	0.5	0.54	±	0.16 J	94	±	8	0.0060	±	0.0018
	SWS-02		8/23/2017	---	±	---	---	±	---	---	±	---	---	±	---	---	±	---
	SWS-05		8/23/2017	3.1	±	0.4	0.063	±	0.057 J	0.25	±	0.10 J	3.4	±	0.5	0.081	±	0.035
JBMDL, NJ	SWS-13		8/22/2017	0.14	±	0.08 J	0.0	±	0.0 U	0.066	±	0.058 U	0.21	±	0.10	ND		
	SWS-14		8/22/2017	0.24	±	0.10 J	0.0019	±	0.0266 U	0.0092	±	0.0184 U	0.25	±	0.11	ND		
PTA, HI	ERM-01		9/6/2017	---	±	---	---	±	---	---	±	---	---	±	---	---	±	---
Schofield Barracks, HI	SWS-01		9/7/2017	---	±	---	---	±	---	---	±	---	---	±	---	---	±	---
	SWS-02		9/7/2017	---	±	---	---	±	---	---	±	---	---	±	---	---	±	---
	SWS-03		9/7/2017	---	±	---	---	±	---	---	±	---	---	±	---	---	±	---

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
--- +/--- – Indicates surface water sample was not collected because water was not present during sampling.
* – Indicates a duplicate sample was collected to fulfill QA/QC requirements and was combined into a single reported result.
J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 20-4. Summary of Sampling Results for Uranium in Sediment (Summer 2017)

Installation	Sample Location		Date	Uranium 234 (pCi/g)				Uranium 235 (pCi/g)				Uranium 238 (pCi/g)				Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
Donnelly TA, AK	SWS-01	*	8/30/2017	0.50	±	0.08	J	0.022	±	0.017	U	0.49	±	0.07	J	1.0	±	0.1	0.97	±	0.24
Fort Benning, GA	OC2		8/29/2017	0.32	±	0.08	J	0.020	±	0.026	U	0.36	±	0.09	J	0.70	±	0.13	1.1	±	0.4
	UC2	*	8/29/2017	0.12	±	0.04	J	0.0060	±	0.0085	U	0.15	±	0.04	J	0.28	±	0.05	1.2	±	0.5
Fort Bragg, NC	SWS-08		8/29/2017	0.39	±	0.10	J	0.010	±	0.019	U	0.33	±	0.09	J	0.73	±	0.13	0.85	±	0.31
Fort Campbell, KY	SWS-09		8/30/2017	0.81	±	0.14		0.070	±	0.041	J	0.77	±	0.14		1.7	±	0.2	0.95	±	0.24
Fort Carson, CO	SWS-02		9/14/2017	0.83	±	0.14		0.039	±	0.030	J	0.77	±	0.13		1.6	±	0.2	0.93	±	0.22
	SWS-03	*	9/14/2017	2.3	±	0.2		0.084	±	0.032	J	2.0	±	0.2		4.4	±	0.3	0.91	±	0.12
Fort Gordon, GA	Gut		8/30/2017	0.63	±	0.12		0.033	±	0.030	J	0.68	±	0.13		1.3	±	0.2	1.1	±	0.3
Fort Hood, TX	ERM-01		8/16/2017	0.39	±	0.09	J	0.019	±	0.025	U	0.41	±	0.10	J	0.82	±	0.14	1.1	±	0.4
	ERM-02		8/16/2017	0.35	±	0.08	J	-0.0046	±	0.0065	U	0.40	±	0.09	J	0.75	±	0.12	1.1	±	0.4
Fort Hunter-Liggett, CA	ERM-01		9/21/2017	0.2	±	0.1	J	0.044	±	0.036	J	0.17	±	0.06	J	0.41	±	0.10	0.85	±	0.41
	ERM-02		9/21/2017	0.25	±	0.08	J	0.026	±	0.026	J	0.31	±	0.08	J	0.59	±	0.12	1.2	±	0.5
Fort Jackson, SC	CC-3		8/31/2017	0.57	±	0.11		0.011	±	0.016	U	0.50	±	0.10	J	1.1	±	0.2	0.88	±	0.25
Fort Knox, KY	SWS-03		8/29/2017	0.83	±	0.14		0.038	±	0.031	J	0.93	±	0.15		1.8	±	0.2	1.1	±	0.3
Fort Polk, LA	SWS-04		8/14/2017	0.11	±	0.05	J	0.019	±	0.022	U	0.12	±	0.05	J	0.25	±	0.07	1.1	±	0.6
Fort Riley, KS	HC-1		9/12/2017	0.65	±	0.12		0.024	±	0.024		0.65	±	0.12		1.3	±	0.2	1.0	±	0.3
	SC-1		9/12/2017	0.45	±	0.1		0.012	±	0.017	U	0.45	±	0.10		0.91	±	0.14	1.0	±	0.3
Fort Sill, OK	SWS-06A		9/7/2017	0.41	±	0.1	J	0.038	±	0.031	J	0.39	±	0.10	J	0.84	±	0.14	0.95	±	0.33
JBLM WA	AIA-SP02		9/11/2017	0.25	±	0.08	J	0.014	±	0.02	U	0.19	±	0.07	J	0.45	±	0.11	0.76	±	0.36
YTC, WA	SWS-01		8/23/2017	1.1	±	0.2		0.042	±	0.037	U	0.62	±	0.12		1.8	±	0.2	0.56	±	0.14
	SWS-02		8/23/2017	1.9	±	0.2		0.042	±	0.036	U	1.1	±	0.2		3.0	±	0.3	0.58	±	0.12
	SWS-05		8/23/2017	0.62	±	0.12		0.021	±	0.032	U	0.52	±	0.11	J	1.2	±	0.2	0.84	±	0.24
JBMDL, NJ	SWS-13		8/22/2017	0.26	±	0.08	J	0.0080	±	0.0232	U	0.28	±	0.08	J	0.55	±	0.11	1.1	±	0.4
	SWS-14		8/22/2017	0.20	±	0.06	J	0.0052	±	0.0103	U	0.12	±	0.05	J	0.33	±	0.08	0.60	±	0.30
PTA, HI	ERM-01		9/6/2017	0.23	±	0.07	J	0.013	±	0.018	U	0.16	±	0.06	J	0.40	±	0.10	0.70	±	0.34
Schofield Barracks, HI	SWS-01		9/7/2017	0.78	±	0.14		0.011	±	0.024	U	0.65	±	0.13		1.4	±	0.2	0.83	±	0.23
	SWS-02		9/7/2017	0.59	±	0.12	J	0.031	±	0.028	J	0.59	±	0.12		1.2	±	0.2	1.0	±	0.3
	SWS-03		9/7/2017	0.30	±	0.08	J	0.033	±	0.030	J	0.24	±	0.07	J	0.57	±	0.11	0.80	±	0.32

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
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J – Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 20-5. Summary of Sampling Results for Uranium in Surface Water (Fall 2017)

Installation	Sample Location		Date	Uranium 234 (pCi/L)				Uranium 235 (pCi/L)				Uranium 238 (pCi/L)				Total U (pCi/L)				U-238/U-234 Ratio (unitless)			
Fort Benning, GA	OC2		12/6/2017	0.097	±	0.065	J	0.0021	±	0.0293	U	0.012	±	0.031	U	0.012	±	0.080		ND			
	UC2	*	12/6/2017	0.16	±	0.06	J	0.012	±	0.016	U	0.013	±	0.026	U	0.013	±	0.067		ND			
Fort Bragg, NC	SWS-08		11/29/2017	0.35	±	0.12	J	-0.0047	±	0.0094	U	0.020	±	0.033	U	0.020	±	0.120		ND			
Fort Campbell, KY	SWS-09		11/30/2017	0.42	±	0.14	J	0.0076	±	0.0281	U	0.085	±	0.064	J	0.085	±	0.160		0.20	±	0.17	
Fort Carson, CO	SWS-02		12/7/2017	210	±	19		6.4	±	1.5	J	130	±	13		130	±	23		0.62	±	0.08	
	SWS-03		12/7/2017	10	±	1		0.31	±	0.13	J	6.3	±	0.7		6.3	±	1.3		0.63	±	0.1	
Fort Gordon, GA	Gut		12/5/2017	0.092	±	0.072	J	-0.0057	±	0.0114	U	0.0064	±	0.0237	U	0.0064	±	0.0770		ND			
Fort Hood, TX	ERM-01		12/5/2017	0.39	±	0.13	J	0.0072	±	0.0267	U	0.26	±	0.10	J	0.26	±	0.17		0.67	±	0.35	
	ERM-02		12/5/2017	0.37	±	0.13	J	0.0073	±	0.0269	U	0.24	±	0.10	J	0.24	±	0.17		0.65	±	0.36	
Fort Hunter-Liggett, CA	ERM-01		11/20/2017	---	±	---		---	±	---		---	±	---		---	±	---		---	±	---	
	ERM-02		11/20/2017	---	±	---		---	±	---		---	±	---		---	±	---		---	±	---	
Fort Jackson, SC	CC-3		11/27/2017	0.18	±	0.10	J	0.045	±	0.056	U	0.011	±	0.030	U	0.011	±	0.120		ND			
Fort Knox, KY	SWS-03		11/29/2017	0.25	±	0.11	J	0.015	±	0.040	U	0.16	±	0.08	J	0.16	±	0.14		0.64	±	0.42	
Fort Polk, LA	SWS-04		12/7/2017	0.096	±	0.064	J	0.012	±	0.025	U	0.018	±	0.038	U	0.018	±	0.080		ND			
Fort Riley, KS	HC-1		11/21/2017	1.0	±	0.2	J	0.0020	±	0.0283	U	0.64	±	0.17	J	0.64	±	0.30		0.64	±	0.22	
	SC-1	*	11/21/2017	1.5	±	0.2		0.046	±	0.038	U	0.75	±	0.13	J	0.75	±	0.21		0.53	±	0.12	
Fort Sill, OK	SWS-06A	*	11/29/2017	0.78	±	0.12	J	0.019	±	0.027	U	0.24	±	0.07	J	0.24	±	0.13		0.4	±	0.1	
JBLM WA	AIA-SP02		12/4/2017	0.065	±	0.053	J	0.011	±	0.023	U	0.033	±	0.037	U	0.033	±	0.070		ND			
YTC, WA	SWS-01		11/29/2017	0.75	±	0.18	J	0.024	±	0.034	U	0.31	±	0.12	J	0.31	±	0.20		0.41	±	0.18	
	SWS-02		11/29/2017	0.91	±	0.20	J	0.068	±	0.056	J	0.52	±	0.14	J	0.52	±	0.30		0.57	±	0.2	
	SWS-05		11/29/2017	0.40	±	0.13	J	0.023	±	0.032	U	0.29	±	0.11	J	0.29	±	0.17		0.73	±	0.35	
JBMDL, NJ	SWS-13		11/21/2017	0.11	±	0.06	J	0.0	±	0.0	U	0.025	±	0.031	U	0.025	±	0.070		ND			
	SWS-14		11/21/2017	0.26	±	0.11	J	0.026	±	0.037	U	0.0079	±	0.0333	U	0.0079	±	0.1200		ND			
PTA, HI	ERM-01		11/28/2017	---	±	---		---	±	---		---	±	---		---	±	---		---	±	---	
Schofield Barracks, HI	SWS-01		11/29/2017	---	±	---		---	±	---		---	±	---		---	±	---		---	±	---	
	SWS-02		11/29/2017	---	±	---		---	±	---		---	±	---		---	±	---		---	±	---	
	SWS-03		11/29/2017	---	±	---		---	±	---		---	±	---		---	±	---		---	±	---	

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
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ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

Table 20-6. Summary of Sampling Results for Uranium in Sediment (Fall 2017)

