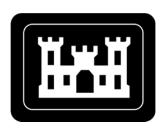
REVISION 0

IOWA ARMY AMMUNITION PLANT OPERABLE UNIT 8 ANNUAL ENVIRONMENTAL MONITORING DATA AND ANALYSIS REPORT FOR CALENDAR YEAR 2017

MIDDLETOWN, IOWA

SEPTEMBER 21, 2018



U.S. Army Corps of Engineers St. Louis District Office Formerly Utilized Sites Remedial Action Program

REVISION 0

IOWA ARMY AMMUNITION PLANT OPERABLE UNIT 8 ANNUAL ENVIRONMENTAL MONITORING DATA AND ANALYSIS REPORT FOR CALENDAR YEAR 2017

MIDDLETOWN, IOWA

SEPTEMBER 21, 2018

prepared by:

U.S. Army Corps of Engineers, St. Louis District Office Formerly Utilized Sites Remedial Action Program

with assistance from:

Leidos, Inc.

under Contract No. W912P9-17-D-0014, Delivery Order 0001

TABLE OF CONTENTS

SEC.	<u>TION</u>		PAGE
LIST	OF TA	ABLES	ii
LIST	OF FI	IGURES	iii
LIST	OF A	PPENDICIES	iii
ACR	ONYN	IS AND ABBREVIATIONS	iv
UNIT	Γ ABBI	REVIATIONS	vi
EXE	CUTIV	E SUMMARY	ES-1
1.0	HIST	TORICAL SITE BACKGROUND AND CURRENT SITE STATUS	1-1
	1.1	INTRODUCTION	1-1
	1.2	PURPOSE	1-1
	1.3	PROGRAM AND SITE HISTORY	1-1
	1.4	CALENDAR YEAR 2017 ACTIVITIES	1-2
		1.4.1 IAAAP Operable Unit 8 Calendar Year 2017 Documents	
		1.4.2 IAAAP Operable Unit 8 Calendar Year 2017 Remedial Actions	1-2
2.0		LICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS	2.1
2.0		LUATION	
3.0		LUATION OF RADIOLOGICAL AIR MONITORING DATA	
	3.1	METHOD	
		3.1.1 EMISSION RATE	
	3.2	METEOROLOGICAL DATA	
	3.3	IAAAP OPERABLE UNIT 8 SITES UNDER ACTIVE REMEDIATION	3-2
		3.3.1 Material Handling and Processing for Calendar Year 2017	3-2
		3.3.2 Source Description – Radionuclide Soil Concentrations	
		3.3.3 List of Assumed Air Releases for Calendar Year 2017	
	2.4	3.3.4 Distances to Receptors	
	3.4	EMISSIONS DETERMINATION	
		3.4.2 IAAAP Operable Unit 8 Total Airborne Radioactive Particulate	, 3-3
		Emission Rates	3-5
		3.4.3 CAP88-PC Results	3-5
4.0	SUR	FACE-WATER, SEDIMENT, AND STORM-WATER MONITORING.	4-1
	4.1	SURFACE-WATER AND SEDIMENT MONITORING	4-1
	4.2	SURFACE-WATER MONITORING RESULTS	4-1
	4.3	SEDIMENT MONITORING RESULTS	4-2
	4.4	STORM-WATER MONITORING	4-4

TABLE OF CONTENTS (Continued)

SEC.	<u> FION</u>		PAGE
	4.5	CONCLUSION	4-4
5.0	ENV	IRONMENTAL QUALITY ASSURANCE PROGRAM	5-1
	5.1	PROGRAM OVERVIEW	5-1
	5.2	QUALITY ASSURANCE PROJECT PLAN	5-1
	5.3	FIELD SAMPLE COLLECTION AND MEASUREMENT	
	5.4	PERFORMANCE AND SYSTEM AUDITS 5.4.1 Field Assessments 5.4.2 Laboratory Audits	5-2
	5.5	SUBCONTRACTED LABORATORY PROGRAMS	5-3
	5.6	QUALITY ASSURANCE AND QUALITY CONTROL SAMPLES 5.6.1 Duplicate Samples 5.6.2 Split Samples 5.6.3 Equipment Rinsate Blanks	5-3 5-4
	5.7	DATA REVIEW, EVALUATION, AND VALIDATION	5-5
	5.8	PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS, AND SENSITIVITY	5-5
	5.9	DATA QUALITY ASSESSMENT SUMMARY	5-7
	5.10	RESULTS FOR PARENT SAMPLES AND THE ASSOCIATED DUPLICATE AND SPLIT SAMPLES	5-7
6.0	REFI	ERENCES	6-1
		LIST OF TABLES	
NUM	IBER		PAGE
Table	3-1.	Quad City International Airport Wind Rose Frequency	3-2
Table	3-2.	IAAAP Operable Unit 8 Receptors for CY 2017	
Table	3-3.	IAAAP Operable Unit 8 Average Gross Alpha Airborne Particulate	2.2
Table	e 3-4.	Emissions for CY 2017	
Table	3-5.	IAAAP Operable Unit 8 Site Release Flow Rate for CY 2017	
Table	3-6.	IAAAP Operable Unit 8 Airborne Radioactive Particulate Emission Rates	
		Based on Excavation Perimeter Air Samples for CY 2017	
Table		IAAAP Operable Unit 8 CAP88-PC Results for Receptors for CY 2017	
Table		Radiological Results for CY 2017 Surface-Water Monitoring	
Table		Comparison of Historical Radiological Surface-Water Results	
Table Table		Radiological Results for CY 2017 Sediment Monitoring	
1 aute	- 1-1 .	Comparison of Historical Radiological Sediment Results	4-3

LIST OF TABLES (Continued)

NUMBER		PAGE
Table 5-1.	Radiological Duplicate Sample Alpha Analysis for CY 2017 – Surface	
	Water	5-4
Table 5-2.	Radiological Duplicate Sample Alpha Analysis for CY 2017 – Sediment	
Table 5-3.	Radiological Split Sample Alpha Analysis for CY 2017 – Surface Water	5-4
Table 5-4.	Radiological Split Sample Alpha Analysis for CY 2017 – Sediment	5-4
Table 5-5.	Radiological Parent Samples and Associated Duplicate and Split Samples for CY 2017 – Surface Water	5-8
Table 5-6.	Radiological Parent Samples and Associated Duplicate and Split Samples	5 0
14010 5 0.	for CY 2017 – Sediment	5-8
	LIST OF FIGURES	
Figure 1-1.	FUSRAP Areas at the IAAAP	
Figure 3-1.	IAAAP Firing Sites Area Receptors	
Figure 4-1.	Surface-Water and Sediment Monitoring Locations	
	LIST OF APPENDICIES	
Appendix A	Calculated Emission Rates from IAAAP Operable Unit 8 Sites	
Appendix B	CAP88-PC Output Report for IAAAP Operable Unit 8 Sites	
Appendix C	Calendar Year 2017 Air Monitoring Data	
Appendix D	Surface-Water and Sediment Data	
	BACK COVER	
CD-ROM	Attachment C-1. Calendar Year 2017 Air Sample Reports	

iii REVISION 0

ACRONYMS AND ABBREVIATIONS

AEC U.S. Atomic Energy Commission

ARAR applicable or relevant and appropriate requirement

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

CFR Code of Federal Regulations
COC contaminant of concern

CY calendar year

DOD U.S. Department of Defense DOE U.S. Department of Energy DQO data quality objective DU depleted uranium

EDE effective dose equivalent

ELAP Environmental Laboratory Accreditation Program

EM Engineer Manual

EMDAR Environmental Monitoring Data and Analysis Report

ER Engineer Regulation

FS firing site

FUSRAP Formerly Utilized Sites Remedial Action Program

GIS geographic information system IAAAP Iowa Army Ammunition Plant load, assemble, and pack

MARSSIM Multi-Agency Radiation Survey and Site Investigation Manual

MDA minimum detectable activity
MDC minimum detectable concentration
MED Manhattan Engineer District
NAD normalized absolute difference

NRC U.S. Nuclear Regulatory Commission

OU operable unit

PDI pre-design investigation

QA quality assurance

QAPP quality assurance project plan

QC quality control

QSM Department of Defense (DoD)/Department of Energy (DOE) Consolidated Quality

Systems Manual (QSM) for Environmental Laboratories

RA remedial action RG remediation goal

RI WP Remedial Investigation Work Plan for Line 1, Firing Sites Area, Yards C, G,

and L, Warehouse 3-01 and the West Burn Pads Area South of the Road

Rn radon

ROD FUSRAP Record of Decision for the Iowa Army Ammunition Plant

RPD relative percent difference SOP standard operating procedure

SU survey unit

TEDE total effective dose equivalent

U uranium

USACE U.S. Army Corps of Engineers

iv REVISION 0

ACRONYMS AND ABBREVIATIONS (Continued)

USEPA U.S. Environmental Protection Agency

VQ validation qualifier

REVISION 0

 \mathbf{v}

UNIT ABBREVIATIONS

Both English and metric units are used in this report. The units used in a specific situation are based on common unit usage or regulatory language (e.g., depths are given in feet, and areas are given in square meters). Units included in the following list are not defined at first use in this report.

°C	degrees Celsius (centigrade)
μCi/mL	microcurie(s) per milliliter
Ci	curie(s)
cm	centimeter(s)
cm ³	cubic centimeter(s)
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mL	milliliter(s)
mrem	millirem
pCi/g	picocurie(s) per gram
pCi/L	picocurie(s) per liter
yd^3	cubic yard(s)

vi REVISION 0

EXECUTIVE SUMMARY

This Annual Environmental Monitoring Data and Analysis Report (EMDAR) for calendar year (CY) 2017 applies to the Iowa Army Ammunition Plant (IAAAP) Operable Unit (OU)-8 (Figure 1-1), which is within the scope of the Formerly Utilized Sites Remedial Action Program (FUSRAP). This EMDAR provides an evaluation of the data collected as part of the environmental monitoring conducted for IAAAP OU-8. IAAAP OU-8 consists of the Firing Sites Area (containing five subareas: Firing Site (FS)-1 and FS-2; FS-3, FS-4, and FS-5; FS-6 Area [FS-6, FS-7, FS-8, and FS-15]; FS-12 Area [FS-9, FS-10, FS-11, and FS-12]; and FS-14); Line 1 Structures; Yards C, G, and L; and Warehouse 3-01. The M-Yard is not included as part of OU-8 in the *FUSRAP Record of Decision for the Iowa Army Ammunition Plant* (ROD) (USACE 2011); however, references to OU-8 include the M-Yard for the purposes of this EMDAR. Environmental monitoring of various media at IAAAP OU-8 is required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and under the commitments in the ROD (USACE 2011).

The U.S. Army Corps of Engineers (USACE) St. Louis District collects environmental monitoring data as a component of remedial action (RA). These data serve as a critical component in the evaluation of the current status of residual contaminants and assessment of the potential future migration of residual contaminants.

The collection and evaluation of environmental monitoring data for IAAAP OU-8 is used to demonstrate compliance with the applicable or relevant and appropriate requirements (ARARs).

Radiological air data collected at IAAAP OU-8 through airborne radioactive particulate monitoring were evaluated. In addition to environmental monitoring purposes, radiological air data were also used as inputs to calculate the total effective dose equivalent (TEDE) to the hypothetical maximally exposed individual from IAAAP OU-8.

The TEDE calculated for the hypothetical maximally exposed individual at IAAAP OU-8 was less than 0.1 mrem per year. The results of the radiological air monitoring conducted at IAAAP OU-8 demonstrate compliance with the ARARs for IAAAP OU-8.

Surface-water and sediment sampling was completed as a best management practice in April and November of 2017. Samples were collected from 10 surface-water and sediment sampling locations (Figure 4-1). The results of the sampling were used to evaluate the radiological conditions of Long Creek and its tributary downgradient of the FS-12 Area and running to the east and south of the FS-12 Area. The results of the surface-water and sediment sampling demonstrate no adverse impacts from the remedial activities at the FS-12 area.

ES-1 REVISION 0

Calendar Year 2017	ant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for
	THIS PAGE INTENTIONALLY LEFT BLANK
	THIS FAGE INTENTIONALLY LEFT BLANK

1.0 HISTORICAL SITE BACKGROUND AND CURRENT SITE STATUS

1.1 INTRODUCTION

This Annual Environmental Monitoring Data and Analysis Report (EMDAR) for calendar year (CY) 2017 applies to the Iowa Army Ammunition Plant (IAAAP) Operable Unit (OU)-8, which is within the scope of the Formerly Utilized Sites Remedial Action Program (FUSRAP). This EMDAR provides an evaluation of the data collected as part of the environmental monitoring conducted for IAAAP OU-8. IAAAP OU-8 includes the Firing Sites Area (consisting of five subareas: Firing Site (FS)-1 and FS-2; FS-3, FS-4, and FS-5; FS-6 Area [FS-6, FS-7, FS-8, and FS-15]; FS-12 Area [FS-9, FS-10, FS-11, and FS-12]; and FS-14); Line 1 Structures; Yards C, G, and L; and Warehouse 3-01 (Figure 1-1). The M-Yard is not included as part of OU-8 in the *FUSRAP Record of Decision for the Iowa Army Ammunition Plant* (ROD) (USACE 2011); however, references to OU-8 include the M-Yard for the purposes of this EMDAR. Environmental monitoring of various media at IAAAP OU-8 is required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and under the commitments in the ROD (USACE 2011).

1.2 PURPOSE

The primary purpose of this EMDAR is to calculate the total effective dose equivalent (TEDE) from radionuclide emissions (exclusive of radon) to the hypothetical maximally exposed individual and other receptors from the IAAAP OU-8 sites at which a reasonable potential for radionuclide emissions due to FUSRAP activities exists to demonstrate compliance with the applicable or relevant and appropriate requirements (ARARs) or other federal and state benchmarks. During CY 2017, the FS-12 Area and the loadout area at the M-Yard had a reasonable potential for radionuclide emissions due to FUSRAP activities. The air emissions from the FS-12 Area and M-Yard are releases of particulate radionuclides in soil as a result of windblown action and remedial action (RA) in the form of excavation, stockpiling, on-site treatment (i.e., sorting), and loadout of soil.

This EMDAR additionally serves to enhance the reader's awareness of the current condition of IAAAP OU-8, summarize the data collection efforts for CY 2017, and provide analysis of the CY 2017 environmental monitoring data results. This EMDAR presents the following information:

- IAAAP OU-8 sample collection data and interpretation of CY 2017 results; and
- The status of IAAAP OU-8 regarding compliance with the ARARs or other federal and state benchmarks.

1.3 PROGRAM AND SITE HISTORY

The FUSRAP was executed by the U.S. Atomic Energy Commission (AEC) in 1974 to identify, remediate, or otherwise control sites at which residual radioactivity remained from operations conducted for the Manhattan Engineer District (MED). The FUSRAP was continued by the successor agencies to the AEC until 1997, when the U.S. Congress transferred responsibility for the execution aspect of the FUSRAP from the U.S. Department of Energy (DOE) to the U.S. Army Corps of Engineers (USACE).

The IAAAP is a government-owned, contractor-operated facility that occupies approximately $76,890,000 \text{ m}^2$ (19,000 acres) in Des Moines County near Middletown, Iowa, approximately

1-1 REVISION 0

10 miles west of Burlington, Iowa, and the Mississippi River (Figure 1-1). The installation's mission is to load, assemble, and pack (LAP) ammunition items, including projectiles, mortar rounds, warheads, demolition charges, and munitions components such as fuses, primers, and boosters.

All IAAAP land is currently owned by and under the control of the U.S. Army. Approximately one-third of the IAAAP property is occupied by active or formerly active munitions production or storage facilities. The remaining property is generally either forested (30,350,000 m² [7,500 acres]) or leased for agricultural use (31,160,000 m² [7,700 acres]).

Since operations began in 1941, the IAAAP has used explosives and lead-based initiating compounds to produce a wide variety of ordnance items. During the summer of 1947, Mason & Hanger – Silas Mason Company Inc., the operating contractor, entered into a contract with the Ordnance Department to assist in the design and engineering, to perform the construction, and to operate a facility for the purpose of supplying the AEC with explosive components for nuclear weapons. From 1947 to 1975, the IAAAP OU-8 sites were under the control of the AEC or its successors for weapon-assembly operations. Based on IAAAP project history reports, the first nuclear weapon assembly operations are believed to have begun in 1949. Throughout the remaining years of AEC control, the IAAAP tested, assembled, conducted surveillance on, and disassembled a wide variety of nuclear weapons. Detailed descriptions and histories of the IAAAP OU-8 sites are contained in the *Iowa Army Ammunition Plant FUSRAP Remedial Investigation Report for Firing Sites Area, Yards C, E, F, G, and L, Warehouse 3-01 and Area West of Line 5B* (USACE 2008) and the ROD (USACE 2011).

1.4 CALENDAR YEAR 2017 ACTIVITIES

1.4.1 IAAAP Operable Unit 8 Calendar Year 2017 Documents

During CY 2017, the *Iowa Army Ammunition Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for Calendar Year 2016* (USACE 2017) was finalized.

1.4.2 IAAAP Operable Unit 8 Calendar Year 2017 Remedial Actions

During CY 2017, an RA was performed at the FS-12 Area. The RA began at the FS-12 Area in the first quarter and continued through the fourth quarter. A total of 9,339 tons of soil was sorted following excavation from the IAAAP OU-8 sites, with 428 tons of the soil stockpiled as contaminated material after sorting at the FS-12 Area.

In CY 2017, contaminated material, including the 2017 soil stockpile, a soil stockpile remaining from 2016 activities, and additional large, bulky material (large materials discharged from soil sorting, tree and brush material, etc.) collected over 4 years of field activities was transported from FS-12 to the M-Yard.

A total of 1,245 tons (1,153 yd³) of contaminated material was loaded on railcars and shipped offsite for disposal at Energy Solutions in Clive, Utah. At the end of CY 2017, approximately 214 yd³ of soil was transported back to FS-12 for stockpiling and no soil remained at the M-Yard.

During CY 2017, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (DOD 2000) Class 1 verifications were completed at the FS-12 Area (survey units [SUs] 13, 14, 15, 20, 21, 22, 23, 24, 35, 36, 37, 41, 42, and 43 [Areas F, G, and H] and at the FS-12 Bunker).

1-2 REVISION 0

Verifications at the FS-12 Area were performed to confirm that the remediation goals (RGs) of the ROD were achieved.

During CY 2017, characterizations/pre-design investigations (PDIs) were performed at the FS-12 Area (SUs 52, 53, 93, 94, 97, 101, 102, 103, 104, 107, 108, 109, 110, 111, 112, 113, 114, and 115).

No excavation or decontamination water was released in CY 2017.