Installation	Sample Location		Date	Uranium 234 (pCi/g)			Uranium 235 (pCi/g)			Uranium 238 (pCi/g)			Total U (pCi/g)			U-238/U-234 Ratio (unitless)		
Fort Benning, GA	OC2		12/6/2017	0.32	± 0.09	J	0.022	± 0.025	U	0.28	± 0.08	J	0.62	± 0.12		0.88	± 0.34	
	UC2	*	12/6/2017	0.083	± 0.033	UJ	0.0094	± 0.0108	U	0.067	± 0.027	J	0.16	± 0.04		ND		
Fort Bragg, NC	SWS-08		11/29/2017	0.59	± 0.12		0.030	± 0.029	U	0.68	± 0.13		1.3	± 0.2		1.2	± 0.3	
Fort Campbell, KY	SWS-09		11/30/2017	1.1	± 0.2		0.061	± 0.037	J	0.82	± 0.14	J	2.0	± 0.2		0.75	± 0.17	
Fort Carson, CO	SWS-02		12/7/2017	0.97	± 0.16		0.018	± 0.021	J	0.88	± 0.15		1.9	± 0.2		0.91	± 0.21	
	SWS-03		12/7/2017	2.9	± 0.3		0.096	± 0.049	J	2.2	± 0.3		5.2	± 0.4		0.76	± 0.13	
Fort Gordon, GA	Gut		12/5/2017	0.44	± 0.10	J	0.019	± 0.022	J	0.42	± 0.10	J	0.88	± 0.14		0.95	± 0.31	
Fort Hood, TX	ERM-01		12/5/2017	0.38	± 0.09	J	0.0062	± 0.0124	U	0.33	± 0.09	J	0.72	± 0.13		0.87	± 0.31	
	ERM-02		12/5/2017	0.54	± 0.12	J	0.054	± 0.041		0.47	± 0.11	J	1.1	± 0.2		0.87	± 0.29	
Fort Hunter-Liggett, CA	ERM-01		11/20/2017	0.27	± 0.08	J	0.011	± 0.023	U	0.30	± 0.08	J	0.58	± 0.12		1.1	± 0.4	
	ERM-02		11/20/2017	0.49	± 0.11	J	0.041	± 0.031	J	0.44	± 0.10	J	0.97	± 0.15		0.90	± 0.29	
Fort Jackson, SC	CC-3		11/27/2017	0.66	± 0.12		0.018	± 0.023	U	0.69	± 0.13		1.4	± 0.2		1.0	± 0.3	
Fort Knox, KY	SWS-03		11/29/2017	0.73	± 0.14		0.047	± 0.038		0.79	± 0.14	J	1.6	± 0.2		1.1	± 0.3	
Fort Polk, LA	SWS-04		12/7/2017	0.17	± 0.06	J	0.017	± 0.020	J	0.13	± 0.05	J	0.32	± 0.08		0.76	± 0.40	
Fort Riley, KS	HC-1		11/21/2017	0.79	± 0.14		0.051	± 0.037	J	0.79	± 0.14		1.6	± 0.2		1.0	± 0.2	
	SC-1	*	11/21/2017	0.57	± 0.08	J	0.043	± 0.023	U	0.60	± 0.08		1.2	± 0.1		1.0	± 0.2	
Fort Sill, OK	SWS-06A	*	11/29/2017	0.47	± 0.07	J	0.011	± 0.017	U	0.43	± 0.07	J	0.92	± 0.10		0.92	± 0.21	
JBLM WA	AIA-SP02		12/4/2017	0.31	± 0.08	J	0.013	± 0.019	U	0.28	± 0.08	J	0.60	± 0.12		0.90	± 0.36	
YTC, WA	SWS-01		11/29/2017	5.5	± 0.6		0.15	± 0.06	J	2.3	± 0.3		8.0	± 0.6		0.42	± 0.07	
	SWS-02		11/29/2017	0.62	± 0.12		0.037	± 0.030	J	0.42	± 0.10	J	1.1	± 0.2		0.68	± 0.21	
	SWS-05		11/29/2017	0.39	± 0.09	J	0.017	± 0.020	J	0.35	± 0.09	J	0.76	± 0.13		0.90	± 0.31	
JBMDL, NJ	SWS-13		11/21/2017	0.28	± 0.08	J	0.020	± 0.026	U	0.41	± 0.10	J	0.71	± 0.13		1.5	± 0.5	
	SWS-14		11/21/2017	0.11	± 0.05	J	0.0074	± 0.0214	U	0.085	± 0.049	J	0.20	± 0.08		0.77	± 0.58	
PTA, HI	ERM-01		11/28/2017	0.15	± 0.05	J	0.014	± 0.020	U	0.17	± 0.06	J	0.33	± 0.08		1.1	± 0.6	
Schofield Barracks, HI	SWS-01		11/29/2017	0.71	± 0.13		0.036	± 0.029	J	0.81	± 0.14		1.6	± 0.2		1.1	± 0.3	
	SWS-02		11/29/2017	0.31	± 0.08	J	0.023	± 0.023	J	0.27	± 0.08	J	0.60	± 0.11		0.87	± 0.33	
	SWS-03		11/29/2017	0.61	± 0.12	J	0.043	± 0.035		0.48	± 0.11	J	1.1	± 0.2		0.79	± 0.24	

+/- – Laboratory uncertainties are specified with two standard deviations (95 percent confidence level).
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U – Indicates that the data met all QA/QC requirements and the radionuclide was analyzed for but was not detected above the reported sample quantification limit.
ND – Indicates that one or more isotopes were not detected; therefore, the calculation was not performed.

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21. REFERENCES

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APPENDIX A

RELATIVE URANIUM-238/URANIUM-234 ACTIVITY RATIOS FOR MIXTURES OF DEPLETED AND NATURAL URANIUM

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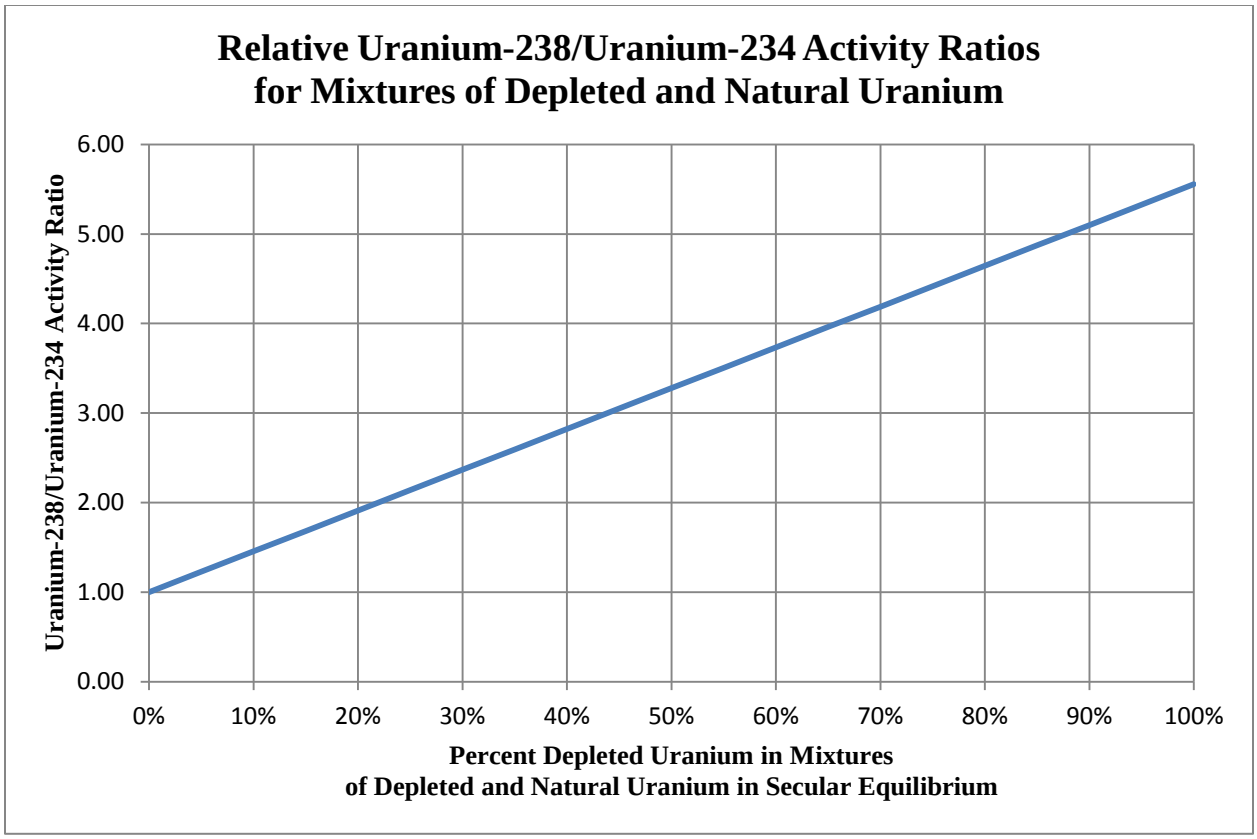
Relative Uranium-238/Uranium-234 Activity Ratios
for Mixtures of Depleted and Natural Uranium
Uranium-238/Uranium-234 Activity Ratio
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent Depleted Uranium in Mixtures
of Depleted and Natural Uranium in Secular Equilibrium

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APPENDICES B THROUGH S

FIELD LOGBOOK PAGES

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The Army maintains a larger version of this report that includes field notes collected during all sampling events. Please contact the Army's License Radiation Safety Officer, Dr. Robert N. Cherry, by telephone at (210) 466-0368 or by email at robert.n.cherry.civ@mail.mil for copies.

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APPENDIX T

DATA QUALITY ASSESSMENT

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APPENDIX T

DATA QUALITY ASSESMENT

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T. DATA QUALITY ASSESMENT

T.1 SUMMARY OF ENVIRONMENTAL RADIATION MONITORING DATA REVIEW AND VALIDATION

This report contains the technical review and validation of the 2017 data collected during the environmental radiation monitoring (ERM) activities conducted at 18 U.S. Army garrisons named in the U.S. Nuclear Regulatory Commission (NRC) source material license (SML) SUC-1593 (ML16343A164) for possession of M101 depleted uranium (DU) spotting rounds and fragments. The data quality assessment is designed to ensure that data collected are of sufficient quality to support the objectives of the approved Site-Specific Environmental Radiation Monitoring Plan (ERMP) and Associated Quality Assurance Plan (QAP) (ML16265A221).

The technical review and validation were conducted in accordance with the criteria set forth in the Quality Systems Manual (QSM) Version 5.0 and qualified per Leidos Quality Assurance Technical Procedure (QATP) Environmental Science and Engineering (ESE) DM-05, *Data Verification and Validation* (Revision 0, 1/2015) (Leidos 2015). The technical review and validation were based on the information and documentation supplied by the associated laboratory. The analyses were evaluated against criteria established in the related analytical procedures and the project data quality requirements.

Attachment 1 to this appendix provides a tabular summary of all surface water and sediment samples collected during the first quarterly (May/June 2017) (Attachment 1A), second quarterly (August/September 2017) (Attachment 1B), and third quarterly (November/December 2017) (Attachment 1C) sampling events. Table T-1 indicates the number of samples collected and valid data points generated, indicating completeness objectives were met for the three quarterly sampling events.

Table T-1. Overall Sampling Summary and Analytical Completeness

Summary – May/June 2017	
Number of Samples Planned [1]	64
Number of Samples Collected [2]	62
Total Number of Analytical Data Points	186
Number of Rejected Data Points	0
Percent Analytical Completeness (valid data/total analytical data)[3]	100%
Summary – August/September 2017	
Number of Samples Planned [1]	60
Number of Samples Collected [2]	53
Total Number of Analytical Data Points[4]	212
Number of Rejected Data Points	0
Percent Analytical Completeness (valid data/total analytical data)	100%
Summary – November/December 2017	
Number of Samples Planned [1]	62
Number of Samples Collected [2]	55
Total Number of Analytical Data Points[4]	220
Number of Rejected Data Points	0
Percent Analytical Completeness (valid data/total analytical data)	100%

Notes:

[1]Includes primary samples, field duplicates, and QA split sample (first quarterly event only).
[2]At several locations, streams were dry and no surface water could be collected or frozen conditions precluded sample collection.
[3]Adverse environmental conditions (e.g., dry streams, frozen matrices) were known to be a temporal possibility; therefore, surface water samples not collected due to environmental constraints were not accounted for in completeness calculations.
[4]The laboratory that analyzed samples for the second and third quarterly events included total uranium as a reported (noncritical) analyte.

Attachment 2 to this appendix provides the sample data analytical results summary forms for the samples associated with the first, second, and third quarterly sampling events. These summary sheets identify the analytical values and the qualifiers for each sample and parameter.

Tables T-2 through T-4 (provided at the end of the appendix) provide a summary of data that were qualified as a result of the validation and indicates the validation qualifiers and reason codes applied to the data. The following items (as applicable) have been addressed during the validation review:

- Sample custody, integrity, and preservation
- Sample handling and preparation
- Holding times
- Dilution factors
- Detection limits
- Laboratory background and carry-over
- Alpha spectrometry quality control (QC)
    - Calibration checks and background
    - Preparation blanks
    - Uncertainty/detected value comparison
    - Laboratory control samples
    - Field blanks (if available)
    - Field duplicates (if available)
    - Chemical yield (tracer recovery)
    - Laboratory duplicates.

T.2 DATA REVIEW OF FIRST QUARTER SAMPLES (MAY/JUNE 2017)

Isotopic uranium, specifically uranium-234 (U-234), uranium-235 (U-235), and uranium-238 (U-238), were determined by alpha spectrometry U.S. Department of Energy [DOE] Health and Safety Laboratory [HASL] Method 300 at Test America, Richland, Washington. The samples were collected in non-preserved bottles for both surface water and sediment samples. The surface water samples were filtered and acidified for preservation by the laboratory upon arrival. The first quarterly sampling event was conducted between 22 May and 15 June 2017.