1-3 REVISION 0

Iowa Army Ammunition Plan Calendar Year 2017	nt Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for
	THIS PAGE INTENTIONALLY LEFT BLANK
	THIS TAGE INTENTIONALLT LEFT BLANK

2.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS EVALUATION

Section 2.8.2 of the ROD lists two ARARs that are evaluated in this EMDAR. The first ARAR, from 10 *Code of Federal Regulations [CFR]* 20.1403(b), requires that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group not exceed 25 mrem per year. The second ARAR, from 10 *CFR* 20.1101(d), requires that emissions of radioactive material to the environment, excluding radon (Rn)-222 and its daughters, be maintained so the highest individual dose to the public does not exceed 10 mrem per year. For the purposes of the CY 2017 evaluation, the critical group is the current IAAAP employee not engaged in FUSRAP RA (i.e., an employee working at FS-1 and FS-2, located approximately 1,285 m south of the FS-12 Area and approximately 521 m northwest of the M-Yard).

The evaluation for compliance with the 10 *CFR* 20.1101(d) ARAR is accomplished using the U.S. Environmental Protection Agency (USEPA) computer code CAP88-PC to determine dose from radioactive airborne emissions to members of the public located at specific distances and directions from the site. The evaluation for compliance with the 10 *CFR* 20.1403(b) ARAR is typically accomplished by calculating dose from all pathways, including radioactive airborne emissions (inhalation), ingestion, dermal contact, external gamma radiation, and radon; however, based on the location of the current site worker at FS-1 and FS-2, the ROD considers exposure from all pathways except airborne emissions to be insignificant. Therefore, both ARARs will be evaluated using only the dose from airborne emissions. Additionally, compliance with 10 *CFR* 20.1101(d) will automatically ensure compliance with 10 *CFR* 20.1403(b), because both are dose-based limits of 10 mrem per year and 25 mrem per year, respectively to the same receptor.

Exposures to potential trespassers and recreational users (e.g., hunters) are considered infrequent and insignificant, because of access restrictions to the IAAAP property, as well as the physical characteristics of each area therein.

Although not required to be followed, 40 *CFR* 61.103, Appendix E, (the USEPA's equivalent regulation to 10 *CFR* 20.1101(d)), provides a procedure to determine compliance with radioactive airborne emissions. This procedure was followed to calculate dose to the potential receptors (e.g., residential, farm, business, and school receptors), and is described in the subsequent sections.

2-1 REVISION 0



3.0 EVALUATION OF RADIOLOGICAL AIR MONITORING DATA

3.1 METHOD

Emission rates for the IAAAP OU-8 sites were modeled using guidance documents referenced in 40 CFR 61, Appendix E, Compliance Procedures Methods for Determining Compliance with Subpart I (USEPA 1989), and were measured by collection of environmental air samples for radioactive particles. Emission rates were input into the USEPA computer code CAP88-PC, Version 4.0.1.17 (USEPA 2014), along with appropriate meteorological data and distances to receptors¹, to obtain the effective dose equivalent (EDE) from the air emissions.

Although 40 *CFR* 61.103 requires the use of the USEPA computer code COMPLY, the USEPA no longer supplies technical support for COMPLY. Because the USEPA lists both COMPLY and CAP88-PC as "Atmospheric transport models for assessing dose and risk from radioactive air emissions" (USEPA 2015), CAP88-PC was used as a comparable and conservative method to demonstrate compliance with the ARARs.

3.1.1 EMISSION RATE

The method used to determine particulate radionuclide emission rates from the IAAAP OU-8 sites was 40 *CFR* 61, Appendix D, *Methods for Estimating Radionuclide Emissions*. Emissions during excavations and waste loadout were evaluated using air sampling data at the excavation and waste loadout perimeters.

3.1.2 EFFECTIVE DOSE EQUIVALENT

The EDE to receptors¹ is obtained using the USEPA computer code CAP88-PC, Version 4.0.1.17 (USEPA 2014). CAP88-PC uses a Gaussian plume equation to estimate the dispersion of radionuclides. An area ground release at a height of 1 m is modeled for IAAAP OU-8.

The EDE is the dose from inhalation; exposures from ingestion, air immersion, and external ground surface are insignificant. CAP88-PC contains historical weather data libraries for major airports across the country, and the results can be modeled for receptors at multiple distances from the emissions source.

3.2 METEOROLOGICAL DATA

Meteorological data were obtained from CAP88-PC for the Quad City International Airport in Moline, Illinois (wind file 14923.WND). The Quad City International Airport, located 60 miles northeast of the IAAAP, is the closest airport to the IAAAP with meteorological data. Data in the file were accumulated from 1988 through 1992.

Average Annual Wind Velocity: 4.252 m per second
Average Annual Precipitation Rate: 103 cm per year

• Average Annual Air Temperature: 11 °C

Wind direction frequency was obtained from the CAP88-PC wind file, 14923.WND (Table 3-1).

3-1 REVISION 0

¹ "Receptors," as used in this EMDAR, are the locations for the nearest residence, school, business, and farm.

Table 3-1. Quad City International Airport Wind Rose Frequency

Wind D	irection	Wind	Wind Direction		Wind
Wind Toward	Wind From	Frequency	Wind Toward	Wind From	Frequency
North	South	0.128	South	North	0.050
North-Northwest	South-Southeast	0.045	South-Southeast	North-Northwest	0.033
Northwest	Southeast	0.036	Southeast	Northwest	0.055
West-Northwest	East-Southeast	0.052	East-Southeast	West-Northwest	0.090
West	East	0.086	East	West	0.005
West-Southwest	East-Northeast	0.052	East-Northeast	West-Southwest	0.085
Southwest	Northeast	0.035	Northeast	Southwest	0.066
South-Southwest	North-Northeast	0.025	North-Northeast	South-Southwest	0.069

3.3 IAAAP OPERABLE UNIT 8 SITES UNDER ACTIVE REMEDIATION

3.3.1 Material Handling and Processing for Calendar Year 2017

At the IAAAP OU-8 sites in CY 2017, remedial activities were performed at the FS-12 Area, and waste loadout activities were conducted at the M-Yard. Excavated soils were placed at the FS-12 Area prior to treatment (i.e., soil sorting). The excavated soils (9,339 tons) were then sorted with 428 tons of the soil diverted to a post-sorting contaminated soil pile. The post-sorting contaminated soil pile was covered when sorting activities were concluded. The clean soil piles were not covered. Verification data for the clean soil piles and the excavation surface are less than the RG. Contaminated soil, debris, and other materials from 2017 and previous years' remedial activities were transported to the M-Yard via covered dump trucks, stockpiled, and loaded onto railcars for offsite disposal. The remaining contaminated soil pile (approximately 214 yd³) was transported back to FS-12 for stockpiling and will be transported to a licensed disposal facility at a later date.

General area air samples were collected around active excavation perimeters, soil sorting activities, and loadout activities during CY 2017, with the results used to determine the site emissions. In-situ emissions from inactive areas of IAAAP OU-8 were not calculated, because the ground surface soil at the IAAAP is generally covered with vegetation that limits the potential for material to become airborne.

3.3.2 Source Description – Radionuclide Soil Concentrations

For the IAAAP OU-8 excavation area, the depleted uranium (DU) activity fractions listed in Section 2.5.7 of the ROD were used. Activity fractions for the contaminants of concern (COCs) are:

- 90.14 percent (uranium [U]-238),
- 1.45 percent (U-235), and
- 8.40 percent (U-234).

The averaged total alpha air particulate concentrations at the FS-12 Area and the M-Yard, along with the three uranium activity fractions, were used to calculate the emission rate for each area.

3.3.3 List of Assumed Air Releases for Calendar Year 2017

Wind erosion during periods of RA excavations and periods in which the excavated soil pile, post-sorting contaminated soil pile at the FS-12 Area, and loadout pile at the M-Yard were uncovered is assumed for the particulate radionuclide emission determinations from IAAAP OU-8. Verification data for post-sorting clean soil piles and non-backfilled excavation surfaces are less than the RG. Therefore, the post-sorting clean soil piles and non-backfilled excavation surfaces

3-2 REVISION 0

are protective of human health and the environment and do not contribute to the emission determinations. Unexcavated areas do not contribute to the emission determinations for periods of inactivity due to the low activity and vegetative cover.

The excavation area, the excavated soil pile, the post-sorting contaminated soil pile, and loadout pile at the M-Yard were assumed to be contributing to air releases during the 2017 dates when the SUs were open and when the sorting and loadout piles were uncovered. Appendix A, Table A-1, lists the 2017 dates of potential air releases by location.

3.3.4 Distances to Receptors

The distances to receptors are listed in Table 3-2. Distances and directions to receptors are determined by using tools in a geographic information system (GIS). The location of the receptors is shown on Figure 3-1.

Sources	Resid	ent	Fari	m	Business ^a		School	
Sources	Distance (m)	Direction	Distance (m)	Direction	Distance (m)	Direction	Distance (m)	Direction
FS-12 Area	2,714	W	2,714	W	1,285	S	7,894	NW
M_Vard	3 498	NW	3 498	NW	521	NW	9.463	NW

Table 3-2. IAAAP Operable Unit 8 Receptors for CY 2017

3.4 EMISSIONS DETERMINATION

3.4.1 Measured Airborne Radioactive Particulate Emissions

Particulate air samples were collected from several locations around the perimeter of the FS-12 Area excavation, soil sorting area, soil stockpile areas, and the M-Yard loadout area to measure the radionuclide emissions from the RA, soil sorting, and soil loadout. The samples provide the basis for determining the radionuclide emission rates during CY 2017. Air sample data for particulate air samples were determined through the use of calibrated field instruments. Appendix C, Attachment C-1, contains the Air Sample Reports and Appendix C, Table C-1, is a summary table of the particulate air sample data. One sample was collected at FS-1 during the 2017 field season. One particulate air sample for each week was submitted to the USACE St. Louis District FUSRAP Radioanalytical Laboratory for analysis to verify sample results from the calibrated field instruments (see Table C-2).

The average gross alpha concentration (in $\mu Ci/mL$) was determined for the FS-12 Area and the M-Yard for CY 2017 and is presented in Table 3-3. Gross alpha particulate results (Table C-1) less than zero indicate the result was less than the average background value for the instrument. When calculating an average airborne concentration, negative data points were rounded to a zero value.

Table 3-3. IAAAP Operable Unit 8 Average Gross Alpha Airborne Particulate Emissions for CY 2017

Sampler Location	Average Concentration (µCi/mL)		
Sampler Location	Gross Alpha		
FS-12 Area ^a	3.42E-15		
M-Yard ^b	1.47E-15		

Includes the emission rates from the RA, soil sorting, and soil stockpiles.

^a The business receptor, an IAAAP employee at FS-1 and FS-2, is an average member of the critical group.

Includes the emission rates from the soil stockpile and loadout activities.

The activity fractions for DU at IAAAP OU-8 were determined as described in Section 3.3.2. The product of the DU activity fraction and the gross concentration provides the radionuclide emission concentration (in μ Ci/mL) for that area. The gross average concentration (in μ Ci/mL) is converted to a release (i.e., emission) rate, measured in Ci per year, using Equations 1 and 2.

A Guide for Determining Compliance with the Clean Air Act Standards for Radionuclide Emissions from NRC-Licensed and Non-DOE Federal Facilities (USEPA 1989) (page 3-21, [2]) provides Equation 1 for determination of the effective diameter of a non-circular stack or vent.

$$D = (1.3 \text{ A})^{1/2}$$
 Equation 1

where:

D = effective diameter of the release (in m), and

A = area of the stack, vent, or release point (in m^2).

Table 3-4 provides (1) the effective surface area available for release of airborne radionuclides normalized to 1 year for the FS-12 Area and the M-Yard and (2) the effective diameter for the FS-12 Area and the M-Yard, at which excavation (Areas F,G, and H) and/or soil stockpiling was conducted in CY 2017. Calculation of the effective surface area is presented in Appendix A.

Table 3-4. IAAAP Operable Unit 8 Excavation Effective Areas and Effective Diameters for CY 2017

IAAAP OU-8 Location	Effective Area (m ²)	Effective Diameter (m)
FS-12 Area	7,336	98
M-Yard	13	4

The average annual wind speed for the Quad City International Airport is provided in CAP88-PC as 4.252 m per second. Conversion of this wind speed to a flow rate through stacks with the listed effective diameters for each area is completed using Equation 2.

$$F = V \pi [(D)^2/4]*60$$
 Equation 2

where:

F = flow rate (in m³ per minute),

V = wind velocity (in m per second),

 π = mathematical constant.

D = effective diameter of the release using Equation 1 (in m), and

60 = time conversion (seconds to minute).

Converting the velocity of emissions from the FS-12 Area and M-Yard to an effective flow rate results in the following site release flow rates for the IAAAP OU-8 sites, as listed in Table 3-5. The product of the flow rate, the activity fraction associated with each radionuclide, and the appropriate conversion factors provide the site emission rate for each radionuclide, as illustrated in Table 3-6. Appendix A contains flow rates and average radionuclide concentration data.

Table 3-5. IAAAP Operable Unit 8 Site Release Flow Rate for CY 2017

IAAAP OU-8 Location	Site Release Flow Rate (m³/minute)
FS-12 Area	1.9E+06
M-Yard	3.4E+03

3-4 REVISION 0

3.4.2 IAAAP Operable Unit 8 Total Airborne Radioactive Particulate Emission Rates

The CY 2017 emission rates for the FS-12 Area and M-Yard are presented in Table 3-6 and are based on the air samples collected from the perimeter of the excavated area, soil sorting area, and stockpiled soil.

Table 3-6. IAAAP Operable Unit 8 Airborne Radioactive Particulate Emission Rates Based on Excavation Perimeter Air Samples for CY 2017

Radionuclide	Emission R	ate (Ci/year) ^a
	FS-12 Area	M-Yard
U-238	3.1E-03	2.4E-06
U-235	5.0E-05	3.8E-08
U-234	2.9E-04	2.2E-07

Emission rate based on 365-day period at a respective flow rate (as presented in Table 3-5) as determined from the average annual wind speed (4.252 m per second) and the effective site area (as presented in Table 3-4) for each location.

3.4.3 CAP88-PC Results

The CAP88-PC report is contained in Appendix B. The effective area factor input was taken from Table 3-4. The individual dose results for the FS-12 Area and the M-Yard were summed. As shown in Table 3-7, this evaluation demonstrates that all IAAAP OU-8 receptors, including the hypothetical maximally exposed individual at IAAAP OU-8 (i.e., the business receptor, an IAAAP employee at FS-1 and FS-2, who is an average member of the critical group), receive less than the dose standards prescribed in 10 *CFR* 20.1101(d) (10 mrem per year) and 10 *CFR* 20.1403(b) (25 mrem per year).

Table 3-7. IAAAP Operable Unit 8 CAP88-PC Results for Receptors for CY 2017

Course		Dose (mrem/year)						
Source	Residenta	School ^b	Business ^c	Farm ^a				
FS-12 Area and M-Yard	< 0.1	< 0.1	< 0.1	< 0.1				

¹⁰⁰ percent occupancy factor.

b Corrected for the 23 percent occupancy factor (40 hours per week for 50 weeks per year).

The business receptor, an IAAAP employee at FS-1 and FS-2, is an average member of the critical group.

Iowa Army Ammunition Pla Calendar Year 2017	ant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for
	THIS PAGE INTENTIONALLY LEFT BLANK
	THIS FAGE INTENTIONALLT LEFT BLANK

4.0 SURFACE-WATER, SEDIMENT, AND STORM-WATER MONITORING

4.1 SURFACE-WATER AND SEDIMENT MONITORING

Surface water and sediment monitoring in Long Creek and its tributary, downgradient of the FS-12 Area and running to the east and south of the FS-12 Area, was performed as a best management practice. The purpose of the monitoring was to determine if RA is having a negative effect on Long Creek.

Surface water and sediment were sampled for the uranium isotopes to evaluate/determine if runoff from the FS-12 Area affects the quality of surface water and sediment in Long Creek and its tributary. Surface water and sediment sampling was conducted during April and November of CY 2017. Grab samples were collected and analyzed according to the protocol defined in Appendix D of the Remedial Investigation Work Plan for Line 1, Firing Sites Area, Yards C, G, and L, Warehouse 3-01 and the West Burn Pads Area South of the Road (RI WP) (USACE 2007).

The sampling events were conducted at 10 monitoring stations. Eight (8) of the stations were established in 2007 during the remedial investigation, and the remaining 2 stations (IAAP177509 and IAAP177517) were established in December 2014. Locations of the 10 surface-water and sediment monitoring stations are shown on Figure 4-1.

4.2 SURFACE-WATER MONITORING RESULTS

The radiological monitoring results for the CY 2017 surface-water sampling events are summarized in Table 4-1. FUSRAP surface-water monitoring analysis included unfiltered water samples for radionuclides associated with DU (i.e., U-234, U-235, and U-238). The monitoring results are presented in Appendix D, Table D-1, of this EMDAR.

Table 4-1. Radiological Results for CY 2017 Surface-Water Monitoring

Monitoring	Collection	Monitoring Parameters (pCi/L)				
Station	Date	U-234	U-235	U-238		
IAAP100153	04/25/17	1.28	0.18 ^a	1.31		
IAAP100153	11/15/17	1.46	0.23 ^a	1.36		
IAAP100154	04/25/17	1.29	0.19 ^a	0.95		
IAAP100154	11/14/17	0.80	0.57 ^a	0.62		
IAAP100155	04/25/17	1.65	0.18 ^a	1.26		
IAAP100155	11/14/17	1.23	0.21 ^a	1.17		
IAAP100164	b	b	b	b		
IAAP100164	b	b	b	b		
IAAP100165	04/25/17	0.78	0.41 ^a	0.31		
IAAP100165	11/14/17	0.51	0.50 ^a	0.25		
IAAP100178	04/25/17	1.02	0.20 ^a	0.74		
IAAP100178	11/14/17	1.01	0.52 ^a	0.54		
IAAP100180	04/25/17	0.67	0.20 ^a	0.47		
IAAP100180	11/14/17	0.82	0.19 ^a	0.53		
IAAP100187	04/25/17	0.43	0.16 ^a	0.44		
IAAP100187	11/14/17	0.61	0.21 ^a	0.43		
IAAP177509	04/25/17	1.08	0.39 ^a	1.03		
IAAP177509	11/15/17	0.55	0.18 ^a	0.40		
IAAP177517	04/25/17	0.16 ^a	0.19 ^a	0.46 ^a		
IAAP177517	11/14/17	0.41 ^a	0.41 ^a	0.51		

Reported result is less than the minimum detectable concentration (MDC) and is therefore set equal to the MDC.

4-1 REVISION 0

No surface water was present at the sample location due to seasonal weather conditions. No surface water sample was collected.

The historical radiological surface water monitoring data for all monitoring stations are summarized in Table 4-2.