Four field samples (two surface waters and two sediments) were split from the primary samples and sent to an independent laboratory referred to as the quality assurance (QA) laboratory. The analysis of QA split samples provides an overall measure of field and laboratory accuracy and precision. Examination of the primary and QA split sample data provides the data user with a degree of acceptance and usability of the chemical data quality. The QA laboratory for the first quarterly sampling event was GEL Laboratories. These results are discussed in Section C.5.

Table T-2 summarizes qualified sample results for sediment and surface water samples and provides the validation qualifiers and the appropriate validation code. Table T-5 summarizes the QC samples and associated locations. QC samples were collected at a frequency of o1 field duplicate per 10 samples and 1 matrix spike/matrix spike duplicate (MS/MSD) pair per 20 samples; these QC sample results met criteria unless otherwise noted in the discussions below.

Table T-5. QC Sample Summary – First Quarter Event

Facility Name	Sample Location	Field Quality Control
Donnelly Training Area, Fort Wainwright, Alaska	SWS-01 (Surface Water and Sediment)	Field Duplicate
Fort Benning, Georgia	UC2 (Surface Water and Sediment)	Field Duplicate
Fort Campbell, Kentucky	SWS-09 (Surface Water and Sediment)	MS/MSD
Fort Carson, Colorado	SWS-02 (Surface Water and Sediment)	Field Duplicate
Fort Jackson, South Carolina	CC-3 (Surface Water and Sediment)	MS/MSD

T.2.1 Donnelly Training Area, Fort Wainwright, Alaska

The first quarterly sampling event at Donnelly Training Area in Fort Wainwright, Alaska occurred on 25 May 2017. Collocated surface water and sediment samples plus field duplicate samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the minimum detectable activity (MDA) were greater than 10 percent of the sample activity with reason code T13.

T.2.2 Fort Benning, Georgia

The first quarterly sampling event at Fort Benning, Georgia occurred on 25 May 2017. Two collocated surface water and sediment samples plus field duplicate samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (six data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.3 Fort Bragg, North Carolina

The first quarterly sampling event at Fort Bragg, North Carolina occurred on 23 May 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.4 Fort Campbell, Kentucky

The first quarterly sampling event at Fort Campbell, Kentucky occurred on 26 May 2017. Collocated surface water and sediment samples plus extra volume for MS/MSD analysis were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.5 Fort Carson, Colorado

The first quarterly sampling event at Fort Carson, Colorado occurred on 24 May 2017. Collocated surface water and sediment samples were collected at two locations plus field duplicate samples were collected at one of the two locations. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (six data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-238 radiochemical sample result (one data point) was qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T12.

T.2.6 Fort Gordon, Georgia

The first quarterly sampling event at Fort Gordon, Georgia occurred on 23 May 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.7 Fort Hood, Texas

The first quarterly sampling event at Fort Hood, Texas occurred on 7 June 2017. Collocated surface water and sediment samples were collected at two locations. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-238 radiochemical sample results (two data points) were qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T12.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.8 Fort Hunter Liggett, California

The first quarterly sampling event at Fort Hunter Liggett, California occurred on 25 May 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.9 Fort Jackson, South Carolina

The first quarterly sampling event at Fort Jackson, South Carolina occurred on 25 May 2017. Collocated surface water and sediment samples plus extra volume for MS/MSD analysis were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.10 Fort Knox, Kentucky

The first quarterly sampling event at Fort Knox, Kentucky occurred on 24 May 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.11 Fort Polk, Louisiana

The first quarterly sampling event at Fort Polk, Louisiana occurred on 9 June 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.12 Fort Riley, Kansas

The first quarterly sampling event at Fort Riley, Kansas occurred on 22 May 2017. Collocated surface water and sediment samples were collected at two locations. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.13 Fort Sill, Oklahoma

The first quarterly sampling event at Fort Sill, Oklahoma occurred on 7 June 2017. Collocated surface water and sediment samples were collected from one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.14 Joint Base Lewis-McChord, Washington

The first quarterly sampling event at Joint Base Lewis-McChord occurred on 22 May 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.15 Joint Base McGuire-Dix-Lakehurst, New Jersey

The first quarterly sampling event at Joint Base McGuire-Dix-Lakehurst, New Jersey occurred on 5 June 2017. Collocated surface water and sediment samples were collected at two locations. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.16 Pohakuloa Training Area, Hawaii

The first quarterly sampling event at Pohakuloa Training Area, Hawaii occurred on 14 June 2017. A sediment sample was collected from one location. The streambed was dry and a surface water sample could not be obtained. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.17 Schofield Barracks, Hawaii

The first quarterly sampling event at Schofield Barracks, Hawaii occurred on 15 June 2017. Collocated surface water and sediment samples were collected from two locations. A dry streambed was encountered at a third location; therefore, only a sediment sample was obtained from the third location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.2.18 Yakima Training Center, Washington

The first quarterly sampling event at Yakima Training Center, Washington occurred on 24 May 2017. Collocated surface water and sediment samples were collected at three locations. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (six data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3 DATA REVIEW OF SECOND QUARTER SAMPLES (AUGUST/SEPTEMBER 2017)

Isotopic uranium, specifically U-234, U-235, and U-238, were determined by alpha spectrometry DOE HASL Method 300 by Test America St. Louis due to capacity issues at the Richland laboratory location used during the first quarter. Total uranium, reported by Test America St. Louis for the second (and third) quarterly events as a noncritical analyte, was calculated using the published specific activity values of each nuclide. Samples were collected in non-preserved bottles for both surface water and sediment samples. The surface water samples were filtered and acidified for preservation by the laboratory upon arrival. The second quarterly sampling event was conducted 14 August and 21 September 2017.

Table T-3 summarizes qualified sample results for sediment and surface water samples collected during the second quarterly sampling event and provides the validation qualifiers and the appropriate validation code. Table T-6 summarizes the QC samples and associated locations. QC samples were collected at a frequency of 1 field duplicate per 10 samples and 1 MS/MSD pair per 20 samples; these QC sample results met criteria unless otherwise noted in the discussions below.

Table T-6. QC Sample Summary – Second Quarter Event

Facility Name	Sample Location	Field Quality Control
Donnelly Training Area, Fort Wainwright, Alaska	SWS-01 (Surface Water and Sediment)	Field Duplicate
Fort Benning, Georgia	UC2 (Surface Water and Sediment)	Field Duplicate
Fort Campbell, Kentucky	SWS-09 (Surface Water and Sediment)	MS/MSD
Fort Carson, Colorado	SWS-03 (Surface Water and Sediment)	Field Duplicate
Fort Jackson, South Carolina	CC-3 (Surface Water and Sediment)	MS/MSD

T.3.1 Donnelly Training Area, Fort Wainwright, Alaska

The second quarterly sampling event at Donnelly Training Area at Fort Wainwright, Alaska occurred on 30 August 2017. Collocated surface water and sediment samples plus field duplicate samples were collected at one location. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.2 Fort Benning, Georgia

The second quarterly sampling event at Fort Benning, Georgia occurred on 29 August 2017. Collocated surface water and sediment were collected from two locations plus field duplicates were collected from one of the two locations. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and U-238 radiochemical sample results (seven data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- ***Field Duplicate Results***—Location UC2 surface water and sediment were collected in duplicate. U-234 did not meet relative percent difference (RPD) control limits. Field duplicate results are not qualified due to duplicates alone.

- ***Sample Receipt Discrepancy***—The shipping cooler was delayed during transit and was received at a temperature of 21.4°C. While the Quality Assurance Project Plan (QAPP) specified the use of ice as a preservative, cooling of samples is not a generally recognized method requirement; therefore, the sample condition upon receipt was not considered to have a significant negative impact on data quality.

T.3.3 Fort Bragg, North Carolina

The second quarterly sampling event at Fort Bragg, North Carolina occurred on 29 August 2017. Collocated surface water and sediment samples were collected at one location. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.4 Fort Campbell, Kentucky

The second quarterly sampling event at Fort Campbell, Kentucky occurred on 30 August 2017. Collocated surface water and sediment samples plus extra volume for MS/MSD analysis were collected at one location. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- ***MS/MSD Results***—SWS-09 surface water and sediment samples were collected as QC samples. U-234, U-235, and U-238 radiochemical sample results were qualified as estimated when percent recovery results were outside control limits. The U-234 surface water sample result was qualified as estimated with reason code H02 due to percent recovery below control limits and reason code H04 due to RPD results above control limits and listed in Table T-3.

T.3.5 Fort Carson, Colorado

The second quarterly sampling event at Fort Carson, Colorado occurred on 14 September 2017. Collocated surface water and sediment samples plus field duplicate samples were collected at one location. A sediment sample was collected from a second location. The streambed was dry and a surface water sample could not be obtained. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.6 Fort Gordon, Georgia

The second quarterly sampling event at Fort Gordon, Georgia occurred on 30 August 2017. Collocated surface water and one sediment samples were collected at one location. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-235, radiochemical sample result was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.7 Fort Hood, Texas

The second quarterly sampling event at Fort Hood, Texas occurred on 16 August 2017. Collocated surface water and sediment samples were collected at two locations. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.8 Fort Hunter Liggett, California

The second quarterly sampling event at Fort Hunter Liggett, California occurred on 21 September 2017. Collocated surface water and sediment samples were collected at one location. A sediment sample was collected from a second location. The streambed was dry and a surface water sample could not be obtained. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.9 Fort Jackson, South Carolina

The second quarterly sampling event at Fort Jackson, South Carolina occurred on 31 August 2017. Collocated surface water and sediment samples were collected at one location. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.
- ***MS/MSD Results***—Location CC-3 surface water and sediment samples were collected as QC samples. U-234, U-235, and U-238 radiochemical sample results were qualified as estimated due to percent recovery results outside control limits. The U-234 surface water sample result was qualified as estimated with reason code H01 due to percent recovery above control limits with reason code H04 due to RPD results above control limits and listed in Table T-3.

T.3.10 Fort Knox, Kentucky

The second quarterly sampling event at Fort Knox occurred on 29 August 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.11 Fort Polk, Louisiana

The second quarterly sampling event at Fort Polk, Louisiana occurred on 14 August 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- ***Laboratory Duplicate Results***—U-234, U-235, and U-238 radiochemical sample results were qualified as estimated when RPD results were above control limits with reason code J01, as listed in Table T-3.
- ***Sample Receipt Discrepancy Results***—The shipping cooler was delayed during transit and was received at a temperature of 11.8°C. While the QAPP specified the use of ice as a preservative, cooling of samples is not a generally recognized method requirement; therefore, the sample condition upon receipt was not considered to have a significant negative impact on data quality.

T.3.12 Fort Riley, Kansas

The second quarterly sampling event at Fort Riley, Kansas occurred on 12 September 2017. Collocated surface water and sediment samples were collected at two locations. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

- U-234, U-235, and/or U-238 radiochemical sample result (four data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.

T.3.13 Fort Sill, Oklahoma

The second quarterly sampling event at Fort Sill, Oklahoma occurred on 7 September 2017. Collocated surface water and sediment samples were collected from one location. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.14 Joint Base Lewis-McChord, Washington

The second quarterly sampling event at Joint Base Lewis-McChord occurred on 14 September 2017. Collocated surface water and sediment samples were collected at one location. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.15 Joint Base McGuire-Dix-Lakehurst, New Jersey

The second quarterly sampling event at Joint Base McGuire-Dix-Lakehurst, New Jersey occurred on 22 August 2017. Collocated surface water and sediment samples were collected at two locations. One or more samples required reanalysis at a reduced aliquot volume, which resulted in the laboratory using increased count times to achieve the MDA detection goal; the reported results met method and project requirements. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (six data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.16 Pohakuloa Training Area, Hawaii

The second quarterly sampling event at Pohakuloa Training Area, Hawaii occurred on 6 September 2017. A sediment sample was collected from one location. The streambed was dry and a surface water sample could not be obtained. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.3.17 Schofield Barracks, Hawaii

The second quarterly sampling event at Schofield Barracks, Hawaii occurred on 7 September 2017. Sediment samples were collected from three locations. The streambeds were dry at all three locations; therefore, surface water samples could not be obtained. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.

T.3.18 Yakima Training Center, Washington

The second quarterly sampling event at Yakima Training Center, Washington occurred conducted on 23 August 2017. Collocated surface water and sediment samples were collected at two locations. A sediment sample was collected from a third location. The streambed was dry at the third location; therefore, a surface water sample could not be obtained. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234, U-235, and/or U-238 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.