Table 4-2. Comparison of Historical Radiological Surface-Water Results

Stations	Radionuclide	Units	December 2014	August 2015	December 2015	April 2016	November 2016	April 2017	November 2017
	U-234	pCi/L	0.59	0.92	0.36	0.64	1.28	1.28	1.46
IAAP100153	U-235	pCi/L	0.16 ^a	0.18 ^a	0.63 ^a	0.63^{a}	0.20^{a}	0.18 ^a	0.23 ^a
11 11 11 100100	U-238	pCi/L	0.67	0.18	0.65	0.30	0.91	1.31	1.36
	U-234	pCi/L	0.63	0.56	0.52	0.48^{a}	0.83	1.29	0.80
IAAP100154	U-235	pCi/L	0.20 ^a	0.22 ^a	0.44 ^a	0.22 ^a	0.23 ^a	0.19 ^a	0.57 ^a
	U-238	pCi/L	0.64	0.33	0.38	0.52	1.07	0.95	0.62
	U-234	pCi/L	0.95	0.54 ^a	0.70	0.71 ^a	0.62	1.65	1.23
IAAP100155	U-235	pCi/L	0.14^{a}	0.22 ^a	0.47^{a}	0.23 ^a	0.24 ^a	0.18 ^a	0.21 ^a
	U-238	pCi/L	0.34	0.75	0.54 ^a	0.42 ^a	0.44^{a}	1.26	1.17
	U-234	pCi/L	1.12	0.72	0.31 ^a	0.37	b	b	b
IAAP100164	U-235	pCi/L	0.16^{a}	0.58^{a}	0.47 ^a	0.19 ^a	b	b	b
	U-238	pCi/L	1.44	0.64	0.13 ^a	0.45	b	b	b
	U-234	pCi/L	0.68	0.24	0.45	0.61 ^a	0.74	0.78	0.51
IAAP100165	U-235	pCi/L	0.16 ^a	0.59	0.17 ^a	0.48^{a}	0.25^{a}	0.41 ^a	0.50 ^a
	U-238	pCi/L	0.58	0.16^{a}	0.36	0.68	0.20^{a}	0.31	0.25
	U-234	pCi/L	0.39	0.36	0.67	0.60	0.42 ^a	1.02	1.01
IAAP100178	U-235	pCi/L	0.16 ^a	0.39 ^a	0.42 ^a	0.22a	0.52 ^a	0.20 ^a	0.52 ^a
	U-238	pCi/L	0.37 ^a	0.20^{a}	0.41	0.49	0.80	0.74	0.54
	U-234	pCi/L	0.77	0.36	0.42	0.62	0.35 ^a	0.67	0.82
IAAP100180	U-235	pCi/L	0.16 ^a	0.20^{a}	0.15 ^a	0.24 ^a	0.20^{a}	0.20 ^a	0.19 ^a
	U-238	pCi/L	0.48 ^a	0.38 ^a	0.40	0.58	0.35 ^a	0.47	0.53
	U-234	pCi/L	1.07	0.52	0.34 ^a	0.43	0.39	0.43	0.61
IAAP100187	U-235	pCi/L	0.20 ^a	0.55 ^a	0.52 ^a	0.21 ^a	0.71 ^a	0.16 ^a	0.21 ^a
	U-238	pCi/L	0.45	0.33	0.42	0.43	0.29	0.44	0.43
	U-234	pCi/L	0.90	1.79	0.48	0.43 ^a	1.06	1.08	0.55
IAAP177509	U-235	pCi/L	0.17 ^a	0.21 ^a	0.19 ^a	0.24 ^a	0.20^{a}	0.39 ^a	0.18 ^a
	U-238	pCi/L	0.43	1.17	0.29	0.19 ^a	0.72	1.03	0.40
	U-234	pCi/L	0.71	0.54 ^a	0.63	0.47	0.93	0.16 ^a	0.41 ^a
IAAP177517	U-235	pCi/L	0.16 ^a	0.22 ^a	0.17 ^a	0.65 ^a	0.57^{a}	0.19 ^a	0.41 ^a
	U-238	pCi/L	0.52	0.43 ^a	0.51	0.68	0.50	0.46^{a}	0.51

^a Reported result is less than the MDC and is therefore set equal to the MDC.

4.3 SEDIMENT MONITORING RESULTS

Sediment samples were collected in depositional environments near each of the 10 previously described surface-water locations (Figure 4-1). Sediment samples were evaluated for the radiological constituents associated with DU (i.e., U-234, U-235, and U-238).

The radiological results for CY 2017 sediment sampling events are summarized in Table 4-3. The ROD (USACE 2011) established a soil RG for DU which uses U-238 as a surrogate. Therefore, sediment sampling results for U-238 were compared against the corresponding soil RG of 150 pCi/g established in the ROD. All sediment monitoring results for U-238 were below the soil RG. The analytical results from these monitoring activities are presented in Appendix D, Table D-2, of this EMDAR.

4-2 REVISION 0

b No surface water was present at the sample location due to seasonal weather conditions. No surface water sample was collected.

Table 4-3. Radiological Results for CY 2017 Sediment Monitoring

Monitoring	Collection	Moni	toring Parameters (pCi/g)
Station	Date	U-234	U-235	U-238
IAAP100153	04/25/17	0.75	0.18 ^a	1.02
IAAP100153	11/15/17	0.37	0.10^{a}	0.50
IAAP100154	04/25/17	0.54	0.26 ^a	0.31
IAAP100154	11/14/17	0.20	0.04^{a}	0.14
IAAP100155	04/25/17	0.67	0.19 ^a	0.85
IAAP100155	11/14/17	0.18	0.04	0.19
IAAP100164	04/24/17	1.04	0.31 ^a	0.84
IAAP100164	11/13/17	0.67	0.10^{a}	0.81
IAAP100165	04/25/17	0.28	0.13 ^a	0.31
IAAP100165	11/14/17	0.32	0.09^{a}	0.20
IAAP100178	04/25/17	0.41	0.11 ^a	0.44
IAAP100178	11/14/17	0.50	0.10^{a}	0.38
IAAP100180	04/25/17	0.36	0.23 ^a	0.37
IAAP100180	11/14/017	0.23	0.09^{a}	0.33
IAAP100187	04/25/17	0.29	0.16^{a}	0.36
IAAP100187	11/14/17	0.35	0.03^{a}	0.34
IAAP177509	04/25/17	0.09 ^a	0.10^{a}	0.31
IAAP177509	11/14/17	0.32	0.22a	0.71
IAAP177517	04/25/17	0.13	0.21 ^a	0.24
IAAP177517	11/14/17	0.17	0.04	0.28

Reported result is less than the MDC and is therefore set equal to the MDC.

The historical radiological sediment monitoring data for all monitoring stations are summarized in Table 4-4.

Table 4-4. Comparison of Historical Radiological Sediment Results

Stations	Radionuclide	Units	April 2007	December 2014	August 2015	December 2015	April 2016	November 2016	April 2017	November 2017
	U-234	pCi/g	a	0.56	0.51	0.43	0.99	0.42	0.75	0.37
IAAP100153		pCi/g	0.11 ^b	0.05 ^b	0.58 ^b	0.13 ^b	0.17 ^b	0.21 ^b	0.18 ^b	0.10^{b}
	U-238	pCi/g	0.50	0.43	1.00	0.20 ^b	0.85	0.31 ^b	1.02	0.50
	U-234	pCi/g	a	0.37	0.53^{b}	0.46	0.82	0.36^{b}	0.54	0.20
IAAP100154	U-235	pCi/g	0.17^{b}	0.13 ^b	0.55^{b}	0.28^{b}	0.36^{b}	0.44 ^b	0.26^{b}	0.04 ^b
	U-238	pCi/g	0.49	0.50	0.44^{b}	0.45	1.08	0.75	0.31	0.14
	U-234	pCi/g	a	0.19	0.61^{b}	0.61	0.76	0.40	0.67	0.18
IAAP100155	U-235	pCi/g	0.17^{b}	0.12^{b}	0.61^{b}	0.24^{b}	0.18^{b}	0.20^{b}	0.19^{b}	0.04
	U-238	pCi/g	0.37	0.24	0.49	0.83	0.86	0.30^{b}	0.85	0.19
	U-234	pCi/g	a	0.79	0.52^{b}	0.94	0.74	0.52	1.04	0.67
IAAP100164	U-235	pCi/g	0.22^{b}	0.12^{b}	0.57^{b}	0.33 ^b	0.14^{b}	0.40^{b}	0.31^{b}	0.10^{b}
	U-238	pCi/g	0.87	0.84	0.59	1.01	0.47	0.84	0.84	0.81
	U-234	pCi/g	a	0.17	0.20^{b}	0.59	0.38	0.26	0.28	0.32
IAAP100165	U-235	pCi/g	0.13^{b}	0.05^{b}	0.24^{b}	0.37^{b}	0.26^{b}	0.33^{b}	0.13^{b}	0.09^{b}
	U-238	pCi/g	0.29	0.14	0.43	1.07	0.41	0.35	0.31	0.20
	U-234	pCi/g	a	0.33	0.53	0.30^{b}	0.62	0.39	0.41	0.50
IAAP100178	U-235	pCi/g		0.13 ^b	0.49^{b}	0.17^{b}	0.15^{b}	0.19 ^b	0.11^{b}	0.10^{b}
	U-238	pCi/g		0.37	0.33	0.30^{b}	0.18	0.29	0.44	0.38
	U-234	pCi/g	a	0.26	0.23 ^b	0.39	0.31 ^b	0.40	0.36	0.23
IAAP10018	U-235	pCi/g		0.13 ^b	0.52^{b}	0.27^{b}	0.21^{b}	0.28 ^b	0.23^{b}	0.09^{b}
	U-238	pCi/g	0.41	0.19	0.23^{b}	0.59	0.49	0.39	0.37	0.33

4-3 REVISION 0

Table 4-4. Comparison of Historical Radiological Sediment Results (Continued)

Stations	Radionuclide	Units	April 2007	December 2014	August 2015	December 2015	April 2016	November 2016	April 2017	November 2017
	U-234	pCi/g	a	0.34	0.39	0.34	0.29^{b}	0.58	0.29	0.35
IAAP100187	U-235	pCi/g	0.14^{b}	0.16^{b}	0.36^{b}	$0.27^{\rm b}$	0.27^{b}	0.15 ^b	0.16^{b}	$0.03^{\rm b}$
	U-238	pCi/g	0.30	0.37	0.29^{b}	0.64	0.25	0.31	0.36	0.34
	U-234	pCi/g	d	0.17	0.14^{b}	0.62	0.32^{b}	0.39	0.09 b	0.32
IAAP177509 ^c	U-235	pCi/g	d	0.04^{b}	0.33^{b}	0.15^{b}	0.21^{b}	0.17^{b}	0.10^{b}	0.22^{b}
	U-238	pCi/g	d	0.27	0.32^{b}	0.68	0.81	0.25	0.31	0.71
	U-234	pCi/g	d	0.27	0.41	0.40	0.32	0.47	0.13	0.17
IAAP177517 ^c	U-235	pCi/g	d	0.04^{b}	0.23^{b}	0.17^{b}	0.16^{b}	0.16^{b}	0.21^{b}	0.04
	U-238	pCi/g	d	0.18	0.41	0.54	0.28	0.28^{b}	0.24	0.28

Sample was not analyzed for U-234.

4.4 STORM-WATER MONITORING

No storm-water monitoring samples were collected in CY 2017.

4.5 CONCLUSION

The results from surface water and sediment sampling during CY2017 do not indicate impacts from the RA at the FS-12 Area.

Reported result is less than the MDC and is therefore set equal to the MDC.

Stations IAAP177509 and IAAP177517 were established and initially sampled in December 2014.

d Sample not collected in 2007.

5.0 ENVIRONMENTAL QUALITY ASSURANCE PROGRAM

5.1 PROGRAM OVERVIEW

The environmental quality assurance (QA) program includes management of the QA/quality control (QC) programs, plans, and procedures governing environmental monitoring activities at the IAAAP and at a USACE subcontracted vendor QA laboratory. This section describes the environmental monitoring standards of the FUSRAP and the goals for these programs, plans, and procedures.

The environmental QA program provides the FUSRAP with reliable, accurate, and precise monitoring data. The program furnishes guidance and directives to detect and prevent problems from the time a sample is collected until the associated data are evaluated.

Key elements in achieving the goals of this program are personnel training; compliance assessments; use of QC samples; documentation of field activities and laboratory analyses; and a review of data documents for precision, accuracy, and completeness.

General objectives are to:

- Provide data of sufficient quality and quantity to support ongoing remedial efforts.
- Ensure samples were collected using approved techniques and are representative of existing site conditions.

5.2 QUALITY ASSURANCE PROJECT PLAN

The quality assurance project plan (QAPP) for environmental monitoring activities performed at the IAAAP OU-8 sites is contained in Appendix D of the RI WP (USACE 2007). The QAPP provides the organization, objectives, functional activities, and specific QA/QC activities associated with environmental monitoring activities at the IAAAP OU-8 sites.

QA/QC procedures are performed in accordance with applicable professional technical standards, USEPA requirements, government regulations and guidelines, and specific project goals and requirements. The QAPP was prepared in accordance with USEPA and USACE guidance documents, including *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* (USEPA 1991), *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations* (USEPA 1994), and Engineer Manual (EM) 200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans* (USACE 2001).

The QAPP summarizes standard operating procedures (SOPs) and data quality requirements for collecting and analyzing environmental data. The QAPP integrates protocols and methodologies identified under various USACE and regulatory guidance. It describes administrative procedures for managing environmental data and governs sampling plan preparation; data review, evaluation, and validation; database administration; and data archiving.

5.3 FIELD SAMPLE COLLECTION AND MEASUREMENT

Prior to beginning field sampling, field personnel were trained, as necessary, and participated in a project-specific readiness review. These activities ensured that standard procedures were followed in sample collection and in completion of field logbooks, chain-of-custody forms, labels, and custody seals. Documentation of training and readiness were submitted to the project file.

5-1 REVISION 0

The master field investigation documents are the site field logbooks. The primary purpose of these documents is to record daily field activities; personnel on each sampling team; and any administrative occurrences, conditions, or activities that may have affected the fieldwork or data quality of any environmental samples for a given day. Guidance for documenting specific types of field sampling activities in field logbooks or log sheets is contained in Appendix C of *Requirements for the Preparation of Sampling and Analysis Plans*, EM 200-1-3 (USACE 2001).

At any point in the process of sample collection or data and document review, a non-conformance report may be initiated if non-conformances are identified (Leidos 2015a). Data entered into the database may be flagged accordingly.

5.4 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits of both field and laboratory activities were conducted to verify that sampling and analysis activities were performed in accordance with the procedures established in the QAPP.

5.4.1 Field Assessments

Internal assessments (i.e., audit or surveillance) of field activities (i.e., sampling and measurements) were conducted by the QA/QC Officer (or designee) for the FUSRAP. Assessments included an examination of field sampling records, field instrument operating records, sample collection, handling and packaging procedures, maintenance of QA procedures, and chain-of-custody forms. These assessments occurred at the onset of the project to verify that all established procedures were followed (system audits).

Performance assessments followed the system audits to ensure that deficiencies had been corrected and to verify that QA practices/procedures were being maintained throughout the duration of the project. These assessments involved reviewing field measurement records, instrumentation calibration records, and sample documentation.

External assessments may be conducted at the discretion of the USACE, USEPA Region 7, or the State of Iowa.

5.4.2 Laboratory Audits

The USACE St. Louis FUSRAP laboratory is subject to periodic review(s) by the local USACE Chemist (system audits) to demonstrate compliance with the *Department of Defense* (*DoD*)/*Department of Energy* (*DOE*) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories (QSM) (DOD and DOE 2013). In conjunction, the USACE St. Louis FUSRAP laboratory participates in blind, third-party performance evaluation studies (performance audits) at least twice per year, with results reported to the local USACE point(s) of contact. In addition, contract laboratories are required to be accredited under the U.S. Department of Defense (DOD) Environmental Laboratory Accreditation Program (ELAP). The DOD ELAP requires an annual audit and re-accreditation every 3 years.

System audits include examining laboratory documentation of sample receipt, sample log-in, sample storage, chain-of-custody procedures, sample preparation and analysis, and instrument operating records. Performance audits consist of USACE laboratories receiving performance evaluation samples from an outside vendor for an ongoing assessment of laboratory precision and accuracy. The analytical results of the analysis of performance evaluation samples are

5-2 REVISION 0

evaluated by USACE Hazardous, Toxic, and Radioactive Waste – Center of Expertise and/or a local oversight chemist to ensure that laboratories maintain acceptable performance.

Internal performance and system audits of laboratories were conducted by the Laboratory QA Manager as directed in the *Laboratory Quality Assurance Plan for the FUSRAP St. Louis Radiological Laboratory* (USACE 2013). Internal system audits included an examination of laboratory documentation of sample receipt, sample log-in, sample storage, chain-of-custody procedures, sample preparation and analysis, and instrument operating records against the requirements of the laboratory SOPs. Internal performance audits were also conducted on a regular basis. Single-blind performance samples were prepared along with project samples and submitted to the laboratory for analysis. The Laboratory QA Manager evaluated the analytical results of these single-blind performance samples to ensure that the laboratory maintained acceptable performance. Quarterly QA/QC reports are generated and provided to the local USACE authority; these reports document the ongoing QC elements and allow further monitoring of quality processes/status. In addition, QA plans and methodology are to follow the guidance presented in the QSM (DOD and DOE 2013).

5.5 SUBCONTRACTED LABORATORY PROGRAMS

All samples collected during environmental monitoring activities were analyzed by USACE-approved laboratories. The QA samples collected for surface water and sediment were analyzed by the designated USACE-subcontracted QA laboratory. The laboratory supporting this work maintained statements of qualifications, including organizational structure, QA manual, and SOPs. Additionally, the subcontracted laboratory is an accredited laboratory under the DOD ELAP.

Samples collected during these investigations were analyzed by the USEPA methods contained in *Test Methods for Evaluating Solid Waste*, *Physical/Chemical Methods SW-846*, Third Edition (USEPA 1993), and by other documented USEPA or nationally recognized methods. Laboratory SOPs are based on USEPA SW-846 methods.

5.6 QUALITY ASSURANCE AND QUALITY CONTROL SAMPLES

The QA/QC samples were analyzed for the purpose of assessing the quality of the sampling effort and the reported analytical data. The QA/QC samples include duplicate samples (-1) and split samples (-2). The equations utilized for accuracy and precision are presented in Section 5.8.