T.4 DATA REVIEW OF THIRD QUARTER SAMPLES (NOVEMBER/ DECEMBER 2017)

Isotopic uranium, specifically U-234, U-235, and U-238, were determined by alpha spectrometry DOE HASL Method 300 by Test America St. Louis due to capacity issues at the Richland laboratory location used during the first quarter. Total uranium, reported by Test America St. Louis as a noncritical analyte, was calculated using the published specific activity values of each nuclide. The surface water samples were filtered and acidified for preservation by the laboratory upon arrival. The third quarterly sampling event was conducted 20 November through 7 December 2017.

Table T-4 summarizes qualified sample results for sediment and surface water samples collected during the third quarterly sampling event and provides the validation qualifiers and the appropriate validation code. Table T-7 summarizes the QC samples and associated locations. QC samples were collected at a frequency of 1 field duplicate per 10 samples and 1 MS/MSD pair per 20 samples; these QC sample results met criteria unless otherwise noted in the discussions below.

Table T-7. QC Sample Summary – Third Quarter Event

Facility Name	Sample Location	Field Quality Control
Fort Riley, Kansas	SC-1 (Surface Water and Sediment)	Field Duplicate
Fort Benning, Georgia	UC2 (Surface Water and Sediment)	Field Duplicate
Fort Campbell, Kentucky	SWS-09 (Surface Water and Sediment)	MS/MSD
Fort Sill, Oklahoma	SWS-06A (Surface Water and Sediment)	Field Duplicate
Fort Jackson, South Carolina	CC-3 (Surface Water and Sediment)	MS/MSD

T.4.1 Donnelly Training Area, Fort Wainwright, Alaska

The weather conditions at Donnelly Training Area at Fort Wainwright, Alaska prohibited third quarter sampling. Surface water and sediment samples were not collected.

T.4.2 Fort Benning, Georgia

The third quarterly sampling event at Fort Benning, Georgia occurred on 6 December 2017. Collocated surface water and sediment were collected from two locations plus field duplicates were collected from one of the two locations. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and U-238 radiochemical sample results (nine data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234 radiochemical sample results (two data points) were qualified as nondetect due to method blank contamination with reason code F01.

T.4.3 Fort Bragg, North Carolina

The third quarterly sampling event at Fort Bragg, North Carolina occurred on 29 November 2017. Collocated surface water and sediment samples were collected at one location. All results were compliant except:

- U-234 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA was greater than 10 percent of the sample activity with reason code T13.

T.4.4 Fort Campbell, Kentucky

The third quarterly sampling event at Fort Campbell, Kentucky occurred on 30 November 2017. Collocated surface water and sediment samples were collected at one location. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-238 radiochemical sample result (one data point) was qualified as estimated due to method blank contamination with reason code F01.

T.4.5 Fort Carson, Colorado

The third quarterly sampling event at Fort Carson, Colorado occurred on 7 December 2017. Collocated surface water and sediment samples were collected at two locations. The sample bottle was bright yellow and expanded and released pressure upon opening at surface water location SWS-02. A reduced aliquot was used to prevent possible matrix interference; while this affected the detection limits, all three radionuclides were detected in the sample. The laboratory noted that homogenization of sediment

samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-235 radiochemical sample results (two data points) were qualified as estimated when MDA was greater than 10 percent of the sample activity with reason code T04.

T.4.6 Fort Gordon, Georgia

The third quarterly sampling event at Fort Gordon, Georgia occurred on 5 December 2017. Collocated surface water and sediment samples were collected at one location. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when measurement uncertainty was greater than 10 percent of the sample activity with reason code T04.

T.4.7 Fort Hood, Texas

The third quarterly sampling event at Fort Hood, Texas occurred on 5 December 2017. Collocated surface water and sediment samples were collected at two locations. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (six data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.4.8 Fort Hunter Liggett, California

The third quarterly sampling event at Fort Hunter Liggett, California occurred on 20 November 2017. One sediment sample was collected at two locations. Two streambeds were dry and surface water samples could not be obtained. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.4.9 Fort Jackson, South Carolina

The third quarterly sampling event at Fort Jackson, South Carolina occurred on 27 November 2017. Collocated surface water and sediment samples were collected at one location plus an MS/MSD pair was collected from one location. All results were compliant except:

- U-234 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.4.10 Fort Knox, Kentucky

The third quarterly sampling event at Fort Knox occurred on 29 November2017. Collocated surface water and sediment samples were collected at one location. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-238 radiochemical sample result (one data point) was qualified as estimated due to method blank contamination with reason code F01.

T.4.11 Fort Polk, Louisiana

The third quarterly sampling event at Fort Polk, Louisiana occurred on 7 December 2017. Collocated surface water and sediment samples were collected at one location. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234 radiochemical sample results (two data points) were qualified as estimated due to method blank contamination with reason code F01.
- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated due to high tracery recovery results with reason code G01.

T.4.12 Fort Riley, Kansas

The third quarterly sampling event at Fort Riley, Kansas occurred on 21 November 2017. Collocated surface water and sediment samples were collected at two locations plus field duplicates were collected from one of the two locations. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.

- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.4.13 Fort Sill, Oklahoma

The third quarterly sampling event at Fort Sill, Oklahoma occurred on 29 November 2017. Collocated surface water and sediment samples were collected from one location plus field duplicates were collected from this location. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (three data points) were qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.
- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.4.14 Joint Base Lewis-McChord, Washington

The third quarterly sampling event at Joint Base Lewis-McChord occurred on 4 December 2017. Collocated surface water and sediment samples were collected at one location. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.
- U-234 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.

T.4.15 Joint Base McGuire-Dix-Lakehurst, New Jersey

The third quarterly sampling event at Joint Base McGuire-Dix-Lakehurst, New Jersey occurred on 21 November 2017. Collocated surface water and sediment samples were collected at two locations. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (five data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-238 radiochemical sample result (one data point) was qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.

T.4.16 Pohakuloa Training Area, Hawaii

The third quarterly sampling event at Pohakuloa Training Area, Hawaii occurred on 28 November 2017. A sediment sample was collected from one location. The streambed was dry and a

surface water sample could not be obtained. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-238 radiochemical sample result (one data point) was qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.
- U-234 radiochemical sample result (one data point) was qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated due to method blank contamination with reason code F01.

T.4.17 Schofield Barracks, Hawaii

The third quarterly sampling event at Schofield Barracks, Hawaii occurred on 29 November 2017. Sediment samples were collected from three locations. The streambeds were dry at all three locations; therefore, surface water samples could not be obtained. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (four data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234, U-235, and/or U-238 radiochemical sample results (two data points) were qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.

T.4.18 Yakima Training Center, Washington

The third quarterly sampling event at Yakima Training Center, Washington occurred on 29 November 2017. Collocated surface water and sediment samples were collected at three locations. The laboratory noted that homogenization of sediment samples was hampered by the sample matrix, which contained varying sizes of rocks. All results were compliant except:

- U-234, U-235, and/or U-238 radiochemical sample results (seven data points) were qualified as estimated when measurement uncertainty and the MDA were greater than 10 percent of the sample activity with reason code T13.
- U-234, U-235, and/or U-238 radiochemical sample results (six data points) were qualified as estimated when the MDA was greater than 10 percent of the sample activity with reason code T04.

T.5 ANALYSIS OF SPLIT FIRST QUARTER SAMPLES AT QA LABORATORY

The purpose of the QA split sample analysis is to ensure the identity of the analytes/compounds. Verification of the presence of analyte/compounds as positive, false positive, negative, and/or false negative is an important step in the defensibility and integrity of the analytical data analyzed in the primary laboratory.

Two field samples each (one surface water and one sediment) from Fort Benning and Donnelly Training Area were split from the primary samples and sent to an independent laboratory referred to as

the QA laboratory. Examination and evaluation of the primary and QA split sample data provide the data user with a degree of assurance and usability of the chemical data quality. The QA laboratory was GEL Laboratories in Charleston, South Carolina.

Primary and QA laboratory data were assessed using the Louisville Chemistry Guidelines (USACE 2002) and Chemical Quality Assurance for Hazardous, Toxic, and Radioactive Waste (HTRW) Projects (USACE 1997) U.S. Army Corps of Engineers (USACE) Engineer Manual (EM) 200-1-6 and are summarized in Table T-8.

The ratio of the primary and QA sample results were compared against EM 200-1-6 criteria established for results that are considered in agreement, disagreement, or that indicated a major disagreement. Data for analytes that were nondetect in both the primary and QA sample analyses (three data pairs) were not included in the table as these are in agreement. Of the nine data pairs where an analyte was detected in either the primary or QA sample (or both), two pairs indicated a disagreement. It should be noted that three data pairs include results that were nondetect in one of the samples and detected at an estimated concentration in the other; these results were all below the reporting limit, and therefore, were not considered an indication of false positives or false negatives. One data pair had a primary result that was almost 10 times the detection limit of the nondetect QA split result; the primary result was qualified as estimated due to elevated uncertainty. The primary laboratory also analyzed a field duplicate of this sample and results were similar (RPD < 30%). This was the only primary/split data pair that approached a major disagreement. Overall, the results for the primary and QA split sample analyses verify the identification of the radionuclides as reported; the only exception indicated a potential false negative in the QA split result.

T.6 REFERENCES

DOD (U.S. Department of Defense). 2013. Quality Systems Manual for Environmental Laboratories. Prepared by the Department of Defense Environmental Data Quality Workgroup. Version 5.0 Final. July.

Leidos. 2015. Quality Assurance Technical Procedure (QATP) Environmental Science and Engineering (ESE) DM-05, Data Verification and Validation Version 0. Final. January.

USACE (U.S. Army Corps of Engineers). 1997. Engineer Manuals 200-1-6: Chemical Quality Assurance for Hazardous, Toxic, and Radioactive (HTRW) Projects. Final. October.

USACE. 2002. Louisville Chemistry Guidelines (LCG). Version 5.0. Final. June.

Table T-2. Qualified Sample Results for First Quarter

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analyte	Value	Validation Qualifier	Units	Reason Code 1	Reason Code 2
Benning	OC2	2LDOS01SD	S	5/25/2017	Uranium 234	0.140	J	pCi/g	T04	
Benning	OC2	2LDOS01SD	S	5/25/2017	Uranium 238	0.137	J	pCi/g	T04	
Benning	OC2	2LDOS01SW	W	5/25/2017	Uranium 234	0.025	J	pCi/L	T13	
Benning	UC2	2LDOS01SD	S	5/25/2017	Uranium 234	0.200	J	pCi/g	T04	
Benning	UC2	2LDOS01SD	S	5/25/2017	Uranium 238	0.181	J	pCi/g	T04	
Benning	UC2	2LDOS01SDFD	S	5/25/2017	Uranium 234	0.189	J	pCi/g	T04	
Benning	UC2	2LDOS01SDFD	S	5/25/2017	Uranium 235	0.010	J	pCi/g	T13	
Benning	UC2	2LDOS01SDFD	S	5/25/2017	Uranium 238	0.244	J	pCi/g	T04	
Benning	UC2	2LDOS01SW	W	5/25/2017	Uranium 234	0.034	J	pCi/L	T13	
Bragg	SWS-08	3LDOS01SD	S	5/23/2017	Uranium 234	0.420	J	pCi/g	T04	
Bragg	SWS-08	3LDOS01SD	S	5/23/2017	Uranium 235	0.015	J	pCi/g	T13	
Bragg	SWS-08	3LDOS01SD	S	5/23/2017	Uranium 238	0.491	J	pCi/g	T04	
Bragg	SWS-08	3LDOS01SW	W	5/23/2017	Uranium 234	0.020	J	pCi/L	T13	
Campbell	SWS-09	4LDOS01SD	S	5/26/2017	Uranium 234	0.826	J	pCi/g	T04	
Campbell	`SWS-09	4LDOS01SD	S	5/26/2017	Uranium 238	0.776	J	pCi/g	T04	
Campbell	SWS-09	4LDOS01SW	W	5/26/2017	Uranium 234	0.427	J	pCi/L	T13	
Campbell	SWS-09	4LDOS01SW	W	5/26/2017	Uranium 238	0.319	J	pCi/L	T13	
Carson	SWS-02	5LDOS01SD	S	5/24/2017	Uranium 234	0.483	J	pCi/g	T04	
Carson	SWS-02	5LDOS01SD	S	5/24/2017	Uranium 235	0.012	J	pCi/g	T13	
Carson	SWS-02	5LDOS01SD	S	5/24/2017	Uranium 238	0.287	J	pCi/g	T04	
Carson	SWS-02	5LDOS01SDFD	S	5/24/2017	Uranium 234	0.404	J	pCi/g	T04	
Carson	SWS-02	5LDOS01SDFD	S	5/24/2017	Uranium 235	0.022	J	pCi/g	T13	
Carson	SWS-02	5LDOS01SDFD	S	5/24/2017	Uranium 238	0.364	J	pCi/g	T04	
Carson	SWS-02	5LDOS01SW	W	5/24/2017	Uranium 235	0.137	J	pCi/L	T13	
Carson	SWS-02	5LDOS01SWFD	W	5/24/2017	Uranium 235	0.172	J	pCi/L	T13	
Carson	SWS-02	5LDOS01SWFD	W	5/24/2017	Uranium 238	5.430	J	pCi/L	T12	
Carson	SWS-03	5LDOS01SD	S	5/24/2017	Uranium 235	0.072	J	pCi/g	T13	
Carson	SWS-03	5LDOS01SW	W	5/24/2017	Uranium 235	0.229	J	pCi/L	T13	

Table T-2. Qualified Sample Results for First Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analyte	Value	Validation Qualifier	Units	Reason Code 1	Reason Code 2
Donnelly	SWS-01	1LDOS01SD	S	5/25/2017	Uranium 234	0.348	J	pCi/g	T04	
Donnelly	SWS-01	1LDOS01SD	S	5/25/2017	Uranium 235	0.012	J	pCi/g	T13	
Donnelly	SWS-01	1LDOS01SDFD	S	5/25/2017	Uranium 234	0.185	J	pCi/g	T04	
Donnelly	SWS-01	1LDOS01SDFD	S	5/25/2017	Uranium 235	0.012	J	pCi/g	T13	
Donnelly	SWS-01	1LDOS01SDFD	S	5/25/2017	Uranium 238	0.212	J	pCi/g	T04	
Donnelly	SWS-01	1LDOS01SW	W	5/25/2017	Uranium 234	0.506	J	pCi/L	T13	
Donnelly	SWS-01	1LDOS01SW	W	5/25/2017	Uranium 238	0.196	J	pCi/L	T13	
Donnelly	SWS-01	1LDOS01SWFD	W	5/25/2017	Uranium 234	0.449	J	pCi/L	T13	
Donnelly	SWS-01	1LDOS01SWFD	W	5/25/2017	Uranium 238	0.352	J	pCi/L	T04	
Gordon	Gut	6LDOS01SD	S	5/23/2017	Uranium 234	0.022	J	pCi/g	T13	
Gordon	Gut	6LDOS01SD	S	5/23/2017	Uranium 238	0.024	J	pCi/g	T13	
Hood	ERM-01	7LDOS01SD	S	6/7/2017	Uranium 234	0.247	J	pCi/g	T04	
Hood	ERM-01	7LDOS01SD	S	6/7/2017	Uranium 238	0.216	J	pCi/g	T04	
Hood	ERM-01	7LDOS01SW	W	6/7/2017	Uranium 234	0.092	J	pCi/L	T13	
Hood	ERM-01	7LDOS01SW	W	6/7/2017	Uranium 238	0.057	J	pCi/L	T13	
Hood	ERM-02	7LDOS01SD	S	6/7/2017	Uranium 234	0.269	J	pCi/g	T04	
Hood	ERM-02	7LDOS01SD	S	6/7/2017	Uranium 238	0.269	J	pCi/g	T04	
Hood	ERM-02	7LDOS01SW	W	6/7/2017	Uranium 234	0.217	J	pCi/L	T12	
Hood	ERM-02	7LDOS01SW	W	6/7/2017	Uranium 238	0.226	J	pCi/L	T12	
Hunter Liggett	SWS-06	8LDOS01SD	S	5/25/2017	Uranium 234	0.308	J	pCi/g	T04	
Hunter Liggett	SWS-06	8LDOS01SD	S	5/25/2017	Uranium 235	0.017	J	pCi/g	T13	
Hunter Liggett	SWS-06	8LDOS01SD	S	5/25/2017	Uranium 238	0.304	J	pCi/g	T04	
Hunter Liggett	SWS-06	8LDOS01SW	W	5/25/2017	Uranium 234	0.518	J	pCi/L	T04	
Hunter Liggett	SWS-06	8LDOS01SW	W	5/25/2017	Uranium 235	0.022	J	pCi/L	T13	
Hunter Liggett	SWS-06	8LDOS01SW	W	5/25/2017	Uranium 238	0.458	J	pCi/L	T04	
Jackson	CC-3	9LDOS01SD	S	5/25/2017	Uranium 234	0.265	J	pCi/g	T04	
Jackson	CC-3	9LDOS01SD	S	5/25/2017	Uranium 238	0.310	J	pCi/g	T04	

Table T-2. Qualified Sample Results for First Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analyte	Value	Validation Qualifier	Units	Reason Code 1	Reason Code 2
Jackson	CC-3	9LDOS01SW	W	5/25/2017	Uranium 234	0.047	J	pCi/L	T13	
JBLM	AIA-SP02	14LDOS01SD	S	5/22/2017	Uranium 234	0.134	J	pCi/g	T04	
JBLM	AIA-SP02	14LDOS01SD	S	5/22/2017	Uranium 238	0.128	J	pCi/g	T04	
JBLM	AIA-SP02	14LDOS01SW	W	5/22/2017	Uranium 234	0.028	J	pCi/L	T13	
JBMDL	SWS-13	16LDOS01SD	S	6/5/2017	Uranium 234	0.334	J	pCi/g	T04	
JBMDL	SWS-13	16LDOS01SD	S	6/5/2017	Uranium 235	0.028	J	pCi/g	T13	
JBMDL	SWS-13	16LDOS01SD	S	6/5/2017	Uranium 238	0.636	J	pCi/g	T04	
JBMDL	SWS-13	16LDOS01SW	W	6/5/2017	Uranium 234	0.081	J	pCi/L	T13	
JBMDL	SWS-13	16LDOS01SW	W	6/5/2017	Uranium 238	0.077	J	pCi/L	T13	
JBMDL	SWS-14	16LDOS01SD	S	6/5/2017	Uranium 234	0.061	J	pCi/g	T13	
JBMDL	SWS-14	16LDOS01SD	S	6/5/2017	Uranium 238	0.080	J	pCi/g	T13	
Knox	SWS-03	10LDOS01SD	S	5/24/2017	Uranium 234	0.249	J	pCi/g	T04	
Knox	SWS-03	10LDOS01SD	S	5/24/2017	Uranium 238	0.125	J	pCi/g	T04	
Knox	SWS-03	10LDOS01SW	W	5/24/2017	Uranium 234	0.182	J	pCi/L	T04	
Knox	SWS-03	10LDOS01SW	W	5/24/2017	Uranium 238	0.135	J	pCi/L	T13	
Pohakuloa	ERM-01	17LDOS01SD	S	6/14/2017	Uranium 234	0.193	J	pCi/g	T13	
Pohakuloa	ERM-01	17LDOS01SD	S	6/14/2017	Uranium 238	0.074	J	pCi/g	T13	
Polk	SWS-04	11LDOS01SD	S	6/9/2017	Uranium 234	0.048	J	pCi/g	T13	
Polk	SWS-04	11LDOS01SD	S	6/9/2017	Uranium 238	0.039	J	pCi/g	T13	
Riley	HC-1	12LDOS01SD	S	5/22/2017	Uranium 234	0.204	J	pCi/g	T04	
Riley	HC-1	12LDOS01SD	S	5/22/2017	Uranium 238	0.142	J	pCi/g	T04	
Riley	HC-1	12LDOS01SW	W	5/22/2017	Uranium 235	0.019	J	pCi/L	T13	
Riley	SC-1	12LDOS01SD	S	5/22/2017	Uranium 234	0.201	J	pCi/g	T04	
Riley	SC-1	12LDOS01SD	S	5/22/2017	Uranium 238	0.158	J	pCi/g	T04	
Riley	SC-1	12LDOS01SW	W	5/22/2017	Uranium 235	0.022	J	pCi/L	T13	
Schofield	SWS-01	18LDOS01SD	S	6/15/2017	Uranium 234	0.375	J	pCi/g	T04	
Schofield	SWS-01	18LDOS01SD	S	6/15/2017	Uranium 238	0.327	J	pCi/g	T04	
Schofield	SWS-01	18LDOS01SW	W	6/15/2017	Uranium 234	0.182	J	pCi/L	T13	

Table T-2. Qualified Sample Results for First Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analyte	Value	Validation Qualifier	Units	Reason Code 1	Reason Code 2
Schofield	SWS-02	18LDOS01SD	S	6/15/2017	Uranium 234	0.197	J	pCi/g	T04	
Schofield	SWS-02	18LDOS01SD	S	6/15/2017	Uranium 238	0.195	J	pCi/g	T13	
Schofield	SWS-03	18LDOS01SD	S	6/15/2017	Uranium 234	0.341	J	pCi/g	T04	
Schofield	SWS-03	18LDOS01SD	S	6/15/2017	Uranium 238	0.300	J	pCi/g	T04	
Sill	SWS-06A	13LDOS01SD	S	6/7/2017	Uranium 234	0.228	J	pCi/g	T04	
Sill	SWS-06A	13LDOS01SD	S	6/7/2017	Uranium 238	0.158	J	pCi/g	T04	
Sill	SWS-06A	13LDOS01SW	W	6/7/2017	Uranium 234	0.532	J	pCi/L	T04	
Sill	SWS-06A	13LDOS01SW	W	6/7/2017	Uranium 238	0.391	J	pCi/L	T13	
YTC	SWS-01	15LDOS01SD	S	5/24/2017	Uranium 235	0.064	J	pCi/g	T13	
YTC	SWS-01	15LDOS01SW	W	5/24/2017	Uranium 235	0.020	J	pCi/L	T13	
YTC	SWS-01	15LDOS01SW	W	5/24/2017	Uranium 238	0.160	J	pCi/L	T04	
YTC	SWS-02	15LDOS01SD	S	5/24/2017	Uranium 235	0.037	J	pCi/g	T13	
YTC	SWS-02	15LDOS01SW	W	5/24/2017	Uranium 234	0.527	J	pCi/L	T04	
YTC	SWS-02	15LDOS01SW	W	5/24/2017	Uranium 235	0.016	J	pCi/L	T13	
YTC	SWS-02	15LDOS01SW	W	5/24/2017	Uranium 238	0.248	J	pCi/L	T04	
YTC	SWS-05	15LDOS01SD	S	5/24/2017	Uranium 234	0.217	J	pCi/g	T04	
YTC	SWS-05	15LDOS01SD	S	5/24/2017	Uranium 238	0.156	J	pCi/g	T04	
YTC	SWS-05	15LDOS01SW	W	5/24/2017	Uranium 234	0.195	J	pCi/L	T04	
YTC	SWS-05	15LDOS01SW	W	5/24/2017	Uranium 238	0.129	J	pCi/L	T13	

Table T-3. Qualified Sample Results for Second Quarter

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
Benning	OC2	2LDOS02SD	S	8/29/2017	Uranium 234	0.32	pCi/g	J	T04		
Benning	OC2	2LDOS02SD	S	8/29/2017	Uranium 238	0.36	pCi/g	J	T04		
Benning	OC2	2LDOS02SW	W	8/29/2017	Uranium 235	0.12	pCi/L	J	T13		
Benning	UC2	2LDOS02SD	S	8/29/2017	Uranium 234	0.09	pCi/g	J	T13		
Benning	UC2	2LDOS02SD	S	8/29/2017	Uranium 238	0.09	pCi/g	J	T13		
Benning	UC2	2LDOS02SDFD	S	8/29/2017	Uranium 234	0.15	pCi/g	J	T13		
Benning	UC2	2LDOS02SDFD	S	8/29/2017	Uranium 238	0.20	pCi/g	J	T13		
Benning	UC2	2LDOS02SW	W	8/29/2017	Uranium 235	0.26	pCi/L	J	T13		
Benning	UC2	2LDOS02SWFD	W	8/29/2017	Uranium 234	1.13	pCi/L	J	T13		
Bragg	SWS-08	3LDOS02SD	S	8/29/2017	Uranium 234	0.39	pCi/g	J	T13		
Bragg	SWS-08	3LDOS02SD	S	8/29/2017	Uranium 238	0.33	pCi/g	J	T04		
Bragg	SWS-08	3LDOS02SW	W	8/29/2017	Uranium 234	0.31	pCi/L	J	T13		
Campbell	SWS-09	4LDOS02SD	S	8/30/2017	Uranium 235	0.07	pCi/g	J	T13		
Campbell	SWS-09	4LDOS02SW	W	8/30/2017	Uranium 234	2.00	pCi/L	J	H02	H04	
Campbell	SWS-09	4LDOS02SW	W	8/30/2017	Uranium 235	0.12	pCi/L	J	T13		
Carson	SWS-02	5LDOS02SD	S	9/14/2017	Uranium 235	0.04	pCi/g	J	T13		
Carson	SWS-03	5LDOS02SD	S	9/14/2017	Uranium 235	0.07	pCi/g	J	T13		
Carson	SWS-03	5LDOS02SDFD	S	9/14/2017	Uranium 235	0.10	pCi/g	J	T13		
Carson	SWS-03	5LDOS02SW	W	9/14/2017	Uranium 235	0.25	pCi/L	J	T13		
Carson	SWS-03	5LDOS02SWFD	W	9/14/2017	Uranium 235	0.21	pCi/L	J	T13		
Donnelly	SWS-01	1LDOS02SD	S	8/30/2017	Uranium 234	0.54	pCi/g	J	T04		
Donnelly	SWS-01	1LDOS02SD	S	8/30/2017	Uranium 238	0.45	pCi/g	J	T04		
Donnelly	SWS-01	1LDOS02SDFD	S	8/30/2017	Uranium 234	0.47	pCi/g	J	T04		
Donnelly	SWS-01	1LDOS02SDFD	S	8/30/2017	Uranium 235	0.04	pCi/g	J	T13		
Donnelly	SWS-01	1LDOS02SDFD	S	8/30/2017	Uranium 238	0.54	pCi/g	J	T04		
Donnelly	SWS-01	1LDOS02SW	W	8/30/2017	Uranium 235	0.22	pCi/L	J	T13		
Donnelly	SWS-01	1LDOS02SW	W	8/30/2017	Uranium 238	0.38	pCi/L	J	T13		
Donnelly	SWS-01	1LDOS02SWFD	W	8/30/2017	Uranium 235	0.14	pCi/L	J	T13		
Donnelly	SWS-01	1LDOS02SWFD	W	8/30/2017	Uranium 238	0.33	pCi/L	J	T13		