5.6.1 Duplicate Samples

These samples, which measure precision, were collected by the sampling teams and were submitted for analysis to the USACE St. Louis FUSRAP laboratory. The purpose of these samples is to provide activity-specific, field-originated information regarding the homogeneity of the sampled matrix and the consistency of the sampling effort. These samples were collected concurrently with the primary environmental samples and equally represent the medium at a given time and location. Duplicate samples were collected from each medium addressed by this project and were submitted to the USACE St. Louis FUSRAP laboratory for analysis. One duplicate sample was collected for approximately every 20 field samples of each matrix and analyte. Precision is measured by the relative percent difference (RPD) or the normalized absolute difference (NAD) for radiological analyses.

5-3 REVISION 0

The RPDs and NADs for radiological analyses are presented in Tables 5-1 and 5-2. The overall precision for CY 2017 environmental monitoring sampling activities was acceptable. See Section 5.8 for the evaluation process.

Table 5-1. Radiological Duplicate Sample Alpha Analysis for CY 2017 – Surface Water

Surface Water Comple Name	U-2	234 ^a	U-2	235 ^a	U-238 ^a	
Surface Water Sample Name	RPD	NAD	RPD	NAD	RPD	NAD
IAAP196171 / IAAP196171-1	NC	NA	NC	NA	NC	NA

RPD criterion for water matrix samples is less than or equal to 30 percent. If the RPD is greater than 30 percent, then the NAD shall be less than or equal to 1.96 to remain within the control limits.

Table 5-2. Radiological Duplicate Sample Alpha Analysis for CY 2017 – Sediment

Cadimant Cample Name	U-2	234 ^a	U-2	235 ^a	U-238 ^a	
Sediment Sample Name	RPD	NAD	RPD	NAD	RPD	NAD
IAAP199568 / IAAP199568-1	22.44	NA	NC	NA	15.09	NA

RPD criterion for solid matrix samples is less than or equal to 50 percent. If the RPD is greater than 50 percent, then the NAD shall be less than or equal to 1.96 to remain within the control limits.

5.6.2 Split Samples

Split samples measure accuracy and were collected by the sampling team and sent to a USACE-subcontracted QA laboratory for analysis to provide an independent assessment of contractor and subcontractor laboratory performance. One split sample was collected for approximately every 20 field samples of each matrix for radiological analytes.

The RPDs and NADs for radiological analyses are presented in Tables 5-3 and 5-4. The overall accuracy for the CY 2017 environmental monitoring sampling activities was acceptable. See Section 5.8 for the evaluation process.

Table 5-3. Radiological Split Sample Alpha Analysis for CY 2017 – Surface Water

Surface Water Sample Name	U-2	34 ^a U-2		235 ^a	U-238 ^a	
Surface water Sample Name	RPD	NAD	RPD	NAD	RPD	NAD
IAAP196171 / IAAP196171-2	NC	NA	NC	NA	NC	NA

RPD criterion for water matrix samples is less than or equal to 30 percent. If the RPD is greater than 30 percent, then the NAD shall be less than or equal to 1.96 to remain within the control limits.

Table 5-4. Radiological Split Sample Alpha Analysis for CY 2017 – Sediment

Codiment Comple None	U-2	34 ^a	U-2	235 ^a	U-238 ^a		
Sediment Sample Name	RPD	NAD	RPD	NAD	RPD	NAD	
IAAP199568 / IAAP199568-2	37.26	NA	NC	NA	2.03	NA	

RPD criterion for solid matrix samples is less than or equal to 50 percent. If the RPD is greater than 50 percent, then the NAD shall be less than or equal to 1.96 to remain within the control limits.

⁻¹ Sample Duplicate

NA Not applicable; see RPD.

NC Not calculated due to one or both concentrations being below MDCs.

⁻¹ Sample Duplicate

NA Not applicable; see RPD.

NC Not calculated due to one or both concentrations being below MDCs.

⁻² Sample Split

NA Not applicable; see RPD.

NC Not calculated due to one or both concentrations being below MDCs.

⁻² Sample Split

NA Not applicable; see RPD.

NC Not calculated due to one or both concentrations being below MDCs.

5.6.3 Equipment Rinsate Blanks

Equipment rinsate blank samples are typically taken from the rinsate water collected from equipment decontamination activities. These samples consist of analyte-free water that has been rinsed over sampling equipment for the purposes of evaluating the effectiveness of equipment decontamination.

Sediment samples are collected from each station using a clean sampling spoon. These spoons are segregated after use and decontaminated according to Field Technical Procedure 400, "Equipment Decontamination" (Leidos 2015b). Because the process of collecting sediment occurs below the surface of the water, a rinsate blank would not represent the wetted surface of the sampling spoon at the time of sample collection and, therefore, would not apply. The surface water samples are collected using new nitrile gloves and new laboratory sample containers. Equipment rinsate blanks for these samples are also not required, because no potential for contamination exists.

5.7 DATA REVIEW, EVALUATION, AND VALIDATION

All data packages received from the analytical laboratory were reviewed and either evaluated or validated by data management personnel. Data validation is the systematic process of ensuring that the precision and accuracy of the analytical data are adequate for their intended use. Validation was performed in accordance with *Data Verification and Validation* (Leidos 2015c), and/or with project-specific guidelines. General chemical data quality management guidance found in Engineer Regulation (ER)-1110-1-263 (USACE 1998) was also used when planning for chemical data management and evaluation. Additional details of data review, evaluation, and validation are provided in the *FUSRAP Laboratory Data Management Process for the St. Louis Site* (USACE 1999). Data assessment guidance to determine the usability of data from hazardous, toxic, and radioactive waste projects is provided in EM-200-1-6 (USACE 1997)

One hundred (100) percent of the data generated from all analytical laboratories was independently reviewed and either evaluated or validated. The data review process documents the possible effects on the data from various QC failures; it does not determine data usability, nor does it include assignment of data validation qualifier (VQ) flags. The data evaluation process uses the results of the data review to determine the usability of the data. The process of data evaluation summarizes the potential effects of QA/QC failures on the data, and the USACE District Chemist or District Health Physicist assesses their impact on the attainment of the project-specific data quality objectives (DQOs). Consistent with the data quality requirements, as defined in the DQOs, approximately 10 percent of all project data were validated.

5.8 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS, AND SENSITIVITY

The data evaluation process considers precision, accuracy, representativeness, comparability, completeness, and sensitivity. The following subsections detail the particular parameters and the data evaluation method for each.

5-5 REVISION 0

Accuracy and precision can be measured by the RPD or the NAD using the following equations:

$$RPD = \left(\frac{[S-D]}{\frac{S+D}{2}}\right) x \ 100$$

$$NAD = \frac{|S - D|}{\sqrt{U_S^2 + U_D^2}}$$

where:

S = Parent Sample Result

D = Duplicate/Split Sample Result U_S = Parent Sample Uncertainty

 U_D = Duplicate/Split Sample Uncertainty

The RPD is calculated for all samples for which a detectable result is reported for both the parent and the QA field split or field duplicate. For surface water radiological samples, when the RPD is greater than 30 percent, the NAD is used to determine the accuracy or precision of the method. The RPD criterion for sediment samples is equal to 50 percent. NAD accounts for uncertainty in the results; RPD does not. The NAD should be equal to or less than a value of 1.96. Neither equation is used when the analyte in one or both of the samples is not detected. In cases in which neither equation can be used, the comparison is counted as acceptable in the overall number of comparisons.

Precision is a measure of mutual agreement among individual measurements performed under the same laboratory controls. To evaluate for precision, a field duplicate is submitted to the same laboratory as the original sample to be analyzed under the same laboratory conditions.

The RPD and NAD between the two results was calculated and used as an indication of the precision of the analyses performed (Tables 5-1 and 5-2). Sample collection precision was evaluated in the laboratory by the analyses of duplicates. The overall precision for the CY 2017 environmental monitoring sampling activities was acceptable.

Accuracy provides a gauge or measure of the agreement between an observed result and the true value for an analysis. The RPD and NAD between the two results was calculated and used as an indication of the accuracy of the analyses performed (Tables 5-3 and 5-4). For this EMDAR, accuracy is evaluated through the use of the field split samples through a comparison of the prime laboratory results versus the results of an independent laboratory. The overall accuracy for CY 2017 environmental monitoring sampling activities was acceptable.

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is a qualitative parameter that depends upon the proper design of the sampling program and proper laboratory protocols. Representativeness is satisfied through proper design of the sampling network, use of proper sampling techniques, following proper analytical procedures, and not exceeding holding times of the samples.

Representativeness was determined by assessing the combined aspects of the QA program, QC measures, and data evaluations. The sampling protocol from the RI WP QAPP was followed, and analytical procedures were conducted in accordance with the QAPP. The overall representativeness of the CY 2017 environmental monitoring sampling activities was acceptable for the media and sampling described in this EMDAR.

5-6 REVISION 0

Comparability expresses the confidence with which one dataset can be compared with another. The extent to which analytical data will be comparable depends upon the similarity of sampling and analytical methods, as well as sample-to-sample and historical comparability. Standardized and consistent procedures used to obtain analytical data are expected to provide comparable results. Some sample media (e.g., radiological monitoring) have values that are primarily useful in the present, thus the comparison to historical data is not as relevant. The overall comparability of the applicable environmental monitoring sampling data met the project DQOs.

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under normal conditions. Laboratories are expected to provide data meeting QC acceptance criteria for all samples tested. For the CY 2017 environmental monitoring sampling activities, the data completeness was 100 percent (the FUSRAP DQO for completeness is 90 percent).

Sensitivity is the determination of minimum detectable concentration (MDC) values that allows the investigation to assess the relative confidence that can be placed in an analytical result in comparison to the magnitude or level of analyte concentration observed. For this report, MDC is a term generically used to represent the minimum detectable activity (MDA) for radiological analytes. The closer a measured value to the MDC, the less confidence and more variation the measurement will have. Project sensitivity goals were expressed as quantitation level goals in the RI WP QAPP. These levels were achieved or exceeded throughout the analytical process.

The MDC is reported for each result obtained by laboratory analysis. These very low MDCs are achieved through the use of alpha spectroscopy. Variations in MDCs for the same radiological analyte reflect variability in the detection efficiencies and conversion factors due to factors such as individual sample aliquot, sample density, and variations in analyte background radioactivity for alpha spectroscopy at the laboratory. In order to complete the data evaluation (i.e. precision, accuracy, representativeness, and comparability), analytical results that exceed the MDC of the analyte are desired.

5.9 DATA QUALITY ASSESSMENT SUMMARY

The overall quality of the data meets the established project objectives. Through proper implementation of the project data review, evaluation, validation, and assessment process, project information has been determined to be acceptable for use.

Data, as presented, have been qualified as usable, but estimated when necessary. Data that have been estimated have concentrations/activities that are below the quantitation limit or are indicative of accuracy, precision, or sensitivity less than desired but adequate for interpretation.

These data can withstand scientific scrutiny, are appropriate for the intended purpose, and are technically defensible. The environmental information presented has an established confidence, which allows utilization for the project objectives and provides data for future needs.

5.10 RESULTS FOR PARENT SAMPLES AND THE ASSOCIATED DUPLICATE AND SPLIT SAMPLES

A summary of the QA parent sample results and associated duplicate and/or split sample results are presented in Tables 5-5 and 5-6.

5-7 REVISION 0

Table 5-5. Radiological Parent Samples and Associated Duplicate and Split Samples for CY 2017 – Surface Water

Surface Water	U-234 ^{b,c}			U-235 ^{b,c}				U-238 ^{b,c}				
Sample Name ^a	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ
IAAP196171	0.11	0.16	0.16	UJ	0.07	0.14	0.19	UJ	0.38	0.35	0.46	UJ
IAAP196171-1	0.55	0.34	0.14	J	0.06	0.12	0.17	UJ	0.70	0.39	0.14	J
IAAP196171-2	0.19	0.30	0.48	UJ	0.00	0.05	0.40	UJ	-0.02	0.04	0.48	UJ

Samples ending in "-1" are duplicate samples. Samples ending in "-2" are split samples.

Table 5-6. Radiological Parent Samples and Associated Duplicate and Split Samples for CY 2017 – Sediment

Sediment	U-234 ^{b,c}			U-235 ^{b,c}				U-238 ^{b,c}				
Sample Name ^a	Result	Error	MDC	VQ	Result	Error	MDC	VQ	Result	Error	MDC	VQ
IAAP199568	0.35	0.13	0.06	J	0.00	0.00	0.03	U	0.34	0.13	0.03	=
IAAP199568-1	0.28	0.12	0.07	J	0.01	0.05	0.11	UJ	0.29	0.12	0.03	=
IAAP199568-2	0.24	0.10	0.06	=	0.00	0.03	0.08	UJ	0.35	0.13	0.03	=

Samples ending in "-1" are duplicate samples. Samples ending in "-2" are split samples.

5-8 **REVISION 0**

Results are expressed in pCi/L.

Results from alpha spectroscopy.

VQ symbols indicate: "=" for positively identified results, "U" for not detected, "J" for analyte was identified as estimated quantity, and "UJ" for analyte was not detected and had QC deficiencies.

Results are expressed in pCi/g.

Results from alpha spectroscopy.

VQ symbols indicate: "-" for positively identified results, "U" for not detected, "J" for analyte was identified as estimated quantity, and "UJ" for analyte was not detected and had QC deficiencies.

6.0 REFERENCES

- DOD 2000. U.S. Department of Defense, U.S. Department of Energy, U.S. Environmental Protection Agency, and U.S. Nuclear Regulatory Commission. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*. NUREG-1575. EPA 402-R-97-016. August.
- DOD and DOE 2013. U.S. Department of Defense and U.S. Department of Energy. *Department of Defense (DoD)/Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories*. DOD Quality Systems Manual Version 5.1 and DOE Quality Systems for Analytical Services Version 3.1. July 2013.
- Leidos 2015a. Leidos Incorporated. Environmental Science & Engineering Operation, Standard Operating Procedure. "Control of Nonconforming Items," ESE A15.1, Rev. 0, January 31.
- Leidos 2015b. Leidos Incorporated. Environmental Science & Engineering Operation, Standard Operating Procedure. "Equipment Decontamination," FTP-400, Rev. 0, January 31.
- Leidos 2015c. Leidos, Incorporated. *Data Verification and Validation*. Environmental Science & Engineering Operation. Standard Operating Procedure. ESE DM-05. Revision 0. January 31, 2015.
- USACE 1997. U.S. Army Corps of Engineers. *Chemical Quality Assurance for Hazardous, Toxic, and Radioactive Waste (HTRW) Projects.* Engineer Manual, EM-200-1-6. October.
- USACE 1998. U.S. Army Corps of Engineers. *Engineering and Design Chemical Data Quality Management for Hazardous, Toxic, and Radioactive Waste Activities.* Engineer Regulation ER-1110-1-263. April.
- USACE 1999. U.S. Army Corps of Engineers. FUSRAP Laboratory Data Management Process for the St. Louis Site, St. Louis, Missouri. June.
- USACE 2001. U.S. Army Corps of Engineers. *Requirements for the Preparation of Sampling and Analysis Plans*, Engineer Manual, EM 200-1-3. February 1.
- USACE 2007. U.S. Army Corps of Engineers. St. Louis District. Remedial Investigation Work Plan for Line 1, Firing Sites Area, Yards C, G, and L, Warehouse 3-01 and the West Burn Pads Area South of the Road. Final. June.
- USACE 2008. U.S. Army Corps of Engineers, St. Louis District. *Iowa Army Ammunition Plant FUSRAP Remedial Investigation Report for Firing Sites Area, Yards C, E, F, G, and L, Warehouse 3-01 and Area West of Line 5B.* Middletown, Iowa. Final. October 8.
- USACE 2011. U.S. Army Corps of Engineers, St. Louis District. *FUSRAP Record of Decision for the Iowa Army Ammunition Plant*. Middletown, Iowa. Final. September.
- USACE 2013. U.S. Army Corps of Engineers, St. Louis District *Laboratory Quality Assurance Plan* for the FUSRAP St. Louis Radiological Laboratory, Berkeley, Missouri. Revision 8. April.
- USACE 2017. U.S. Army Corps of Engineers, St. Louis District Iowa Army Ammunition Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for Calendar Year 2016. Revision 0. June.
- USEPA 1989. U.S. Environmental Protection Agency, Office of Radiation Programs, Washington, D.C. A Guide for Determining Compliance with the Clean Air Act Standards for Radionuclide Emissions from NRC-Licensed and Non-DOE Federal Facilities. EPA 520/1-89-002. October.

- USEPA 1991. U.S. Environmental Protection Agency. *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*. QAMS-005/80.
- USEPA 1993. U.S. Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*, Third Edition, Revision 1, Updates 1, 2, and 3.
- USEPA 1994. U.S. Environmental Protection Agency. *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations*. EPA QA/R-5. January.
- USEPA 2014. U.S. Environmental Protection Agency. CAP88-PC Version 4.0.1.17 Computer Code. September.
- USEPA 2015. U.S. Environmental Protection Agency. "Rad NESHAPs Models." Radiation Protection. http://www.epa.gov/radiation/neshaps/models.html. Accessed September 2015.
- 10 CFR 20. Standards for Protection Against Radiation.
- 40 CFR 61, Subpart I. National Emission Standards for Radionuclide Emissions from Federal Facilities Other Than Nuclear Regulatory Commission Licensees and Not Covered by Subpart H.
- 40 CFR 61, Appendix D. Methods for Estimating Radionuclide Emissions.
- 40 CFR 61, Appendix E. Compliance Procedures Methods for Determining Compliance with Subpart I.