Table T-3. Qualified Sample Results for Second Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
Gordon	Gut	6LDOS02SD	S	8/30/2017	Uranium 235	0.03	pCi/g	J	T13		
Hood	ERM-01	7LDOS02SD	S	8/16/2017	Uranium 234	0.39	pCi/g	J	T04		
Hood	ERM-01	7LDOS02SD	S	8/16/2017	Uranium 238	0.41	pCi/g	J	T04		
Hood	ERM-01	7LDOS02SW	W	8/16/2017	Uranium 234	0.24	pCi/L	J	T13		
Hood	ERM-01	7LDOS02SW	W	8/16/2017	Uranium 235	0.04	pCi/L	J	T13		
Hood	ERM-01	7LDOS02SW	W	8/16/2017	Uranium 238	0.13	pCi/L	J	T13		
Hood	ERM-02	7LDOS02SD	S	8/16/2017	Uranium 234	0.35	pCi/g	J	T04		
Hood	ERM-02	7LDOS02SD	S	8/16/2017	Uranium 238	0.40	pCi/g	J	T04		
Hood	ERM-02	7LDOS02SW	W	8/16/2017	Uranium 234	0.28	pCi/L	J	T13		
Hood	ERM-02	7LDOS02SW	W	8/16/2017	Uranium 238	0.21	pCi/L	J	T13		
Hunter Liggett	ERM-01	8LDOS02SD	S	9/21/2017	Uranium 234	0.20	pCi/g	J	T04		
Hunter Liggett	ERM-01	8LDOS02SD	S	9/21/2017	Uranium 235	0.04	pCi/g	J	T13		
Hunter Liggett	ERM-01	8LDOS02SD	S	9/21/2017	Uranium 238	0.17	pCi/g	J	T04		
Hunter Liggett	ERM-01	8LDOS02SW	W	9/21/2017	Uranium 234	0.19	pCi/L	J	T13		
Hunter Liggett	ERM-02	8LDOS02SD	S	9/21/2017	Uranium 234	0.25	pCi/g	J	T13		
Hunter Liggett	ERM-02	8LDOS02SD	S	9/21/2017	Uranium 235	0.03	pCi/g	J	T13		
Hunter Liggett	ERM-02	8LDOS02SD	S	9/21/2017	Uranium 238	0.31	pCi/g	J	T04		
Jackson	CC-3	9LDOS02SD	S	8/31/2017	Uranium 238	0.50	pCi/g	J	T04		
Jackson	CC-3	9LDOS02SW	W	8/31/2017	Uranium 234	0.17	pCi/L	J	T13	H01	H04
JBLM	AIA-SP02	14LDOS02SW	W	9/14/2017	Uranium 234	0.270	pCi/L	J	T13		
JBLM	AIA-SP02	14LDOS02SD	S	9/14/2017	Uranium 234	0.252	pCi/g	J	T13		
JBLM	AIA-SP02	14LDOS02SD	S	9/14/2017	Uranium 238	0.189	pCi/g	J	T13		
JBMDL	SWS-13	16LDOS02SD	S	8/22/2017	Uranium 234	0.26	pCi/g	J	T13		
JBMDL	SWS-13	16LDOS02SD	S	8/22/2017	Uranium 238	0.28	pCi/g	J	T13		
JBMDL	SWS-13	16LDOS02SW	W	8/22/2017	Uranium 234	0.14	pCi/L	J	T13		
JBMDL	SWS-14	16LDOS02SD	S	8/22/2017	Uranium 234	0.20	pCi/g	J	T13		
JBMDL	SWS-14	16LDOS02SD	S	8/22/2017	Uranium 238	0.12	pCi/g	J	T13		
JBMDL	SWS-14	16LDOS02SW	W	8/22/2017	Uranium 234	0.24	pCi/L	J	T13		

Table T-3. Qualified Sample Results for Second Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
Knox	SWS-03	10LDOS02SD	S	8/29/2017	Uranium 235	0.04	pCi/g	J	T13		
Knox	SWS-03	10LDOS02SW	W	8/29/2017	Uranium 235	0.07	pCi/L	J	T13		
Knox	SWS-03	10LDOS02SW	W	8/29/2017	Uranium 238	0.30	pCi/L	J	T13		
Pohakuloa	ERM-01	17LDOS02SD	S	9/6/2017	Uranium 234	0.23	pCi/g	J	T13		
Pohakuloa	ERM-01	17LDOS02SD	S	9/6/2017	Uranium 238	0.16	pCi/g	J	T13		
Polk	SWS-04	11LDOS02SD	S	8/14/2017	Uranium 234	0.11	pCi/g	J	J01	T13	
Polk	SWS-04	11LDOS02SD	S	8/14/2017	Uranium 238	0.12	pCi/g	J	J01	T13	
Polk	SWS-04	11LDOS02SW	W	8/14/2017	Uranium 234	0.13	pCi/L	J	T13		
Polk	SWS-04	11LDOS02SW	W	8/14/2017	Uranium 238	0.07	pCi/L	J	T13		
Riley	HC-1	12LDOS02SW	W	9/12/2017	Uranium 234	0.94	pCi/L	J	T04		
Riley	HC-1	12LDOS02SW	W	9/12/2017	Uranium 238	0.74	pCi/L	J	T04		
Riley	HC-1	12LDOS02SD	S	9/12/2017	Uranium 235	0.02	pCi/g	J	T13		
Riley	SC-1	12LDOS02SW	W	9/12/2017	Uranium 234	0.99	pCi/L	J	T04		
Riley	SC-1	12LDOS02SW	W	9/12/2017	Uranium 235	0.08	pCi/L	J	T13		
Riley	SC-1	12LDOS02SW	W	9/12/2017	Uranium 238	0.69	pCi/L	J	T13		
Riley	SC-1	12LDOS02SD	S	9/12/2017	Uranium 234	0.45	pCi/g	J	T13		
Riley	SC-1	12LDOS02SD	S	9/12/2017	Uranium 238	0.45	pCi/g	J	T04		
Schofield	SWS-02	18LDOS02SD	S	9/7/2017	Uranium 234	0.59	pCi/g	J	T04		
Schofield	SWS-02	18LDOS02SD	S	9/7/2017	Uranium 235	0.03	pCi/g	J	T13		
Schofield	SWS-03	18LDOS02SD	S	9/7/2017	Uranium 234	0.30	pCi/g	J	T13		
Schofield	SWS-03	18LDOS02SD	S	9/7/2017	Uranium 235	0.03	pCi/g	J	T13		
Schofield	SWS-03	18LDOS02SD	S	9/7/2017	Uranium 238	0.24	pCi/g	J	T13		
Sill	SWS-06A	13LDOS02SD	S	9/7/2017	Uranium 234	0.41	pCi/g	J	T13		
Sill	SWS-06A	13LDOS02SD	S	9/7/2017	Uranium 235	0.04	pCi/g	J	T13		
Sill	SWS-06A	13LDOS02SD	S	9/7/2017	Uranium 238	0.39	pCi/g	J	T13		
Sill	SWS-06A	13LDOS02SW	W	9/7/2017	Uranium 234	0.26	pCi/L	J	T13		
Sill	SWS-06A	13LDOS02SW	W	9/7/2017	Uranium 238	0.18	pCi/L	J	T13		
YTC	SWS-01	15LDOS02SW	W	8/23/2017	Uranium 238	0.54	pCi/L	J	T13		
YTC	SWS-05	15LDOS02SD	S	8/23/2017	Uranium 238	0.52	pCi/g	J	T04		

Table T-3. Qualified Sample Results for Second Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
YTC	SWS-05	15LDOS02SW	W	8/23/2017	Uranium 235	0.06	pCi/L	J	T13		
YTC	SWS-05	15LDOS02SW	W	8/23/2017	Uranium 238	0.25	pCi/L	J	T13		

Table T-4. Qualified Sample Results for Third Quarter

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
Benning	OC2	2LDOS03SD	S	12/6/2017	Uranium 234	0.323	pCi/g	J	T13		
Benning	OC2	2LDOS03SD	S	12/6/2017	Uranium 238	0.283	pCi/g	J	T13		
Benning	OC2	2LDOS03SW	W	12/6/2017	Uranium 234	0.0971	pCi/L	J	T13		
Benning	UC2	2LDOS03SD	S	12/6/2017	Uranium 234	0.0882	pCi/g	UJ	T13	F01	
Benning	UC2	2LDOS03SD	S	12/6/2017	Uranium 238	0.0568	pCi/g	J	T13		
Benning	UC2	2LDOS03SDFD	S	12/6/2017	Uranium 234	0.0772	pCi/g	UJ	F01	T13	
Benning	UC2	2LDOS03SDFD	S	12/6/2017	Uranium 238	0.077	pCi/g	J	T13		
Benning	UC2	2LDOS03SW	W	12/6/2017	Uranium 234	0.117	pCi/L	J	T13		
Benning	UC2	2LDOS03SWFD	W	12/6/2017	Uranium 234	0.193	pCi/L	J	T13		
Bragg	SWS-08	3LDOS03SW	W	11/29/2017	Uranium 234	0.348	pCi/L	J	T13		
Campbell	SWS-09	4LDOS03SD	S	11/30/2017	Uranium 235	0.0614	pCi/g	J	T13		
Campbell	SWS-09	4LDOS03SD	S	11/30/2017	Uranium 238	0.82	pCi/g	J	F01		
Campbell	SWS-09	4LDOS03SW	W	11/30/2017	Uranium 234	0.422	pCi/L	J	T13		
Campbell	SWS-09	4LDOS03SW	W	11/30/2017	Uranium 238	0.0848	pCi/L	J	T13		
Carson	SWS-02	5LDOS03SD	S	12/7/2017	Uranium 235	0.0181	pCi/g	J	T13		
Carson	SWS-02	5LDOS03SW	W	12/7/2017	Uranium 235	6.44	pCi/L	J	T04		
Carson	SWS-03	5LDOS03SD	S	12/7/2017	Uranium 235	0.096	pCi/g	J	T04		
Carson	SWS-03	5LDOS03SW	W	12/7/2017	Uranium 235	0.308	pCi/L	J	T13		
Gordon	Gut	6LDOS03SD	S	12/5/2017	Uranium 234	0.435	pCi/g	J	T04		
Gordon	Gut	6LDOS03SD	S	12/5/2017	Uranium 235	0.0185	pCi/g	J	T13		
Gordon	Gut	6LDOS03SD	S	12/5/2017	Uranium 238	0.416	pCi/g	J	T04		
Gordon	Gut	6LDOS03SW	W	12/5/2017	Uranium 234	0.0915	pCi/L	J	T13		
Hood	ERM-01	7LDOS03SD	S	12/5/2017	Uranium 234	0.375	pCi/g	J	T04		
Hood	ERM-01	7LDOS03SD	S	12/5/2017	Uranium 238	0.328	pCi/g	J	T13		
Hood	ERM-01	7LDOS03SW	W	12/5/2017	Uranium 234	0.39	pCi/L	J	T13		
Hood	ERM-01	7LDOS03SW	W	12/5/2017	Uranium 238	0.257	pCi/L	J	T13		
Hood	ERM-02	7LDOS03SD	S	12/5/2017	Uranium 234	0.536	pCi/g	J	T04		
Hood	ERM-02	7LDOS03SD	S	12/5/2017	Uranium 235	0.0537	pCi/g	J	T13		
Hood	ERM-02	7LDOS03SD	S	12/5/2017	Uranium 238	0.468	pCi/g	J	T04		
Hood	ERM-02	7LDOS03SW	W	12/5/2017	Uranium 234	0.373	pCi/L	J	T13		
Hood	ERM-02	7LDOS03SW	W	12/5/2017	Uranium 238	0.237	pCi/L	J	T13		
Hunter Liggett	ERM-01	8LDOS03SD	S	11/20/2017	Uranium 234	0.269	pCi/g	J	T13		

Table T-4. Qualified Sample Results for Third Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
Hunter Liggett	ERM-01	8LDOS03SD	S	11/20/2017	Uranium 238	0.303	pCi/g	J	T13		
Hunter Liggett	ERM-02	8LDOS03SD	S	11/20/2017	Uranium 234	0.494	pCi/g	J	T13		
Hunter Liggett	ERM-02	8LDOS03SD	S	11/20/2017	Uranium 235	0.0406	pCi/g	J	T13		
Hunter Liggett	ERM-02	8LDOS03SD	S	11/20/2017	Uranium 238	0.439	pCi/g	J	T13		
Jackson	CC-3	9LDOS03SW	W	11/27/2017	Uranium 234	0.182	pCi/L	J	T13		
JBLM	AIA-SP02	14LDOS03SD	S	12/4/2017	Uranium 234	0.305	pCi/g	J	T04		
JBLM	AIA-SP02	14LDOS03SD	S	12/4/2017	Uranium 238	0.283	pCi/g	J	T04		
JBLM	AIA-SP02	14LDOS03SW	W	12/4/2017	Uranium 234	0.0653	pCi/L	J	T13		
JBMDL	SWS-13	16LDOS03SD	S	11/21/2017	Uranium 234	0.285	pCi/g	J	T13		
JBMDL	SWS-13	16LDOS03SD	S	11/21/2017	Uranium 238	0.407	pCi/g	J	T04		
JBMDL	SWS-13	16LDOS03SW	W	11/21/2017	Uranium 234	0.11	pCi/L	J	T13		
JBMDL	SWS-14	16LDOS03SD	S	11/21/2017	Uranium 234	0.11	pCi/g	J	T13		
JBMDL	SWS-14	16LDOS03SD	S	11/21/2017	Uranium 238	0.0845	pCi/g	J	T13		
JBMDL	SWS-14	16LDOS03SW	W	11/21/2017	Uranium 234	0.26	pCi/L	J	T13		
Knox	SWS-03	10LDOS03SD	S	11/29/2017	Uranium 238	0.788	pCi/g	J	F01		
Knox	SWS-03	10LDOS03SD	S	11/29/2017	Uranium 235	0.0473	pCi/g	J	T13		
Knox	SWS-03	10LDOS03SW	W	11/29/2017	Uranium 234	0.254	pCi/L	J	T13		
Knox	SWS-03	10LDOS03SW	W	11/29/2017	Uranium 238	0.155	pCi/L	J	T13		
Pohakuloa	ERM-01	17LDOS03SD	S	11/28/2017	Uranium 234	0.148	pCi/g	J	F01	T13	
Pohakuloa	ERM-01	17LDOS03SD	S	11/28/2017	Uranium 238	0.173	pCi/g	J	F01	T04	
Polk	SWS-04	11LDOS03SD	S	12/7/2017	Uranium 234	0.165	pCi/g	J	F01	T13	G01
Polk	SWS-04	11LDOS03SD	S	12/7/2017	Uranium 235	0.0171	pCi/g	J	T13	G01	
Polk	SWS-04	11LDOS03SD	S	12/7/2017	Uranium 238	0.133	pCi/g	J	T13	G01	
Polk	SWS-04	11LDOS03SW	W	12/7/2017	Uranium 234	0.0958	pCi/L	J	F01	T13	
Riley	HC-1	12LDOS03SD	S	11/21/2017	Uranium 235	0.0506	pCi/g	J	T13		
Riley	HC-1	12LDOS03SW	W	11/21/2017	Uranium 234	1.03	pCi/L	J	T13		
Riley	HC-1	12LDOS03SW	W	11/21/2017	Uranium 238	0.637	pCi/L	J	T13		

Table T-4. Qualified Sample Results for Third Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
Riley	SC-1	12LDOS03SDFD	S	11/21/2017	Uranium 234	0.575	pCi/g	J	T13		
Riley	SC-1	12LDOS03SDFD	S	11/21/2017	Uranium 235	0.05	pCi/g	J	T13		
Riley	SC-1	12LDOS03SW	W	11/21/2017	Uranium 238	0.689	pCi/L	J	T04		
Riley	SC-1	12LDOS03SWFD	W	11/21/2017	Uranium 238	0.798	pCi/L	J	T04		
Schofield	SWS-01	18LDOS03SD	S	11/29/2017	Uranium 235	0.0356	pCi/g	J	T13		
Schofield	SWS-02	18LDOS03SD	S	11/29/2017	Uranium 234	0.311	pCi/g	J	T13		
Schofield	SWS-02	18LDOS03SD	S	11/29/2017	Uranium 235	0.0228	pCi/g	J	T13		
Schofield	SWS-02	18LDOS03SD	S	11/29/2017	Uranium 238	0.27	pCi/g	J	T13		
Schofield	SWS-03	18LDOS03SD	S	11/29/2017	Uranium 234	0.613	pCi/g	J	T04		
Schofield	SWS-03	18LDOS03SD	S	11/29/2017	Uranium 238	0.48	pCi/g	J	T04		
Sill	SWS-06A	13LDOS03SD	S	11/29/2017	Uranium 234	0.459	pCi/g	J	T04		
Sill	SWS-06A	13LDOS03SD	S	11/29/2017	Uranium 238	0.450	pCi/g	J	T13		
Sill	SWS-06A	13LDOS03SDFD	S	11/29/2017	Uranium 238	0.414	pCi/g	J	T04		
Sill	SWS-06A	13LDOS03SDFD	S	11/29/2017	Uranium 234	0.476	pCi/g	J	T13		
Sill	SWS-06A	13LDOS03SW	W	11/29/2017	Uranium 234	0.457	pCi/L	J	T13		
Sill	SWS-06A	13LDOS03SW	W	11/29/2017	Uranium 238	0.226	pCi/L	J	T13		
Sill	SWS-06A	13LDOS03SWFD	W	11/29/2017	Uranium 234	1.1	pCi/L	J	T04		
Sill	SWS-06A	13LDOS03SWFD	W	11/29/2017	Uranium 238	0.244	pCi/L	J	T13		
YTC	SWS-01	15LDOS03SD	S	11/29/2017	Uranium 235	0.147	pCi/g	J	T13		
YTC	SWS-01	15LDOS03SW	W	11/29/2017	Uranium 234	0.751	pCi/L	J	T04		
YTC	SWS-01	15LDOS03SW	W	11/29/2017	Uranium 238	0.312	pCi/L	J	T13		
YTC	SWS-02	15LDOS03SD	S	11/29/2017	Uranium 235	0.0368	pCi/g	J	T13		
YTC	SWS-02	15LDOS03SD	S	11/29/2017	Uranium 238	0.421	pCi/g	J	T04		
YTC	SWS-02	15LDOS03SW	W	11/29/2017	Uranium 234	0.905	pCi/L	J	T04		
YTC	SWS-02	15LDOS03SW	W	11/29/2017	Uranium 235	0.0682	pCi/L	J	T13		
YTC	SWS-02	15LDOS03SW	W	11/29/2017	Uranium 238	0.516	pCi/L	J	T04		

Table T-4. Qualified Sample Results for Third Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Full Name	Value	Units	Validation Qualifier	Reason Code 1	Reason Code 2	Reason Code 3
YTC	SWS-05	15LDOS03SD	S	11/29/2017	Uranium 234	0.389	pCi/g	J	T04		
YTC	SWS-05	15LDOS03SD	S	11/29/2017	Uranium 235	0.0172	pCi/g	J	T13		
YTC	SWS-05	15LDOS03SD	S	11/29/2017	Uranium 238	0.354	pCi/g	J	T04		
YTC	SWS-05	15LDOS03SW	W	11/29/2017	Uranium 234	0.398	pCi/L	J	T13		
YTC	SWS-05	15LDOS03SW	W	11/29/2017	Uranium 238	0.289	pCi/L	J	T13		

Table T-8. QA Split Sample Results

Site	Location I.D.	Sample I.D.	Analyte	Parent Result	Split Result	Units	MDL	RL	Difference Factor	Criteria	Agreement?
Donnelly	SWS-01	1LDOS01SW	Uranium 234	0.506 J	0.471	pCi/L	0.155	0.1	1.1	<2	Yes
Donnelly	SWS-01	1LDOS01SW	Uranium 238	0.196 J	0.518	pCi/L	0.155	0.1	2.6	<2	No *
Donnelly	SWS-01	1LDOS01SD	Uranium 234	0.348 J	0.238	pCi/g	0.0095	0.1	1.5	<2	Yes
Donnelly	SWS-01	1LDOS01SD	Uranium 235	0.0121 J	0.0101 U	pCi/g	0.0074	0.1	1.2	<3	Yes
Donnelly	SWS-01	1LDOS01SD	Uranium 238	0.375	0.238	pCi/g	0.0089	0.1	1.6	<2	Yes
Benning	UC2	2LDOS01SW	Uranium 234	0.0335 J	0.0596 U	pCi/L	0.019	0.1	1.8	<3	Yes
Benning	UC2	2LDOS01SW	Uranium 238	0.0139 U	0.0664	pCi/L	0.019	0.1	4.8	<5	Yes
Benning	UC2	2LDOS01SD	Uranium 234	0.2 J	0.154	pCi/g	0.0111	0.1	1.3	<2	Yes
Benning	UC2	2LDOS01SD	Uranium 238	0.181 J	0.0184 U	pCi/g	0.0135	0.1	9.8	<3	No *

* Results are considered to disagree, but are not a major disagreement

Matrix	Parameter	Disagreement	Major Disagreement
Soil	Metals	>2x difference when both results > RL	>3x difference when both results > RL
All	All	>5x difference when one result is <DL	>10x difference when one result is <DL
All	All	>3x difference when result is <RL	>5x difference when one result is <RL

ATTACHMENT TABLES

DAVY CROCKETT
SAMPLE DATA SUMMARY

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Table 1a. Sample Summary for First Quarter

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analysis
Benning	UC2	2LDOS01SDX	S	5/25/2017	Uranium
Benning	UC2	2LDOS01SWX	W	5/25/2017	Uranium
Benning	UC2	2LDOS01SW	W	5/25/2017	Uranium
Benning	UC2	2LDOS01SD	S	5/25/2017	Uranium
Benning	OC2	2LDOS01SW	W	5/25/2017	Uranium
Benning	OC2	2LDOS01SD	S	5/25/2017	Uranium
Benning	UC2	2LDOS01SWFD	W	5/25/2017	Uranium
Benning	UC2	2LDOS01SDFD	S	5/25/2017	Uranium
Bragg	SWS-08	3LDOS01SD	S	5/23/2017	Uranium
Bragg	SWS-08	3LDOS01SW	W	5/23/2017	Uranium
Campbell	SWS-09	4LDOS01SD	S	5/26/2017	Uranium
Campbell	SWS-09	4LDOS01SW	W	5/26/2017	Uranium
Carson	SWS-02	5LDOS01SD	S	5/24/2017	Uranium
Carson	SWS-02	5LDOS01SDFD	S	5/24/2017	Uranium
Carson	SWS-02	5LDOS01SW	W	5/24/2017	Uranium
Carson	SWS-02	5LDOS01SWFD	W	5/24/2017	Uranium
Carson	SWS-03	5LDOS01SD	S	5/24/2017	Uranium
Carson	SWS-03	5LDOS01SW	W	5/24/2017	Uranium
Donnelly	SWS-01	1LDOS01SD	S	5/25/2017	Uranium
Donnelly	SWS-01	1LDOS01SDFD	S	5/25/2017	Uranium
Donnelly	SWS-01	1LDOS01SDX	S	5/25/2017	Uranium
Donnelly	SWS-01	1LDOS01SW	W	5/25/2017	Uranium
Donnelly	SWS-01	1LDOS01SWX	W	5/25/2017	Uranium
Donnelly	SWS-01	1LDOS01SWFD	W	5/25/2017	Uranium
Gordon	Gut	6LDOS01SD	S	5/23/2017	Uranium
Gordon	Gut	6LDOS01SW	W	5/23/2017	Uranium
Hood	ERM-01	7LDOS01SD	S	6/7/2017	Uranium
Hood	ERM-01	7LDOS01SW	W	6/7/2017	Uranium
Hood	ERM-02	7LDOS01SD	S	6/7/2017	Uranium
Hood	ERM-02	7LDOS01SW	W	6/7/2017	Uranium
Hunter Liggett	SWS-06	8LDOS01SD	S	5/25/2017	Uranium
Hunter Liggett	SWS-06	8LDOS01SW	W	5/25/2017	Uranium
Jackson	CC-3	9LDOS01SD	S	5/25/2017	Uranium
Jackson	CC-3	9LDOS01SW	W	5/25/2017	Uranium
JBLM	AIA-SP02	14LDOS01SD	S	5/22/2017	Uranium
JBLM	AIA-SP02	14LDOS01SW	W	5/22/2017	Uranium
JBMDL	SWS-13	16LDOS01SD	S	6/5/2017	Uranium
JBMDL	SWS-13	16LDOS01SW	W	6/5/2017	Uranium
JBMDL	SWS-14	16LDOS01SD	S	6/5/2017	Uranium
JBMDL	SWS-14	16LDOS01SW	W	6/5/2017	Uranium