6-2 REVISION 0

idai 1 cai 2017	lant Operable Unit 8			
		FIGUE	RES	

Calendar Year 2017	ant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for
	THIS PAGE INTENTIONALLY LEFT BLANK

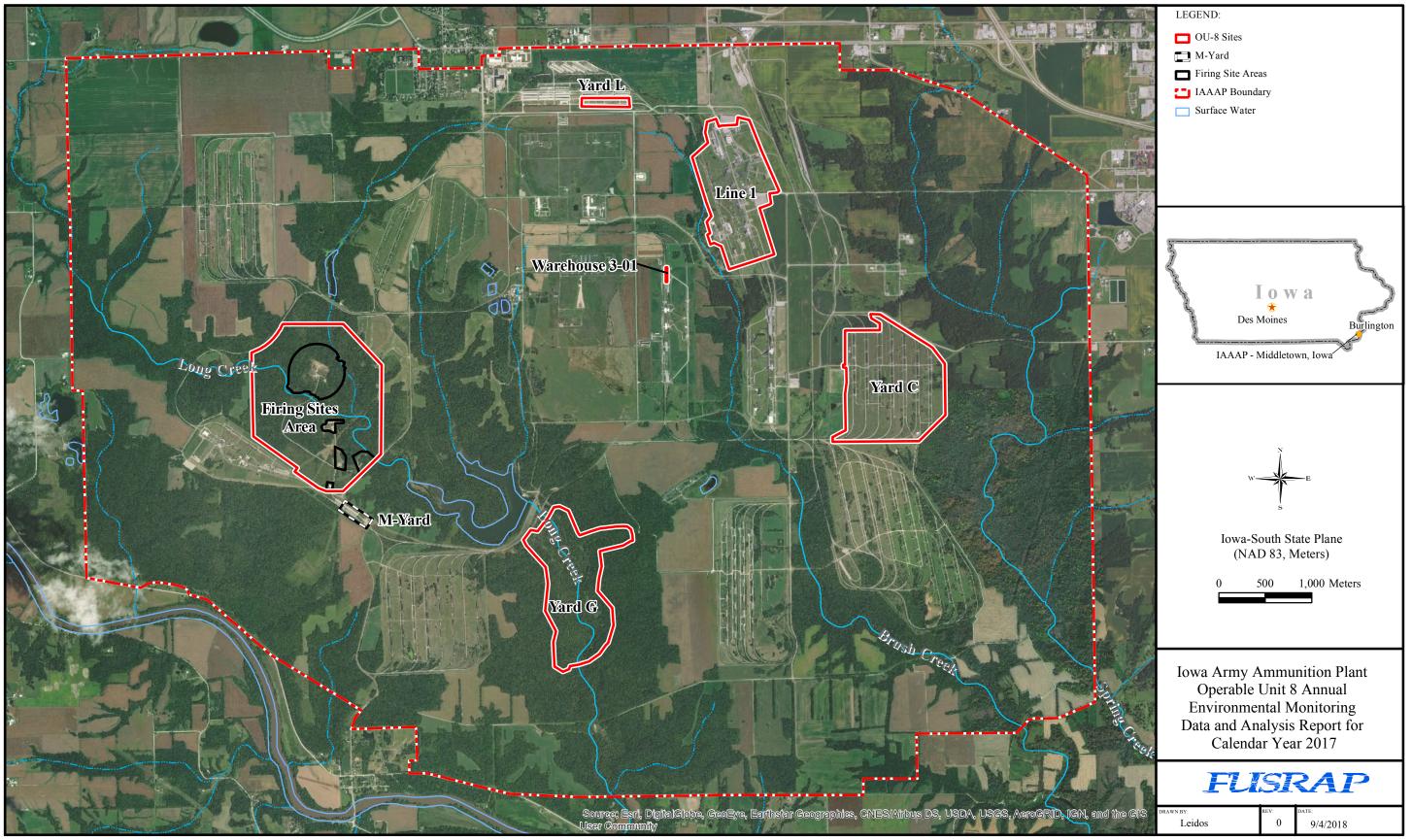


Figure 1-1. FUSRAP Areas at the IAAAP

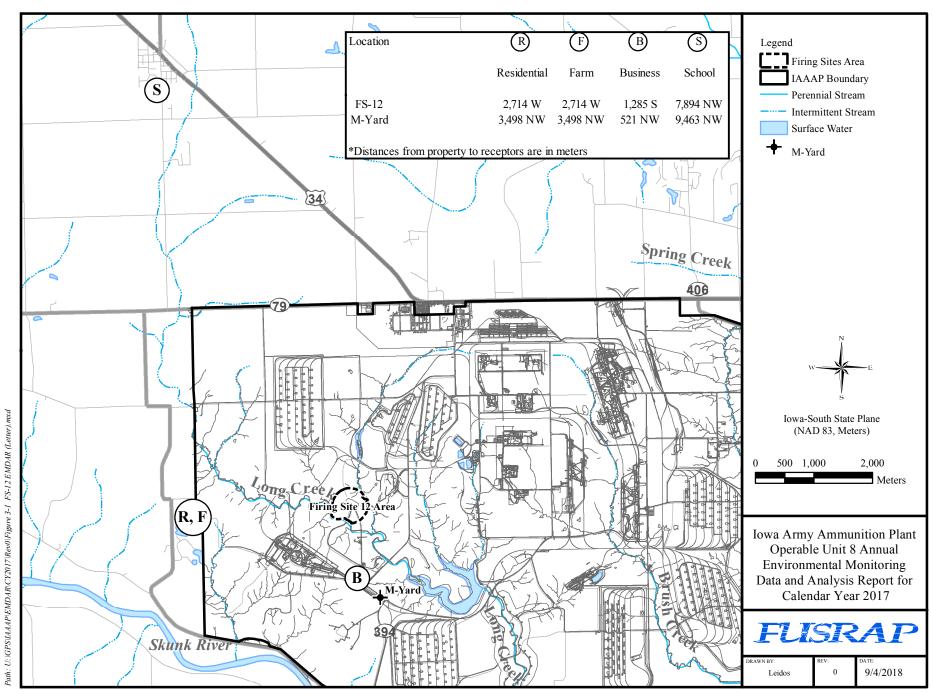


Figure 3-1. IAAAP Firing Sites Area Receptors

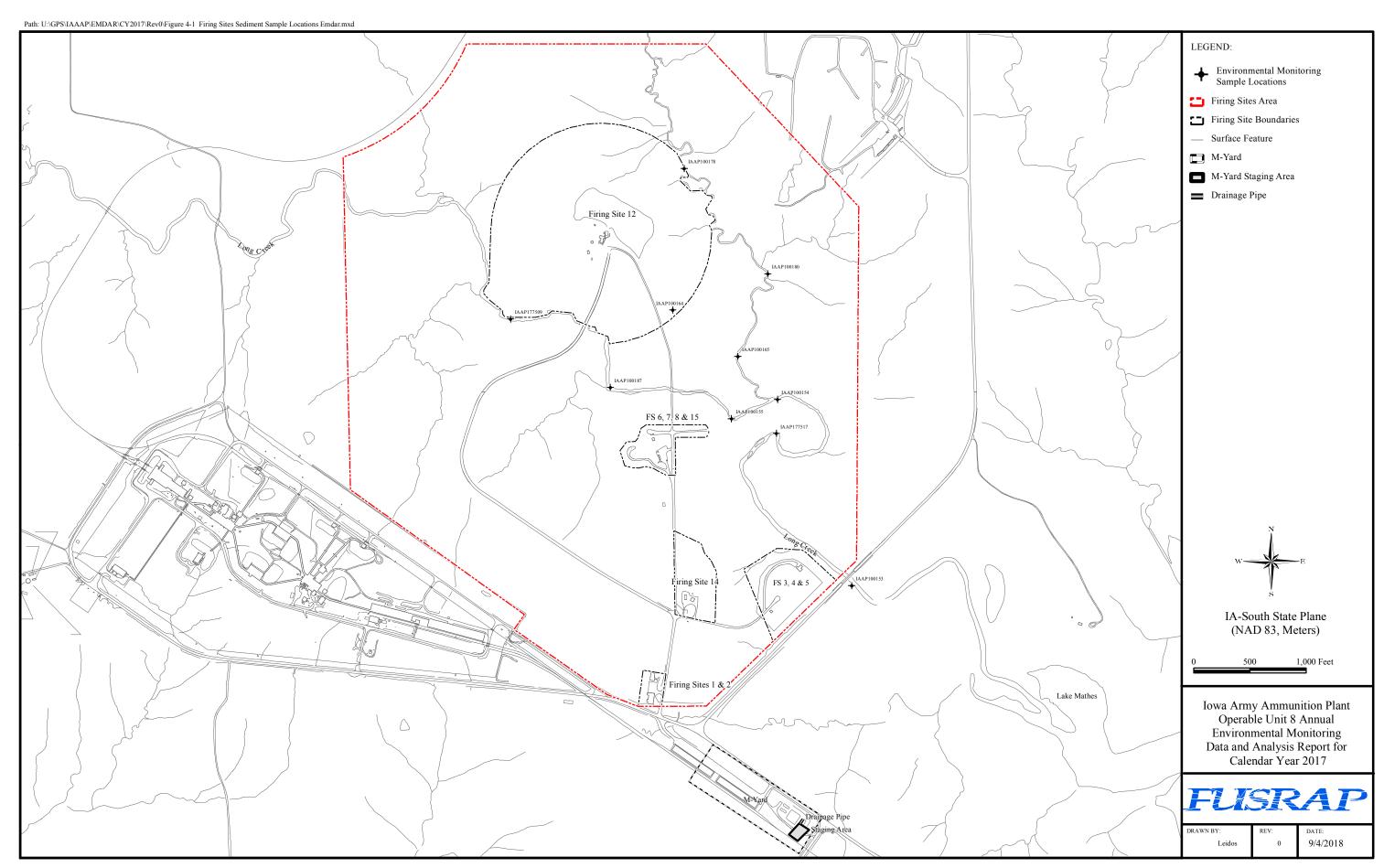
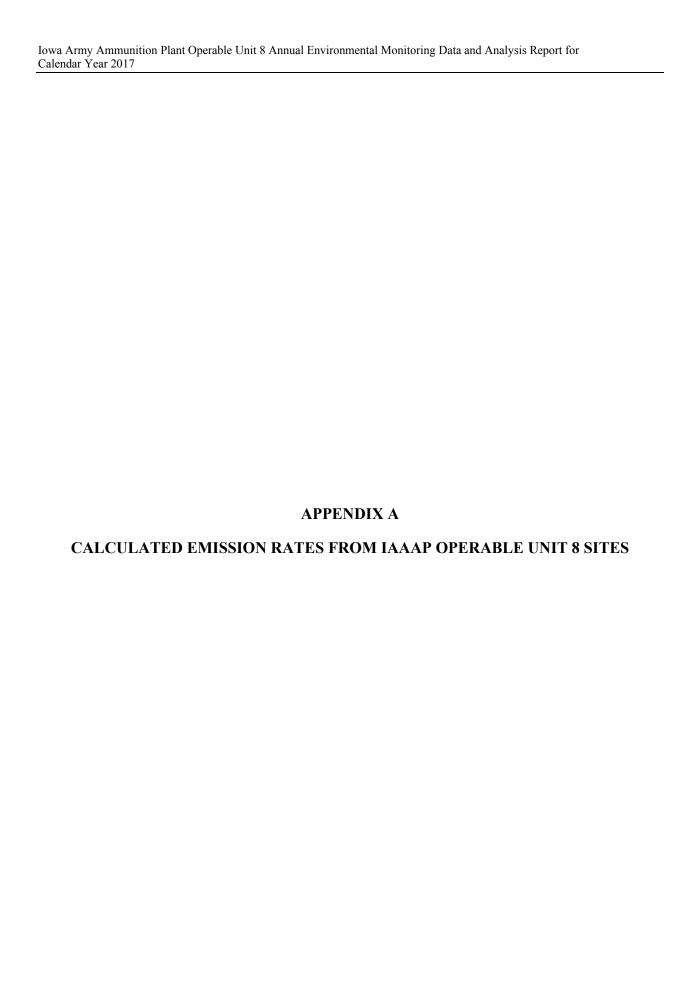


Figure 4-1. Surface-Water and Sediment Monitoring Locations



APPENDIX A REVISION 0

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A REVISION 0

Table A-1. Total Days for CY 2017

Location	Open Date	Close Date	Total Days
FS-12 Area SUs (Areas F, G, H)	05/04/17	10/26/17	176
FS-12 Area Pre-Sorting Pile	05/18/17	10/26/17	162
FS-12 Area Post-Sorting Contaminated Pile	05/18/17	11/15/17	182
M-Yard Post-Sorting Contaminated Pile	10/26/17	11/06/17	12

Table A-2. FS-12 Area Average Surface Area and Flow Rate Per Location for CY 2017

Location	Surface Area (m²)	Total Days ^a	Surface Area × Total Days	Average Surface Area/Year (A) ^c (m ²)	Diameter of Stack D = $(1.3 \text{ A})^{1/2}$ (m)	Flow Rated ^d $F = V \pi [(D)^2 / 4]*60$ $(m^3/minute)$
FS-12 Area						
SUs (Areas F, G, H)	13,000	176	2,288,000			
Pre-Sorting Pile ^b	2,000	162	324,000			
Post-Sorting Contaminated Pile ^b	400	182	72,800			
		Total	2,684,800	7,336	98	1.9E+06
M-Yard		•				
Post-Sorting Contaminated Pile ^b	400	12	4,800	13	4	3.4E+03

^a Total days were based on the 2017 dates in which potential wind-erosion occurred, as listed in Table A-1.

Table A-3. Airborne Radioactive Particulate Emissions Based on Excavation Perimeter Air Samples

Radionuclide	Gross Alpha Concentration (μCi/cm³)	Activity Fraction ^a	Emission Concentration (μCi/cm³) ^b	Emission Rate (Ci/year) ^c
FS-12 Area				
U-238	3.42E-15	0.9014	3.1E-15	3.1E-03
U-235	3.42E-15	0.0145	5.0E-17	5.0E-05
U-234	3.42E-15	0.0840	2.9E-16	2.9E-04
M-Yard				
U-238	1.47E-15	0.9014	1.3E-15	2.4E-06
U-235	1.47E-15	0.0145	2.1E-17	3.8E-08
U-234	1.47E-15	0.0840	1.2E-16	2.2E-07

a As listed in the ROD (USACE 2011).

No data identifying the area associated with the pre- and post-sorting piles existed. Therefore, the pre-sorting contaminated pile area was set at 2,000 m² (conservative value selected based on previous years' area values). The post-sorting contaminated piles at both FS-12 and the M-Yard were set at 400 m², which corresponds to 20 percent of the pre-sorting pile. The average volume ratio of post-sorting contaminated pile to pre-sorting pile is 13 percent.

Average surface area/year (A) = $[\Sigma(\text{surface area x total days})]/365$.

V = 4.252 m per second

b Emission concentration is equal to the activity fraction multiplied by the gross alpha airborne particulate concentrations.

^c Emission rate is based on a 365-day period calculated flow rate (Table A-2) for each site as determined from the average annual wind speed (4.252 m per second) and calculated site area (Table A-2). (Note: 1 mL = 1 cm³).

va Army Ammunition P lendar Year 2017	Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for
	THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B

CAP88-PC OUTPUT REPORT FOR IAAAP OPERABLE UNIT 8 SITES

APPENDIX B REVISION 0

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B REVISION 0

DOSE AND RISK SUMMARIES

Non-Radon Individual Assessment Mon Apr 16 15:14:09 2018

Facility: FS-12 IAAAP Address: Iowa Army Ammunition Plant

City: Middletown

State: IA Zip: 52638

Source Category: Area Source Type: Area Emission Year: 2017 DOSE Age Group: Adult

> Comments: FS-12 Emissions FS-12 Emissions

Dataset Name: FS-12 Emissions

Dataset Date: Apr 16, 2018 03:14 PM

Wind File: C:\Users\passigm\Documents\CAP88\Wind Files\14923.WND

SUMMARY Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal UB_Wall Bone_Sur Brain Breasts St_Wall SI_Wall ULI_Wall LLI_Wall Kidneys Liver Muscle Ovaries Pancreas R_Marrow Skin Spleen Testes Thymus Thyroid GB_Wall Ht_Wall Uterus ET_Reg Lung_66	2.18E-03 2.29E-03 3.16E-02 2.23E-03 2.60E-03 2.30E-03 2.45E-03 2.45E-03 1.15E-02 5.14E-03 2.55E-03 2.20E-03 2.16E-03 4.35E-03 4.17E-01 2.30E-03 2.27E-03 2.27E-03 2.21E-03 2.25E-03 2.25E-03
Effectiv	1.91E-02

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	5.44E-04
INHALATION	1.29E-02
AIR IMMERSION	3.52E-09
GROUND SURFACE	5.56E-03
INTERNAL	1.35E-02
EXTERNAL	5.56E-03
TOTAL	1.91E-02

SUMMARY Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

	Selected
	Individual
Nuclide	(mrem)
U-234	1.35E-03
Th-230	8.43E-10
Ra-226	1.02E-10
Rn-222	5.70E-12
Po-218	1.02E-16
Pb-214	3.72E-09
At-218	3.83E-16
Bi-214	2.18E-08
Rn-218	2.22E-18
Po-214	1.21E-12
T1-210	8.49E-12
Pb-210	1.42E-11
Bi-210	2.30E-10
Hg-206	1.86E-17
Po-210	5.91E-14
T1-206	5.37E-16
U-235	3.13E-04
Th-231	1.09E-05
Pa-231	1.81E-08
Ac-227	6.06E-11
Th-227	2.89E-08
Fr-223	2.73E-10
Ra-223	3.23E-08
Rn-219	1.40E-08
At-219	0.00E+00
Bi-215	6.30E-14
Po-215	4.28E-11
Pb-211	2.75E-08
Bi-211	1.13E-08
T1-207	1.42E-08
Po-211	5.45E-12
U-238	1.20E-02
Th-234	3.63E-04
Pa-234m	4.97E-03
Pa-234	9.79E-05
TOTAL	1.91E-02

SUMMARY Page 3

CANCER RISK SUMMARY

	Selected Individual	
	Total Lifetime	
Cancer	Fatal Cancer Risk	

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION INHALATION AIR IMMERSION GROUND SURFACE INTERNAL EXTERNAL	3.30E-11 4.44E-09 1.86E-15 1.18E-09 4.48E-09 1.18E-09
TOTAL	5.66E-09

SUMMARY Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
Nuclide U-234 Th-230 Ra-226 Rn-222 Po-218 Pb-214 At-218 Bi-214 Rn-218 Po-214 Tl-210 Pb-210 Bi-210 Hg-206 Po-210 Tl-206 U-235 Th-231 Pa-231 Ac-227 Th-227 Fr-223 Ra-223 Rn-219 At-219 Bi-215 Po-215 Pb-211 Bi-211 Tl-207 Po-211	
U-238 Th-234 Pa-234m Pa-234	3.95E-09 1.88E-10 8.69E-10 5.32E-11
TOTAL	5.66E-09

SUMMARY Page 5

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem) (All Radionuclides and Pathways)

			Dista	ance (m)
Directi	on 1285	2714	7894	
N	1.9E-02	5.7E-03	1.4E-03	
NNW	7.4E-03	2.4E-03	7.8E-04	
NW	5.8E-03	1.9E-03	7.0E-04	
WNW	1.1E-02	3.2E-03	9.3E-04	
W	1.8E-02	5.2E-03	1.3E-03	
WSW	8.4E-03	2.6E-03	8.3E-04	
SW	4.4E-03	1.5E-03	6.3E-04	
SSW	3.3E-03	1.2E-03	5.7E-04	
S	5.4E-03	1.8E-03	6.9E-04	
SSE	3.9E-03	1.4E-03	6.1E-04	
SSE	5.0E-03	1.7E-03	6.8E-04	
ESE	8.2E-03	2.7E-03	8.5E-04	
E	1.4E-02	4.2E-03	1.1E-03	
ENE	1.6E-02	4.8E-03	1.2E-03	
NE	1.1E-02	3.5E-03	9.8E-04	
NNE	1.0E-02	3.2E-03	9.4E-04	

Note: Highlighted EDE values (in mrem) are applicable to the critical receptors as defined in Section 3.3.4 of this report taking into account the distance and direction from the applicable site to each receptor. The highlighted value assumes 100 percent occupancy.