Table 1a. Sample Summary for First Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analysis
Knox	SWS-03	10LDOS01SD	S	5/24/2017	Uranium
Knox	SWS-03	10LDOS01SW	W	5/24/2017	Uranium
Pohakuloa	ERM-01	17LDOS01SD	S	6/14/2017	Uranium
Polk	SWS-04	11LDOS01SD	S	6/9/2017	Uranium
Polk	SWS-04	11LDOS01SW	W	6/9/2017	Uranium
Riley	HC-1	12LDOS01SD	S	5/22/2017	Uranium
Riley	HC-1	12LDOS01SW	W	5/22/2017	Uranium
Riley	SC-1	12LDOS01SD	S	5/22/2017	Uranium
Riley	SC-1	12LDOS01SW	W	5/22/2017	Uranium
Schofield	SWS-01	18LDOS01SD	S	6/15/2017	Uranium
Schofield	SWS-01	18LDOS01SW	W	6/15/2017	Uranium
Schofield	SWS-02	18LDOS01SD	S	6/15/2017	Uranium
Schofield	SWS-03	18LDOS01SD	S	6/15/2017	Uranium
Schofield	SWS-03	18LDOS01SW	W	6/15/2017	Uranium
Sill	SWS-06A	13LDOS01SD	S	6/7/2017	Uranium
Sill	SWS-06A	13LDOS01SW	W	6/7/2017	Uranium
YTC	SWS-01	15LDOS01SD	S	5/24/2017	Uranium
YTC	SWS-01	15LDOS01SW	W	5/24/2017	Uranium
YTC	SWS-02	15LDOS01SD	S	5/24/2017	Uranium
YTC	SWS-02	15LDOS01SW	W	5/24/2017	Uranium
YTC	SWS-05	15LDOS01SD	S	5/24/2017	Uranium
YTC	SWS-05	15LDOS01SW	W	5/24/2017	Uranium

Table 1b. Sample Summary for Second Quarter

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analysis
Benning	OC2	2LDOS02SD	S	8/29/2017	Uranium
Benning	OC2	2LDOS02SW	W	8/29/2017	Uranium
Benning	UC2	2LDOS02SD	S	8/29/2017	Uranium
Benning	UC2	2LDOS02SDFD	S	8/29/2017	Uranium
Benning	UC2	2LDOS02SW	W	8/29/2017	Uranium
Benning	UC2	2LDOS02SWFD	W	8/29/2017	Uranium
Bragg	SWS-08	3LDOS02SD	S	8/29/2017	Uranium
Bragg	SWS-08	3LDOS02SW	W	8/29/2017	Uranium
Campbell	SWS-09	4LDOS02SD	S	8/30/2017	Uranium
Campbell	SWS-09	4LDOS02SW	W	8/30/2017	Uranium
Carson	SWS-02	5LDOS02SD	S	9/14/2017	Uranium
Carson	SWS-03	5LDOS02SD	S	9/14/2017	Uranium
Carson	SWS-03	5LDOS02SDFD	S	9/14/2017	Uranium
Carson	SWS-03	5LDOS02SW	W	9/14/2017	Uranium
Carson	SWS-03	5LDOS02SWFD	W	9/14/2017	Uranium
Donnelly	SWS-01	1LDOS02SD	S	8/30/2017	Uranium
Donnelly	SWS-01	1LDOS02SDFD	S	8/30/2017	Uranium
Donnelly	SWS-01	1LDOS02SW	W	8/30/2017	Uranium
Donnelly	SWS-01	1LDOS02SWFD	W	8/30/2017	Uranium
Gordon	Gut	6LDOS02SD	S	8/30/2017	Uranium
Gordon	Gut	6LDOS02SW	W	8/30/2017	Uranium
Hood	ERM-01	7LDOS02SD	S	8/16/2017	Uranium
Hood	ERM-01	7LDOS02SW	W	8/16/2017	Uranium
Hood	ERM-02	7LDOS02SD	S	8/16/2017	Uranium
Hood	ERM-02	7LDOS02SW	W	8/16/2017	Uranium
Hunter Liggett	ERM-01	8LDOS02SD	S	9/21/2017	Uranium
Hunter Liggett	ERM-01	8LDOS02SW	W	9/21/2017	Uranium
Hunter Liggett	ERM-02	8LDOS02SD	S	9/21/2017	Uranium
Jackson	CC-3	9LDOS02SD	S	8/31/2017	Uranium
Jackson	CC-3	9LDOS02SW	W	8/31/2017	Uranium
JBLM	AIA-SP02	14LDOS02SW	W	9/14/2017	Uranium
JBLM	AIA-SP02	14LDOS02SD	S	9/14/2017	Uranium
JBMDL	SWS-13	16LDOS02SD	S	8/22/2017	Uranium
JBMDL	SWS-13	16LDOS02SW	W	8/22/2017	Uranium
JBMDL	SWS-14	16LDOS02SD	S	8/22/2017	Uranium
JBMDL	SWS-14	16LDOS02SW	W	8/22/2017	Uranium
Knox	SWS-03	10LDOS02SD	S	8/29/2017	Uranium
Knox	SWS-03	10LDOS02SW	W	8/29/2017	Uranium
Pohakuloa	ERM-01	17LDOS02SD	S	9/6/2017	Uranium

Table 1b. Sample Summary for Second Quarter (Continued)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analysis
Polk	SWS-04	11LDOS02SD	S	8/14/2017	Uranium
Polk	SWS-04	11LDOS02SW	W	8/14/2017	Uranium
Riley	HC-1	12LDOS02SD	S	9/12/2017	Uranium
Riley	HC-1	12LDOS02SW	W	9/12/2017	Uranium
Riley	SC-1	12LDOS02SD	S	9/12/2017	Uranium
Riley	SC-1	12LDOS02SW	W	9/12/2017	Uranium
Schofield	SWS-01	18LDOS02SD	S	9/7/2017	Uranium
Schofield	SWS-02	18LDOS02SD	S	9/7/2017	Uranium
Schofield	SWS-03	18LDOS02SD	S	9/7/2017	Uranium
Sill	SWS-06A	13LDOS02SD	S	9/7/2017	Uranium
Sill	SWS-06A	13LDOS02SW	W	9/7/2017	Uranium
YTC	SWS-01	15LDOS02SD	S	8/23/2017	Uranium
YTC	SWS-01	15LDOS02SW	W	8/23/2017	Uranium
YTC	SWS-02	15LDOS02SD	S	8/23/2017	Uranium
YTC	SWS-05	15LDOS02SD	S	8/23/2017	Uranium
YTC	SWS-05	15LDOS02SW	W	8/23/2017	Uranium

Table 1c. Sample Summary for Third Quarter

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analysis
Benning	OC2	2LDOS03SD	S	12/6/2017	Uranium
Benning	OC2	2LDOS03SW	W	12/6/2017	Uranium
Benning	UC2	2LDOS03SD	S	12/6/2017	Uranium
Benning	UC2	2LDOS03SDFD	S	12/6/2017	Uranium
Benning	UC2	2LDOS03SW	W	12/6/2017	Uranium
Benning	UC2	2LDOS03SWFD	W	12/6/2017	Uranium
Bragg	SWS-08	3LDOS03SD	S	11/29/2017	Uranium
Bragg	SWS-08	3LDOS03SW	W	11/29/2017	Uranium
Campbell	SWS-09	4LDOS03SD	S	11/30/2017	Uranium
Campbell	SWS-09	4LDOS03SW	W	11/30/2017	Uranium
Carson	SWS-02	5LDOS03SD	S	12/7/2017	Uranium
Carson	SWS-02	5LDOS03SW	W	12/7/2017	Uranium
Carson	SWS-03	5LDOS03SD	S	12/7/2017	Uranium
Carson	SWS-03	5LDOS03SW	W	12/7/2017	Uranium
Gordon	Gut	6LDOS03SD	S	12/5/2017	Uranium
Gordon	Gut	6LDOS03SW	W	12/5/2017	Uranium
Hood	ERM-01	7LDOS03SD	S	12/5/2017	Uranium
Hood	ERM-01	7LDOS03SW	W	12/5/2017	Uranium
Hood	ERM-02	7LDOS03SD	S	12/5/2017	Uranium
Hood	ERM-02	7LDOS03SW	W	12/5/2017	Uranium
Hunter Liggett	ERM-01	8LDOS03SD	S	11/20/2017	Uranium
Hunter Liggett	ERM-02	8LDOS03SD	S	11/20/2017	Uranium
Jackson	CC-3	9LDOS03SD	S	11/27/2017	Uranium
Jackson	CC-3	9LDOS03SW	W	11/27/2017	Uranium
JBLM	AIA-SP02	14LDOS03SD	S	12/4/2017	Uranium
JBLM	AIA-SP02	14LDOS03SW	W	12/4/2017	Uranium
JBMDL	SWS-13	16LDOS03SD	S	11/21/2017	Uranium
JBMDL	SWS-13	16LDOS03SW	W	11/21/2017	Uranium
JBMDL	SWS-14	16LDOS03SD	S	11/21/2017	Uranium
JBMDL	SWS-14	16LDOS03SW	W	11/21/2017	Uranium
Knox	SWS-03	10LDOS03SD	S	11/29/2017	Uranium
Knox	SWS-03	10LDOS03SW	W	11/29/2017	Uranium
Pohakuloa	ERM-01	17LDOS03SD	S	11/28/2017	Uranium
Polk	SWS-04	11LDOS03SD	S	12/7/2017	Uranium
Polk	SWS-04	11LDOS03SW	W	12/7/2017	Uranium
Riley	HC-1	12LDOS03SD	S	11/21/2017	Uranium
Riley	HC-1	12LDOS03SW	W	11/21/2017	Uranium
Riley	SC-1	12LDOS03SD	S	11/21/2017	Uranium
Riley	SC-1	12LDOS03SDFD	S	11/21/2017	Uranium
Riley	SC-1	12LDOS03SW	W	11/21/2017	Uranium
Riley	SC-1	12LDOS03SWFD	W	11/21/2017	Uranium
Schofield	SWS-01	18LDOS03SD	S	11/29/2017	Uranium
Schofield	SWS-02	18LDOS03SD	S	11/29/2017	Uranium
Schofield	SWS-03	18LDOS03SD	S	11/29/2017	Uranium
Sill	SWS-06A	13LDOS03SD	S	11/29/2017	Uranium
Sill	SWS-06A	13LDOS03SDFD	S	11/29/2017	Uranium

Table 1c. Sample Summary for Third Quarter (Continue)

Site	Site I.D.	Sample I.D.	Matrix	Sample Date	Analysis
Sill	SWS-06A	13LDOS03SW	W	11/29/2017	Uranium
Sill	SWS-06A	13LDOS03SWFD	W	11/29/2017	Uranium
YTC	SWS-01	15LDOS03SD	S	11/29/2017	Uranium
YTC	SWS-01	15LDOS03SW	W	11/29/2017	Uranium
YTC	SWS-02	15LDOS03SD	S	11/29/2017	Uranium
YTC	SWS-02	15LDOS03SW	W	11/29/2017	Uranium
YTC	SWS-05	15LDOS03SD	S	11/29/2017	Uranium
YTC	SWS-05	15LDOS03SW	W	11/29/2017	Uranium

Data Validation Reason Codes

F01 Sample data were qualified as a result of the method blank.
H01 MS/MSD recovery was above the upper control limit.
H02 MS/MSD recovery was above the lower control limit.
H04 MS/MSD pairs exceed the RPD limit.
J01 Duplicate RPD/radiological duplicate error ratio (DER) was outside the control limit.
T04 Professional judgment was used to qualify the data.

T12 Analytical result is less than the associated MDA but greater than the counting uncertainty.
T13 Analytical result is less than both the associated counting uncertainty and the MDA.