SUMMARY Page 6

INDIVIDUAL LIFETIME RISK (deaths) (All Radionuclides and Pathways)

			Dist	cance (m)
Directio	n 1285	2714	7894	
N	5.7E-09	1.6E-09	3.2E-10	
NNW	2.1E-09	6.1E-10	1.3E-10	
NW	1.7E-09	4.8E-10	1.1E-10	
WNW	3.1E-09	8.7E-10	1.8E-10	
W	5.2E-09	1.5E-09	2.9E-10	
WSW	2.4E-09	6.9E-10	1.5E-10	
SW	1.2E-09	3.6E-10	8.8E-11	
SSW	8.9E-10	2.7E-10	7.1E-11	
S	1.5E-09	4.5E-10	1.1E-10	
SSE	1.1E-09	3.2E-10	8.3E-11	
SSE	1.4E-09	4.2E-10	1.0E-10	
ESE	2.4E-09	6.9E-10	1.5E-10	
E	4.1E-09	1.2E-09	2.4E-10	
ENE	4.8E-09	1.4E-09	2.7E-10	
NE	3.3E-09	9.4E-10	1.9E-10	
NNE	3.1E-09	8.6E-10	1.8E-10	

DOSE AND RISK SUMMARIES

Non-Radon Individual Assessment Mon Apr 16 15:18:43 2018

Facility: M-Yard IAAAP
Address: Iowa Army Ammunition Plant

City: Middletown

State: IA Zip: 52638

Source Category: Area Source Type: Area Emission Year: 2017 DOSE Age Group: Adult

> Comments: FS-12 Emissions FS-12 Emissions

Dataset Name: M-Yard Emissions Dataset Date: Apr 16, 2018 03:18 PM

Wind File: C:\Users\passigm\Documents\CAP88\Wind Files\14923.WND

SUMMARY Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)
Adrenal UB Wall	8.46E-06 8.89E-06
Bone_Sur	1.23E-04
Brain	8.67E-06
Breasts	1.01E-05
St_Wall	8.90E-06
SI_Wall	8.70E-06
ULI_Wall	9.39E-06
LLI_Wall	1.08E-05
Kidneys	4.49E-05
Liver	2.00E-05
Muscle	9.89E-06
Ovaries	8.54E-06
Pancreas	8.37E-06
R_Marrow Skin	1.69E-05 1.61E-03
Skin Spleen	1.61E-03 8.92E-06
Testes	1.01E-05
Thymus	8.80E-06
Thyroid	9.33E-06
GB_Wall	8.48E-06
Ht Wall	8.74E-06
Uterus	8.58E-06
ET_Req	1.06E-04
Lung_66	4.23E-04
Effectiv	7.78E-05

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem)
INGESTION	1.73E-06
INHALATION	5.45E-05
AIR IMMERSION	1.46E-11
GROUND SURFACE	2.16E-05
INTERNAL	5.62E-05
EXTERNAL	2.16E-05
TOTAL	7.78E-05

SUMMARY Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

	Selected
	Individual
Nuclide	(mrem)
U-234	5.52E-06
Th-230	3.20E-12
Ra-226	3.89E-13
Rn-222	2.16E-14
Po-218	3.87E-19
Pb-214	1.41E-11
At-218	1.45E-18
Bi-214	8.26E-11
Rn-218	8.42E-21
Po-214	4.58E-15
T1-210	3.23E-14
Pb-210	5.41E-14
Bi-210	8.74E-13
Hg-206	7.05E-20
Po-210	2.24E-16
T1-206	2.04E-18
U-235	1.25E-06
Th-231	4.14E-08
Pa-231	6.87E-11
Ac-227	2.30E-13
Th-227	1.10E-10
Fr-223	1.04E-12
Ra-223	1.23E-10
Rn-219	5.33E-11
At-219	0.00E+00
Bi-215	2.40E-16
Po-215	1.63E-13
Pb-211	1.05E-10
Bi-211	4.31E-11
T1-207	5.42E-11
Po-211	2.07E-14
U-238	4.99E-05
Th-234	1.41E-06
Pa-234m	1.92E-05
Pa-234	3.79E-07
TOTAL	7.78E-05

SUMMARY Page 3

CANCER RISK SUMMARY

	Selected Individual
	Total Lifetime
Cancer	Fatal Cancer Risk

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.04E-13
INHALATION	1.87E-11
AIR IMMERSION	7.71E-18
GROUND SURFACE	4.57E-12
INTERNAL	1.88E-11
EXTERNAL	4.57E-12
TOTAL	2.34E-11

SUMMARY Page 4

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
U-234 Th-230 Ra-226 Rn-222 Po-218 Pb-214 At-218 Bi-214 Rn-218 Po-214 T1-210 Pb-210 Bi-210 Hg-206 Po-210 T1-206 U-235 Th-231 Pa-231 Ac-227 Th-227 Fr-223 Ra-223 Rn-219 At-219 Bi-215 Po-215 Pb-211 Bi-211 T1-207 Po-211 U-238 Th-234 Pa-234m Pa-234	1.90E-12 1.36E-18 2.11E-19 1.18E-20 1.73E-25 7.56E-18 1.79E-25 4.36E-17 4.61E-27 2.51E-21 1.72E-20 2.42E-20 9.69E-20 3.13E-26 1.23E-22 2.29E-25 5.03E-13 1.89E-14 3.58E-17 8.61E-20 5.96E-17 3.86E-19 6.64E-17 2.91E-17 0.00E+00 1.07E-22 8.92E-20 3.74E-17 2.35E-17 6.96E-18 1.14E-20 1.67E-11 7.29E-13 3.37E-12 2.06E-13
TOTAL	2.34E-11

SUMMARY Page 5

INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem) (All Radionuclides and Pathways)

	Distance (m)				
Direction	521	3498	9463		
NNW NW WNW WSW SSW SSE ESE ESE ENE	7.8E-05 3.0E-05 2.3E-05 4.3E-05 7.3E-05 3.4E-05 1.7E-05 1.3E-05 2.1E-05 1.9E-05 3.2E-05 5.7E-05 6.7E-05 4.7E-05	3.9E-06 2.2E-06 2.7E-06 3.7E-06 1.8E-06 1.7E-06 2.0E-06 1.9E-06 2.4E-06 3.2E-06 3.5E-06 2.8E-06	1.8E-06 1.4E-06 1.5E-06 1.5E-06 1.5E-06 1.5E-06 1.4E-06 1.4E-06 1.4E-06 1.5E-06 1.5E-06 1.5E-06		

Note: Highlighted EDE values (in mrem) are applicable to the critical receptors as defined in Section 3.3.4 of this report taking into account the distance and direction from the applicable site to each receptor. The highlighted value assumes 100 percent occupancy.

SUMMARY Page 6

INDIVIDUAL LIFETIME RISK (deaths) (All Radionuclides and Pathways)

	Distance (m)					
Directio	n 521	3498	9463			
N	2.3E-11	8.8E-13	2.4E-13			
NNW	8.8E-12	3.8E-13	1.4E-13			
NW	6.8E-12	3.1E-13	1.2E-13			
WNW	1.3E-11	5.1E-13	1.6E-13			
W	2.2E-11	8.2E-13	2.3E-13			
WSW	1.0E-11	4.2E-13	1.4E-13			
SW	4.9E-12	2.5E-13	1.1E-13			
SSW	3.6E-12	2.0E-13	1.0E-13			
S	6.1E-12	2.9E-13	1.2E-13			
SSE	4.3E-12	2.3E-13	1.1E-13			
SSE	5.5E-12	2.8E-13	1.2E-13			
ESE	9.5E-12	4.2E-13	1.5E-13			
E	1.7E-11	6.6E-13	2.0E-13			
ENE	2.0E-11	7.6E-13	2.1E-13			
NE	1.4E-11	5.4E-13	1.7E-13			
NNE	1.3E-11	5.0E-13	1.6E-13			

APPENDIX C CALENDAR YEAR 2017 AIR MONITORING DATA

APPENDIX C REVISION 0

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX C REVISION 0

Table C-1. CY 2017 IAAAP Air Sample Summary Table

Date	Sample ID	A	Gross Alph	Gross Alpha Concentration (μCi/mL)		
Date	Sample ID	Area	1st Count	2nd Count	3rd Count	
04/20/17	20170421-001	FS-1 Background	7.31E-16	-	-	
05/02/17	20170502-002	Bobcat RotoTiller	6.49E-15	-	-	
05/03/17	20170503-003	Bobcat RotoTiller	1.30E-14	-	-	
05/03/17	20170503-004	Amec Soil Sorting Area	5.01E-15	-	-	
05/03/17	20170503-005	Amec Soil Sorting Area	-2.42E-15	-	-	
05/03/17	20170503-006	Bobcat RotoTiller	-1.95E-14	-	-	
05/04/17	20170504-007	Bobcat RotoTiller	-6.06E-15	-	-	
05/04/17	20170504-009	Amec Soil Sorting Area	1.96E-15	-	-	
05/04/17	20170504-010	Boundry	4.27E-15	-	-	
05/05/17	20170505-008	Bobcat RotoTiller	8.75E-16	-	-	
05/08/17	20170508-011	Bobcat RotoTiller	-8.56E-16	-	-	
05/09/17	20170509-012	Amec Soil Sorting Area	8.59E-16	-	-	
05/09/17	20170509-013	Boundry	5.29E-15	-	-	
05/09/17	20170509-014	Bobcat RotoTiller	0.00E+00	-	-	
05/10/17	20170510-015	Bobcat RotoTiller	-7.42E-15	-	-	
05/12/17	20170512-016	Amec Soil Sorting Area	1.60E-15	-	-	
05/12/17	20170512-017	Boundry	2.74E-15	-	-	
05/12/17	20170512-018	Bobcat RotoTiller	3.23E-15	-	-	
05/16/17	20170516-019	Amec Soil Sorting Area	9.69E-15	-	-	
05/16/17	20170516-020	Boundry	4.50E-15	-	-	
05/18/17	20170518-021	Bobcat RotoTiller	-3.89E-15	-	-	
05/18/17	20170518-022	Boundry	5.18E-15	-	-	
05/31/17	20170518-023	Amec Soil Sorting Area	7.83E-15	-	-	
05/25/17	20170525-024	Amec Soil Sorting Area	1.85E-14	-	-	
05/31/17	20170531-025	Amec Soil Sorting Area	2.35E-15	6.3E-14	-	
06/02/17	20170602-026	Boundry	3.45E-15	-	-	
06/02/17	20170602-027	Amec Soil Sorting Area	4.55E-15	-	-	
06/13/17	20170606-028	Amec Soil Sorting Area	4.55E-15	-	-	
06/13/17	20170606-029	FS12 SCA Boundary	7.62E-17	-	-	
06/16/17	20170608-030	Amec Soil Sorting Area	7.74E-15	-	-	
06/16/17	20170608-031	FS12 SCA Boundary	2.64E-15	-	-	
06/19/17	20170612-032	Amec Soil Sorting Area	7.29E-15	-	-	
06/19/17	20170612-033	FS12 SCA Boundary	1.72E-15	-	-	
06/26/17	20170615-034	Amec Soil Sorting Area	7.16E-15	-	-	
06/26/17	20170615-035	FS12 SCA Boundary	3.01E-15	-	-	
06/27/17	20170619-036	FS12 SCA Boundary	3.09E-15	-	-	
06/19/17	20170619-037	Amec Soil Sorting Area	1.21E-15	-	-	
06/29/17	20170621-038	FS12 SCA Boundary	5.28E-16	-	-	
07/12/17	20170623-039	Bobcat RotoTiller	2.23E-15	-	-	

Table C-1. CY 2017 IAAAP Air Sample Summary Table

Date	Comple ID	A	Gross Alph	Gross Alpha Concentration (μCi/mL)		
Date	Sample ID	Area	1st Count	2nd Count	3rd Count	
07/12/17	20170626-040	FS12 SCA Boundary	4.22E-15	-	-	
07/12/17	20170626-041	FS12 SCA Boundary	4.97E-15	-	-	
07/12/17	20170626-042	Bobcat RotoTiller	2.23E-15	-	-	
07/14/17	20170629-043	Bobcat RotoTiller	2.23E-15	-	-	
07/14/17	20170629-044	FS12 SCA Boundary	5.05E-15	-	-	
07/14/17	20170629-045	FS12 SCA Boundary	1.51E-16	-	-	
07/17/17	20170706-046	FS12 SCA Boundary	8.29E-16	-	-	
07/17/17	20170706-047	Amec Soil Sorting Area	2.34E-15	-	-	
07/19/17	20170712-048	FS12 SCA Boundary	4.52E-15	-	-	
07/19/17	20170712-049	Amec Soil Sorting Area	7.54E-15	-	-	
07/24/17	20170717-050	Amec Soil Sorting Area	3.92E-15	-	-	
07/24/17	20170717-051	FS12 SCA Boundary	5.28E-16	-	-	
07/28/17	20170719-052	Amec Soil Sorting Area	4.30E-15	-	-	
07/28/17	20170719-053	FS12 SCA Boundary	4.22E-15	-	-	
07/31/17	20170721-054	FS12 SCA Boundary	2.71E-15	-	-	
07/31/17	20170721-055	Amec Soil Sorting Area	1.21E-15	-	-	
08/02/17	20170725-056	Amec Soil Sorting Area	3.77E-15	-	-	
08/02/17	20170725-057	FS12 SCA Boundary	4.90E-15	-	-	
08/04/17	20170725-059	FS12 SCA Boundary	4.15E-15	-	-	
08/04/17	20170728-058	Amec Soil Sorting Area	1.51E-15	-	-	
08/09/17	20170801-060	Amec Soil Sorting Area	5.35E-15	-	-	
08/09/17	20170801-061	FS12 SCA Boundary	3.09E-15	-	-	
08/14/17	20170804-062	Amec Soil Sorting Area	9.87E-15	-	-	
08/14/17	20170804-063	FS12 SCA Boundary	4.60E-15	-	-	
08/17/17	20170808-064	Amec Soil Sorting Area	2.03E-15	-	-	
08/17/17	20170808-065	FS12 SCA Boundary	1.66E-15	-	-	
08/18/17	20170810-066	FS12 SCA Boundary	3.77E-15	-	-	
08/18/17	20170810-067	Amec Soil Sorting Area	1.51E-15	-	-	
08/22/17	20170814-068	FS12 SCA Boundary	2.61E-15	-	-	
08/24/17	20170814-069	Amec Soil Sorting Area	6.50E-15	-	-	
08/25/17	20170817-070	FS12 SCA Boundary	8.02E-16	-	-	
08/29/17	20170821-071	Amec Soil Sorting Area	7.84E-15	-	-	
08/29/17	20170821-072	FS12 SCA Boundary	6.86E-15	-	-	
09/01/17	20170824-073	Amec Soil Sorting Area	1.77E-15	-	-	
09/01/17	20170824-074	FS12 SCA Boundary	2.12E-15	-	-	
09/08/17	20170830-075	FS12 SCA Boundary	2.12E-15	-	-	
09/08/17	20170830-076	Amec Soil Sorting Area	6.36E-15	-	-	
09/08/17	20170901-077	FS12 SCA Boundary	7.54E-16	-	-	
09/08/17	20170901-078	Amec Soil Sorting Area	1.06E-15	-	-	

Table C-1. CY 2017 IAAAP Air Sample Summary Table

Doto	Committee ID	Ama	Gross Alph	Gross Alpha Concentration (μCi/mL)			
Date	Sample ID	Area	1st Count	2nd Count	3rd Count		
09/13/17	20170906-079	Amec Soil Sorting Area	-7.28E-15	-	-		
09/15/17	20170908-080	Amec Soil Sorting Area	3.53E-15	-	-		
09/15/17	20170908-081	Amec Soil Sorting Area	4.24E-15	-	-		
09/22/17	20170912-082	FS12 SCA Boundary	1.43E-15	-	-		
09/22/17	20170912-083	Amec Soil Sorting Area	3.11E-15	-	-		
09/22/17	20170914-084	FS12 SCA Boundary	6.36E-16	-	-		
09/25/17	20170914-085	Amec Soil Sorting Area	3.82E-15	-	-		
10/02/17	20170927-086	FS12 SCA Boundary	-9.04E-16	-	-		
10/02/17	20170927-087	Amec Soil Sorting Area	4.31E-15	1.96E-15	-		
10/12/17	20170929-088	Amec Soil Sorting Area	3.67E-15	-	-		
10/12/17	20170929-089	FS12 SCA Boundary 4.24E-16		-	-		
10/13/17	20171004-090	FS12 SCA Boundary	1.13E-15	-	-		
10/13/17	20171004-091	Amec Soil Sorting Area	2.19E-15	-	-		
10/17/17	20171010-092	FS12 SCA Boundary	1.13E-15	-	-		
10/17/17	20171010-093	Amec Soil Sorting Area	3.60E-15	-	-		
10/24/17	20171018-094	FS12 SCA Boundary	6.78E-16	-	-		
10/24/17	20171018-095	FS12 SCA Boundary	6.78E-16	-	-		
10/30/17	20171020-096	FS12 SCA Boundary	1.57E-15	-	-		
10/30/17	20171020-097	Amec Soil Sorting Area	8.37E-15	-	-		
10/31/17	20171025-098	FS12 SCA Boundary	2.26E-16	-	-		
10/31/17	20171025-099	Amec Soil Sorting Area	2.19E-15	-	-		
11/09/17	20171027-100	Amec Soil Sorting Area	1.88E-15	-	-		
11/13/17	20171102-105	FS12 CRZ Boundry	3.63E-15	-	-		
11/13/17	20171106-107	FS12 CRZ Boundry	-2.02E-15	-	-		
11/09/17	20171027-101	M Yard	5.02E-15	-	-		
11/09/17	20171031-102	M Yard	8.70E-16	-	-		
11/13/17	20171102-104	M Yard -8.07E-16		-	-		
11/13/17	20171106-106	M Yard	-1.21E-15	-	-		

Negative results indicate result was less than the average background value for the instrument.

⁻ Count not performed.

Table C-2. CY 2017 IAAAP Air Sample Laboratory Analysis Summary Table

Sample ID	Station Name	Sample Name	Collect Date	Analyte	Result	Error	Detection Limit	Units	vQ
AS20170509-010	Boundary	IAAP200576	05/05/17	Gross Alpha	1.5041E-14	5.4989E-15	3.7287E-15	μCi/mL	=
	Boundary	IAAP200576	05/05/17	Gross Beta	6.0853E-14	1.0372E-14	6.5599E-15	μCi/mL	=
AS20170509-013	Boundary	IAAP200577	05/09/17	Gross Alpha	1.6405E-14	8.7536E-15	8.0941E-15	μCi/mL	J
11020170307 013	Boundary	IAAP200577	05/09/17	Gross Beta	6.4187E-14	1.661E-14	1.424E-14	μCi/mL	=
AS20170518-022	Boundary	IAAP200578	05/18/17	Gross Alpha	7.7757E-15	4.1491E-15	3.8365E-15	μCi/mL	J
A520170310-022	Boundary	IAAP200578	05/18/17	Gross Beta	5.2172E-14	9.7955E-15	6.7495E-15	μCi/mL	=
AS20170615-035	Boundary	IAAP200579	06/15/17	Gross Alpha	3.9906E-15	3.1063E-15	3.6873E-15	μCi/mL	J
A320170013-033	Boundary	IAAP200579	06/15/17	Gross Beta	5.7668E-14	1.0049E-14	6.487E-15	μCi/mL	=
AS20170619-036	Boundary	IAAP200580	06/19/17	Gross Alpha	9.65E-15	4.4574E-15	3.6873E-15	μCi/mL	=
A320170019-030	Boundary	IAAP200580	06/19/17	Gross Beta	5.0143E-14	9.4146E-15	6.487E-15	μCi/mL	=
AS20170621-038	Boundary	IAAP200581	06/21/17	Gross Alpha	7.4733E-15	3.9878E-15	3.6873E-15	μCi/mL	J
A320170021-036	Boundary	IAAP200581	06/21/17	Gross Beta	5.0701E-14	9.462E-15	6.487E-15	μCi/mL	=
AS20170629-045	Boundary	IAAP200582	06/29/17	Gross Alpha	5.7319E-15	3.5723E-15	3.6873E-15	μCi/mL	J
A320170029-043	Boundary	IAAP200582	06/29/17	Gross Beta	2.3666E-14	7.0431E-15	6.487E-15	μCi/mL	=
AS20170712-046	Boundary	IAAP200583	07/06/17	Gross Alpha	1.0956E-14	4.7191E-15	3.6873E-15	μCi/mL	=
A320170712-040	Boundary	IAAP200583	07/06/17	Gross Beta	3.5372E-14	8.1252E-15	6.487E-15	μCi/mL	=
AS20170712-048	Boundary	IAAP200584	07/12/17	Gross Alpha	1.3568E-14	5.2077E-15	3.6873E-15	μCi/mL	=
A520170712-046	Boundary	IAAP200584	07/12/17	Gross Beta	6.9652E-14	1.1035E-14	6.487E-15	μCi/mL	=
AS20170719-053	Boundary	IAAP200585	07/19/17	Gross Alpha	1.5658E-14	5.4774E-15	3.5684E-15	μCi/mL	=
AS201/0/19-033	Boundary	IAAP200585	07/19/17	Gross Beta	7.3879E-14	1.1201E-14	6.2777E-15	μCi/mL	=
A \$20170725 057	Boundary	IAAP200586	07/25/17	Gross Alpha	6.1673E-15	3.6802E-15	3.6873E-15	μCi/mL	J
AS20170725-057	Boundary	IAAP200586	07/25/17	Gross Beta	3.0913E-14	7.7206E-15	6.487E-15	μCi/mL	=
AS20170804-063	Boundary	IAAP200587	08/04/17	Gross Alpha	1.0085E-14	4.5461E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200587	08/04/17	Gross Beta	4.3733E-14	8.8634E-15	6.487E-15	μCi/mL	=
AS20170808-065	Boundary	IAAP200588	08/08/17	Gross Alpha	1.3133E-14	5.1291E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200588	08/08/17	Gross Beta	2.506E-14	7.1756E-15	6.487E-15	μCi/mL	=
AS20170817-070	Boundary	IAAP200589	08/17/17	Gross Alpha	1.6615E-14	5.7325E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200589	08/17/17	Gross Beta	4.7356E-14	9.1763E-15	6.487E-15	μCi/mL	=

Table C-2. CY 2017 IAAAP Air Sample Laboratory Analysis Summary Table

Sample ID	Station Name	Sample Name	Collect Date	Analyte	Result	Error	Detection Limit	Units	vQ
AS20170824-074	Boundary	IAAP200590	08/24/17	Gross Alpha	5.7818E-15	3.4502E-15	3.4568E-15	μCi/mL	J
	Boundary	IAAP200590	08/24/17	Gross Beta	2.9765E-14	7.3098E-15	6.0815E-15	μCi/mL	=
AS20170901-077	Boundary	IAAP200591	09/01/17	Gross Alpha	3.1199E-15	2.8467E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200591	09/01/17	Gross Beta	2.4224E-14	7.0962E-15	6.487E-15	μCi/mL	UJ
AS20170913-082	Boundary	IAAP200592	09/12/17	Gross Alpha	1.2262E-14	4.9686E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200592	09/12/17	Gross Beta	4.2897E-14	8.7906E-15	6.487E-15	μCi/mL	=
AS20170927-086	Boundary	IAAP200593	09/27/17	Gross Alpha	1.8792E-14	6.084E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200593	09/27/17	Gross Beta	5.3209E-14	9.6744E-15	6.487E-15	μCi/mL	=
AS20171004-090	Boundary	IAAP200594	10/04/17	Gross Alpha	9.65E-15	4.4574E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200594	10/04/17	Gross Beta	4.4012E-14	8.8876E-15	6.487E-15	μCi/mL	=
AS20171010-092	Boundary	IAAP200595	10/10/17	Gross Alpha	7.4733E-15	3.9878E-15	3.6873E-15	μCi/mL	J
A5201/1010-092	Boundary	IAAP200595	10/10/17	Gross Beta	2.7011E-14	7.3592E-15	6.487E-15	μCi/mL	=
AS20171018-094	Boundary	IAAP200596	10/18/17	Gross Alpha	1.0521E-14	4.6333E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200596	10/18/17	Gross Beta	4.2618E-14	8.7663E-15	6.487E-15	μCi/mL	=
AS20171025-098	Boundary	IAAP200597	10/25/17	Gross Alpha	3.5552E-15	2.9792E-15	3.6873E-15	μCi/mL	=
	Boundary	IAAP200597	10/25/17	Gross Beta	2.0879E-14	6.7745E-15	6.487E-15	μCi/mL	UJ

Negative results are less than the laboratory system's background level.

VQs:

⁼ Indicates that the data met all QA/QC requirements, and that the parameter has been positively identified and the associated concentration value is accurate.

J Indicates that the parameter was positively identified; the associated numerical value is the approximate concentration of the parameter in the sample.

U Indicates that the data met all QA/QC requirements, and that the parameter was analyzed for but was not detected above the reported sample quantitation limit.

UJ Indicates that the parameter was not detected above the reported sample quantitation limit and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. However, the reported quantitation limit is approximate.

Iowa Army Ammunition Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for Calendar Year 2017					
	THIS PAGE INTENTIONALLY LEFT BLANK				

ATTACHMENT C-1

CALENDAR YEAR 2017 AIR SAMPLE REPORTS

(On the CD-ROM on the Back Cover of this Report)

APPENDIX C REVISION 0

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX C REVISION 0

|--|

ATTACHMENT C-1-1

CALENDAR YEAR 2017 BACKGROUND AIR SAMPLE REPORT

(On the CD-ROM on the Back Cover of this Report)

Iowa Army Ammunition Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for Calendar Year 2017
THIS PAGE INTENTIONALLY LEFT BLANK

Section I - Collection Data							
Date:	4/20/2017	Sample ID:	201704	121-001	RW	/P: 2017-001	
Occupational (DAC):	Limit:	C 00E 14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	_	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14uCi/ml			DU (Deple	_
Location:	_	FS-1 Background			Sampled By:	David	
_		-					
Wearer:		NA			ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
4/20/2017	7:00	15:30	5	10		65.0	65.0
4/21/2017	7:00	15:30	5	10		65	65
		Total Time (Tc):	10	120		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.2E+04	Litoro	
				•		Liters	
Sample Volume:	65	(lpm)	X	1020	(minutes) =	6.6E+04	Liters (A)
Remarks: 1	Minimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	vsis Data			
Instrument Information		Serial Number		y sis Dutu	Calibrati	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A		/A	N/A	N/A	N/A
11111		1111			1771	Alpha	11/11
Vai	riables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count
Count Date				5/5/2107			
Count Time (e.g., noon, 1300,	etc.)			1	:00		
Sample Count Time (Ts, Tb) =	T		minutes		60		
Total Counts			counts		10		
Sample Count Rate			cpm	0	.17		
Background Count Rate			cpm	0	0.13		
Air Volume (liters)	((A)	liters	6.6	E+04	6.6E+04	6.6E+04
Net count rate	(B)	cpm	0	0.04		
Counter Efficiency	(C)	cpm/dpm	0	.34	0.34	0.34
Collection Efficiency	(E	0)	0.99	0	.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)	ı	cpm/dpm	0.34		0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	0	.11		
Minimum Detectable Activity	(dpm) = (3+4.65*S)	QRT(Cb))/(E*T) (G)	dpm	0	.77		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$ (H)		μCi/ml	7.31E-16			
Background "Strip" value (F.1) Date Updated	4/20-4/21	uCi/ml				
NET Concentration Value = (H) - (F1); (F	2)	uCi/ml	7.31	IE-16		
DAC (or AE) Fraction = (F2)/(I)				1.2	22%		
MDC = MDA/V = (G)/(A) (J)			μCi/ml		6E-15		
MDC Fraction of DAC (or AE	$= (\mathbf{J})/(\mathbf{I})$ (Goal<	(10%)		8.7	77%		
Final Count?			Yes/No		Yes		
Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.							
Performed By	y:					Date:	
Reviewed By	y:					Date:	



C-1-1-2 REVISION 0

Iowa Army Ammunition Plan	nt Operable Unit 8 Annual 1	Environmental Monitoring	Data and Analysis	Report for
Calendar Year 2017				

ATTACHMENT C-1-2

CALENDAR YEAR 2017 LAPEL AIR SAMPLE REPORTS

(On the CD-ROM on the Back Cover of this Report)

Iowa Army Ammunition Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for Calendar Year 2017
THIS PAGE INTENTIONALLY LEFT BLANK

Section I - Collection Data								
							_	
Date:	5/2/2017	Sample ID:			R	WP: 2017-001		
Occupational (DAC):	/ Limit:	2.0E-11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:	
Non-Occupational (EC):]	[DAC = 2.0E-11µCi/ml (U-238), EC	'= 6.0E-14μCi/ml]		Radionuclides:	DU (Deple	ted Uranium)	
Location:		Bobcat RotoTiller			Sampled By:	David	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tillin	g Dirt	
Monitored Workers:				Jake Burgess	_			
Lapel Pump Model:	SKC224_PCYP8		Serial No.	21	62	Calibration Due Date:	5/2/2018	
Air Pump Model:						Calibration Due Date:		
All Fullip Model:	NA		Serial No.	N	A	1		
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop	
5/2/2017	14:15	15:15		0		56.6	56.6	
)				
		Total Time (Tc):	6	0		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	3.1E+01	Liters		
Sample Volume:	57	(lpm)	x	60	(minutes) =	3.4E+03	Liters (A)	
Remarks: M	Minimum sample vo	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.			•	
Temano.	······································	station identified the necessary to their	1070 01 1110	or rib value.				
		Sec	ction II - Anal	ysis Data				
Instrument Information		Serial Number			Calibra	tion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817	164	736	12/13/2017	12/13/2017	0.344	
N/A		N/A	N.	/A	N/A	N/A	N/A	
						Alpha		
Var	iables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				5/9	/2017			
Count Time (e.g., noon, 1300,	etc.)			1:	3:00			
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		7			
Sample Count Rate			cpm		0.12			
Background Count Rate			cpm		0.10			
Air Volume (liters)		(A)	liters		E+03	3.4E+03	3.4E+03	
Net count rate	-	B)	cpm		0.02			
Counter Efficiency	(C		cpm/dpm).34	0.34	0.34	
Collection Efficiency	(D		0.99).99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E)	1	cpm/dpm		0.34	0.34	0.34	
Activity (dpm) = (B)/(E)	(F)	ODT(CL))/(E*T) (C)	dpm		0.05			
Minimum Detectable Activity (_	QR1(Cb))/(E+1) (G)	dpm μCi/ml		0.70 DF-15			
oncentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$ (H) ackground "Strip" value (F.1) Date Updated 4/20-4/21		μCi/ml	6.49E-15 7.31E-18					
NET Concentration Value = (I			uCi/ml		8E-15			
		2)	uci/iiii		03%			
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$ (J)			uCi/ml		5E-14			
MDC = MDA/ $V = (G)/(A)$ MDC Fraction of DAC (or AE)		:10%)	μCi/ml		46%		+	
Final Count?	(((((((((((((((((((Yes/No		Yes			
I IIII Counti		Note: Unexpected DAC or AE				on.		
		Oncaptettu DAC 01 AE		requires initied	and App nouncati	····		
Performed By: Date:								
Reviewed By	<i>/</i> :					Date:		

Section I - Collection Data								
Date:	5/3/2017	Sample ID:	201705	503-003	RW	P: 2017-001		
Occupational (DAC):	/ Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area:	
Non-Occupational (EC):	_	$2.0E-11$ [DAC = $2.0E-11\mu$ Ci/ml (U-238), EC	= 6.0E 14uCi/ml			_		
	_		= 0.0E-14µCI/III			DU (Deple		
Location:		Bobcat RotoTiller			Sampled By:	David	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tilling	g Dirt	
Monitored Workers:				Jake Burgess				
Lapel Pump Model:	SKC224-PCXR8		Serial No.	21	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	minutes)	, <u>l</u>	Start	Stop	
5/3/2017	7:45	11:45	2	40		56.6	56.6	
				0				
		Total Time (Tc):	2	40		Avg. Flow Rate (lpm)	56.6	
	•		Minimum Air	Sample Volume:	3.1E+01	Liters		
Comple Volume	57	(1)		•			Litom (A)	
Sample Volume:		(lpm)	X	240	(minutes) =	1.4E+04	Liters (A)	
Remarks: N	Ainimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.				
		Sec	tion II - Anal	vsis Data				
Instrument Information		Serial Number		<i></i>	Calibrati	on Due Date		
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)	
L2929		158817		1736	12/13/2017	12/13/2017	0.344	
N/A		N/A		N/A N/A		N/A N/A		
						Alpha		
Vari	iables, Calculatior	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				5/10/2017				
Count Time (e.g., noon, 1300, e	etc.)			1-	4:00			
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		14			
Sample Count Rate			cpm		0.23			
Background Count Rate			cpm		0.10			
Air Volume (liters)		(A)	liters		E+04	1.4E+04	1.4E+04	
Net count rate		B)	cpm		0.13			
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34	
Collection Efficiency	<u>(D</u>		0.99).99	0.99	0.99	
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34	
Activity (dpm) = (B)/(E) Minimum Detectable Activity ((F)	OPT(Ch))/(E*T) (C)	dpm dpm					
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$		QKI(CD))/(L 1) (G)	μCi/ml	0.70 1.30E-14				
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18			
NET Concentration Value = (F			uCi/ml		DE-14			
DAC (or AE) Fraction = (F2)/(I		,			06%			
MDC = MDA/V = (G)/(A) (J)			μCi/ml	2.31E-14				
MDC Fraction of DAC (or AE)		(10%)	p - 5 - 55-		12%			
Final Count?			Yes/No	,	Yes			
Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.								
Performed By	r:					Date:		
Reviewed By	<i>'</i> :					Date:		

Section I - Collection Data								
Date:	5/3/2017	Sample ID:			R	WP: 2017-001		
Occupational (DAC):	✓ Limit:	2.0E-11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:	
Non-Occupational (EC):		[DAC = 2.0E-11µCi/ml (U-238), EC	= 6.0E-14µCi/ml]		Radionuclides:	DU (Deple	ted Uranium)	
Location:		Bobcat RotoTiller			Sampled By:	David	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tillin	g Dirt	
Monitored Workers:				Jake Burgess	_			
Lapel Pump Model:	SKC224-PCXR8		Serial No.	21	62	Calibration Due Date:	5/2/2018	
						Calibration Due Date:		
Air Pump Model:	NA		Serial No.	N	A	1		
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop	
5/3/2017	12:30	14:50	14	10		56.6	56.6	
)				
		Total Time (Tc):	14	10		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	4.2E+01	Liters		
Sample Volume:	57	(lpm)	x	140	(minutes) =	7.9E+03	Liters (A)	
Remarks: M	Minimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.	•		•	
	The second secon							
		Sec	tion II - Anal	ysis Data				
Instrument Information		Serial Number			Calibra	tion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817	164	736	12/13/2017	12/13/2017	0.344	
N/A		N/A	N.	/A	N/A	N/A	N/A	
						Alpha		
Var	riables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				5/12	2/2017			
Count Time (e.g., noon, 1300,	etc.)			1:	2:30			
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		5			
Sample Count Rate			cpm		0.08			
Background Count Rate			cpm		0.20			
Air Volume (liters)		(A)	liters		E+03	7.9E+03	7.9E+03	
Net count rate		B)	cpm		0.12			
Counter Efficiency	(C	•	cpm/dpm).34	0.34	0.34	
Collection Efficiency	(E	•	0.99).99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E))	cpm/dpm		0.34	0.34	0.34	
Activity (dpm) = (B)/(E)	(F)	ODT(CL))/(E*T) (C)	dpm		0.34			
Minimum Detectable Activity (QR1(Cb))/(E+1) (G)	dpm μCi/ml		0.93 5F-14			
oncentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$ (H) ackground "Strip" value (F.1) Date Updated 4/20-4/21		μCi/ml	-1.95E-14 7.31E-18					
NET Concentration Value = (I	•		uCi/ml		5E-14			
		2)	uci/iii					
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$ (J)		μCi/ml	-0.10% 5.26E-14					
MDC Fraction of DAC (or AE)		:10%)	μCI/III		26%		+	
Final Count?	, (2),(-) (00m	• • • • •	Yes/No		Yes			
count		Note: Unexpected DAC or AE				on.		
		Cheaptettu DAC 01 AE		requires initied	and App nouncati	····		
Performed By:								
Reviewed By	y:					Date:		

		Sec	tion I - Collec	tion Data				
Date:	5/4/2017	Sample ID:	201705	504-007	RW	/P: 2017-001		
Occupational (DAC):	/ Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area:	
Non-Occupational (EC):	_	$2.0E-11$ [DAC = $2.0E-11\mu$ Ci/ml (U-238), EC	= 6.0E 1/uCi/ml		- 1			
	_		= 0.0E-14µCI/IIII			DU (Deplet		
Location:		Bobcat RotoTiller			Sampled By:	David 1	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tilling	g Dirt	
Monitored Workers:				Jake Burgess				
Lapel Pump Model:	SKC224-PCXR8		Serial No.	210	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	ninutes)	' <u>'</u>	Start	Stop	
5/4/2017	7:45	15:15	4.	50		56.6	56.6	
				0				
		Total Time (Tc):	4.	50		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	4.2E+01	Liters		
Comple Volume	57	(1)		•			Litom (A)	
Sample Volume:		(lpm)	X		(minutes) =	2.5E+04	Liters (A)	
Remarks: N	Minimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.				
		Sec	tion II - Anal	vsis Data				
Instrument Information		Serial Number		<i></i>	Calibrati	ion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817		1736	12/13/2017	12/13/2017	0.344	
N/A		N/A		N/A N/A		N/A N/A		
						Alpha		
Vari	iables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				5/12/2017				
Count Time (e.g., noon, 1300, e	etc.)			11	3:40			
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		5			
Sample Count Rate			cpm		.08			
Background Count Rate			cpm	0.20				
Air Volume (liters)		(A)	liters		E+04	2.5E+04	2.5E+04	
Net count rate		B)	cpm		0.12			
Counter Efficiency	(C		cpm/dpm		1.34	0.34	0.34	
Collection Efficiency	(D		0.99		1.99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34	
Activity (dpm) = (B)/(E) Minimum Detectable Activity ((F)	ODT/Ch\\//E*T\ (C)	dpm	-0.34				
Concentration = (F)/(2.22E9 x		QR1(Cb))/(E*1) (G)	dpm μCi/ml	0.93 -6.06E-15				
Background "Strip" value (F.1)		4/20-4/21	μCi/ml		1E-18			
NET Concentration Value = (F	, ,		uCi/ml		7E-15			
DAC (or AE) Fraction = (F2)/(1		2)	uci/iiii		03%			
DAC (of AE) Fraction = $(\mathbf{r}2)'(\mathbf{l})$ $MDC = MDA/V = (\mathbf{G})/(\mathbf{A})$ (J)			μCi/ml		4E-14			
MDC Fraction of DAC (or AE)		(10%)	μСі/іпі		08%			
Final Count?	(-),(-)	/	Yes/No		Yes			
Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.								
Performed By	/:					Date:		
Reviewed By	/:					Date:		

Section I - Collection Data							
Date:	5/5/2017	Sample ID:	201705	505-008	RW	/P: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	✓ General Area:	Work Area:
Non-Occupational (EC):	_	2.0E-11 [DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E 1/uCi/ml		- '	DU (Deplei	
	_		- 0.0Ε-14μCl/IIII				
Location:		Bobcat RotoTiller			Sampled By:	David 1	
Wearer:		Jake Burgess		Act	ivity Performed:	Tilling	g Dirt
Monitored Workers:				Jake Burgess			
Lapel Pump Model:	SKC224-PCXR8		Serial No.	21	62	Calibration Due Date:	5/2/2018
Air Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	ı L	Start	Stop
5/5/2017	7:45	15:10		45		56.6	56.6
0,0,202				0			
		Total Time (Tc):	4-	45		Avg. Flow Rate (lpm)	56.6
			Minimum Ain	Comple Volumes	2.1E+01	Litoro	
				Sample Volume:		Liters	
Sample Volume:	57	(lpm)	x	445	(minutes) =	2.5E+04	Liters (A)
Remarks: M	linimum sample vo	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	veic Data			
Instrument Information	1	Serial Number	tion ii - mai	ysis Data	Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L2929		158817		1736	12/13/2017	12/13/2017	0.344
N/A		N/A		//A	N/A	N/A	N/A
11/14		1711	1,		11/11	Alpha	11/11
Vari	iables, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date	•			5/15/2017			
Count Time (e.g., noon, 1300, e	etc.)			1	3:15		
Sample Count Time (Ts, Tb) =	T		minutes		60		
Total Counts			counts		7		
Sample Count Rate			cpm	(0.12		
Background Count Rate			cpm	0	0.10		
Air Volume (liters)	((A)	liters	2.5	E+04	2.5E+04	2.5E+04
Net count rate	(B)	cpm	0	0.02		
Counter Efficiency	(C)	cpm/dpm	C	0.34	0.34	0.34
Collection Efficiency	(D)	0.99	C).99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)	ı	cpm/dpm	C	0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.05		
Minimum Detectable Activity (dpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	().70		
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$ (H)		μCi/ml	8.75E-16				
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H	I) - (F1); (F	2)	uCi/ml	8.68	8E-16		
DAC (or AE) Fraction = (F2)/(I)				0.0	00%		
MDC = MDA/V = (G)/(A) (J)		μCi/ml	1.25E-14				
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)			06%		
Final Count?			Yes/No		Yes		
Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.							
Performed By	:					Date:	
Reviewed By	:					Date:	

Section I - Collection Data								
Date:	5/8/2017	Sample ID:			R	WP: 2017-001		
Occupational (DAC):				μCi/ml (I)	Breathing Zone		── Work Area: ☐	
][2.0E-11			-			
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml]		Radionuclides	: DU (Deple	ted Uranium)	
Location:		Bobcat RotoTiller			Sampled By:	David	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tillin	g Dirt	
Monitored Workers:				Jake Burgess	_			
Lapel Pump Model: S	KC224-PCXR8		Serial No.		62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N.		Calibration Due Date:		
	II.		Scriai 140.		n			
Sample Information	<u> </u>	Time	T				Rate (lpm)	
Collection Date	Start	Stop	Total (n	·		Start	Stop	
5/8/2017	7:45	15:20		55		56.6	56.6	
		Total Time (Ta).)		A Fl-w Boto (lam)	56.6	
		Total Time (Tc):	43	55		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	3.1E+01	Liters		
Sample Volume:	57	(lpm)	x	455	(minutes) =	2.6E+04	Liters (A)	
Remarks: Mi	inimum sample vo	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.				
		Sec	ction II - Anal	ysis Data				
Instrument Information		Serial Number			Calibr	ation Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817	164	164736 12/13/201		12/13/2017	0.344	
N/A	<u> </u>	N/A	N/	/A	N/A	N/A	N/A	
						Alpha	1	
	ables, Calculation	is, Results	Units		Count	2nd Count	3rd Count	
Count Date					5/2017			
Count Time (e.g., noon, 1300, et					3:30			
Sample Count Time (Ts, Tb) = T	<u> </u>		minutes	60				
Total Counts			counts		5			
Sample Count Rate			cpm	0.08 0.10				
Background Count Rate Air Volume (liters)		(A)	cpm liters		E+04	2.6E+04	2.6E+04	
Net count rate		B)	cpm		0.02	Z.ULTU4	Z.OLITOT	
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34	
Collection Efficiency	(D	•	0.99		1.99	0.99	0.99	
Efficiency = (C) x (D)	(E)	•	cpm/dpm	_	.34	0.34	0.34	
Activity $(dpm) = (B)/(E)$	(F)		dpm		0.05			
Minimum Detectable Activity (d	pm) = (3+4.65*S6)	QRT(Cb))/(E*T) (G)	dpm	0	.70	<u></u>		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	-8.5	6E-16			
Background "Strip" value (F.1)	und "Strip" value (F.1) Date Updated 4/20-4/21		uCi/ml	7.31E-18				
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	-8.6	3E-16			
DAC (or AE) Fraction = (F2)/(I)				0.0	00%			
MDC = MDA/V = (G)/(A)	μCi/ml	1,22	2E-14					
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)		0.0	06%			
Final Count?			Yes/No	3	Yes			
	Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.							
Performed By: Date:								
Reviewed By:						Date:		

Section I - Collection Data								
Date:	5/9/2017	Sample ID:			RV	WP: 2017-001		
Occupational (DAC):				μCi/ml (I)	Breathing Zone:	_	Work Area:	
		2.0E-11						
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml]		Radionuclides:	DU (Deple	ted Uranium)	
Location:		Bobcat RotoTiller			Sampled By:	David	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tilling	g Dirt	
Monitored Workers:				Jake Burgess				
Lapel Pump Model: S	KC224-PCXR8		Serial No.	210	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop	
5/9/2017	12:30	15:15	10	55		56.6	56.6	
			()				
		Total Time (Tc):	10	55		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	3.1E+01	Liters		
Sampla Valuma	57	(lnm)	X	•	(minutes) =	•	Liters (A)	
Sample Volume:		(lpm)			(illilities) –	7.3E+03	Liters (A)	
Remarks: Mi	inimum sample vo	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.				
		Sec	tion II - Anal	ysis Data				
Instrument Information		Serial Number			Calibra	tion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817	164	736	12/13/2017	12/13/2017	0.344	
N/A		N/A	N	/A	N/A	N/A	N/A	
						Alpha		
	ables, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count	
Count Date					3/2017			
Count Time (e.g., noon, 1300, et					3:30			
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60			
Total Counts			counts		6			
Sample Count Rate			cpm		0.10			
Background Count Rate		(4)	cpm		0.10	0.25.02	0.25.02	
Air Volume (liters)		A) B)	liters		E+03	9.3E+03	9.3E+03	
Net count rate Counter Efficiency	(C		cpm cpm/dpm		0.34	0.34	0.34	
Collection Efficiency	(D		0.99).99	0.99	0.99	
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34	
Activity (dpm) = $(B)/(E)$	(F)		dpm		0.00			
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm	0	0.70			
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	0.00	E+00			
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18			
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	-7.3	1E-18			
DAC (or AE) Fraction = $(F2)/(I)$)			0.0	00%			
MDC = MDA/V = (G)/(A) (J)			μCi/ml		6E-14			
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)		0.1	17%			
Final Count?			Yes/No	7	Yes			
Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.								
Performed By:						Date:		
Reviewed By:						Date:	_	

			tion I - Collec				_	
Date:	5/10/2017	Sample ID:			R	WP: 2017-001		
Occupational (DAC):	/ Limit:	2.0E-11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:	
Non-Occupational (EC):		[DAC = 2.0E-11µCi/ml (U-238), EC	= 6.0E-14μCi/ml]		Radionuclides:	DU (Deple	ted Uranium)	
Location:		Bobcat RotoTiller			Sampled By:	David	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tillin	g Dirt	
Monitored Workers:		-		Jake Burgess	_			
Lapel Pump Model:	SKC224-PCXR8		Serial No.	210	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA NA		Serial No.	N.		Calibration Due Date:		
	NA .		Seliai No.	IN.	H	Transition of the state of the		
Sample Information	_	Time	1			Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	,		Start	Stop	
5/10/2017	13:30	15:15	10			56.6	56.6	
		m . 1m . (m))			***	
		Total Time (Tc):	10)5		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	3.1E+01	Liters		
Sample Volume:	57	(lpm)	x	105	(minutes) =	5.9E+03	Liters (A)	
Remarks: N	Ainimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.				
	1							
Section II - Analysis Data								
Instrument Information		Serial Number			Calibra	tion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817	164	736	12/13/2017	12/13/2017	0.344	
N/A		N/A	N.	'A	N/A	N/A	N/A	
						Alpha		
	iables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				5/18	3/2017			
Count Time (e.g., noon, 1300,	etc.)			1:	5:15			
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		4			
Sample Count Rate			cpm		0.07			
Background Count Rate			cpm		0.10			
Air Volume (liters)		(A)	liters		E+03	5.9E+03	5.9E+03	
Net count rate	-	B)	cpm		0.03			
Counter Efficiency	(C		cpm/dpm		1.34	0.34	0.34	
Collection Efficiency	(D		0.99		1.99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34	
Activity (dpm) = (B)/(E)	(F)	ODT/CL\\//E*T\ (C)	dpm		0.10			
Minimum Detectable Activity (Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	_	QR1(Cb))/(E*1) (G)	dpm μCi/ml		2E-15			
Background "Strip" value (F.1		4/20-4/21	μCi/ml		1E-18			
NET Concentration Value = (I	•		uCi/ml		3E-15			
-		2)	uci/iii		04%			
DAC (or AE) Fraction = $(F2)/($ MDC = MDA/V = $(G)/(A)$	(J)		uCi/ml		8E-14			
MDC = MDA/ $V = (G)/(A)$ MDC Fraction of DAC (or AE)		:10%)	μCi/ml		26%			
Final Count?			Yes/No		Yes			
I mar Count.		Note: Unexpected DAC or AE				on.		
		Hote, Oncapeette DAC 01 AE	11 action > 100 /0	requires minieur	ate RSO notification	,ii.		
Performed By	7:					Date:		
Reviewed By	<i>r</i> :					Date:		

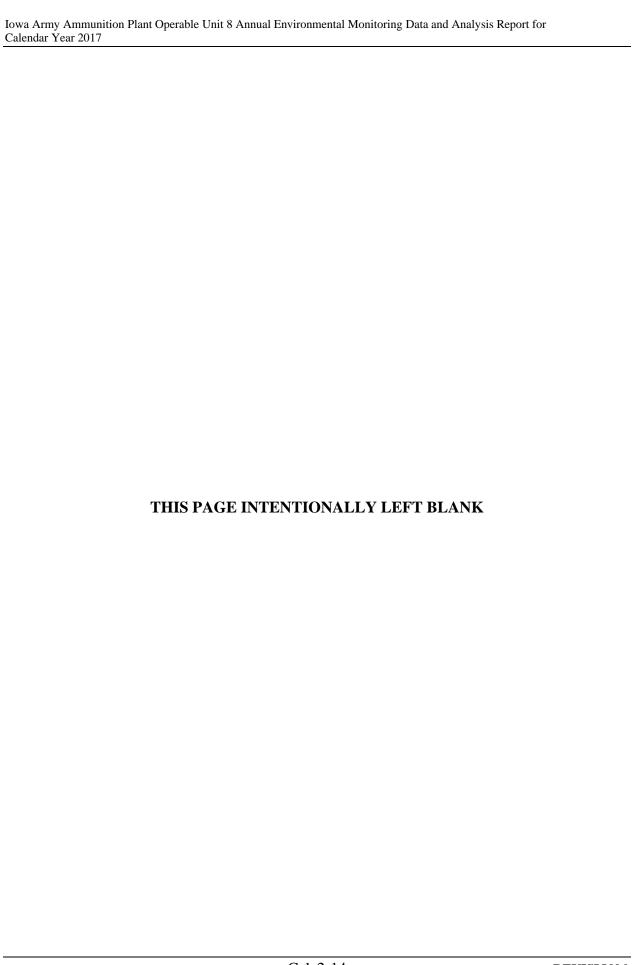
		Sec	tion I - Collec	tion Data				
Date:	5/12/2017	Sample ID:	201705	512-018	RW	P: 2017-001		
Occupational (DAC):	/ Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area:	
Non-Occupational (EC):	_	2.0E-11 [DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14Ci/mi					
	_		= 0.0E-14µCI/IIII			DU (Depleted Uranium)		
Location:		Bobcat RotoTiller			Sampled By:	David I	Berres	
Wearer:		Jake Burgess		Act	ivity Performed:	Tilling	g Dirt	
Monitored Workers:				Jake Burgess				
Lapel Pump Model:	SKC224-PCXR8		Serial No.	21	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	ninutes)	' <u> </u>	Start	Stop	
5/12/2017	7:40	14:30	4	10		56.6	56.6	
				0				
		Total Time (Tc):	4	10		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	2.6E+01 I	Liters		
Comple Volume	57	(1)		•			Litoro (A)	
Sample Volume:		(lpm)	X	410	(minutes) =	2.3E+04	Liters (A)	
Remarks: N	Minimum sample v	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.				
Section II - Analysis Data								
Instrument Information		Serial Number		J	Calibrati	on Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817		1736	12/13/2017	12/13/2017	0.344	
N/A		N/A		/A	N/A	N/A	N/A	
						Alpha		
Var	iables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				5/22/2017				
Count Time (e.g., noon, 1300,	etc.)			11:30				
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		7			
Sample Count Rate			cpm		0.12			
Background Count Rate			cpm		0.06			
Air Volume (liters)		(A)	liters		E+04	2.3E+04	2.3E+04	
Net count rate		B)	cpm		0.06			
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34	
Collection Efficiency	(E	•	0.99).99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E))	cpm/dpm		0.34	0.34	0.34	
Activity (dpm) = (B)/(E) Minimum Detectable Activity ((F)	OPT(Ch))/(E*T) (C)	dpm		0.17			
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$		QK1(Cb))/(E+1) (G)	dpm μCi/ml		3E-15			
Background "Strip" value (F.1)		4/20-4/21	μCi/ml		1E-18			
NET Concentration Value = (I	1		uCi/ml		2E-15			
DAC (or AE) Fraction = (F2)/(I		_,	uci/iiii		02%			
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$ (J)		μCi/ml		1E-14				
MDC Fraction of DAC (or AE)		(10%)	F. 2.7 IIII		06%			
Final Count?	.,,,,	· ·	Yes/No		Yes			
		Note: Unexpected DAC or AE				1.	1	
Performed By	/:					Date:		
						Date:		

		Sec	tion I - Collec	tion Data				
Date:	5/18/2017	Sample ID:	201705	518-021	RW	P: 2017-001		
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area:	
	_	2.0E-11						
Non-Occupational (EC):	_	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml	-4μCi/ml] Radionuclides		DU (Deplet	ted Uranium)	
Location:		Hopper			Sampled By:	David 1	Berres	
Wearer:		John King		Act	ivity Performed:	Sortin	g Dirt	
Monitored Workers:		· ·		John King				
Lapel Pump Model:	SKC224_PCYP8		Serial No.	210	52	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	ninutes)		Start	Stop	
5/18/2017	10:30	15:10		80		56.6	56.6	
				0	-			
		Total Time (Tc):	2	80		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	2.9E+01 I	Liters		
Sample Volume:	57	(lpm)	X	280	(minutes) =	1.6E+04	Liters (A)	
· -		olumes identified are necessary to ach			· · · · · -			
Remarks: N	Anninum sample v	ofunies identified are necessary to ach	leve 10% of DAC	of AE value.				
Section II - Analysis Data								
Instrument Information		Serial Number			Calibration	on Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817	164	736	12/13/2017	12/13/2017	0.344	
N/A		N/A	N	/A	N/A	N/A	N/A	
						Alpha		
Var	iables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				5/31/2017				
Count Time (e.g., noon, 1300,				10:30				
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		2			
Sample Count Rate			cpm		0.03			
Background Count Rate		(A)	cpm		0.08 E+04	1.6E+04	1.65.04	
Air Volume (liters) Net count rate		(A) B)	liters		E+04 0.05	1.6E+04	1.6E+04	
Counter Efficiency	(C		cpm cpm/dpm		1.34	0.34	0.34	
Collection Efficiency	(E		0.99		1.99	0.99	0.99	
Efficiency = (C) x (D)	(E)	•	cpm/dpm		1.34	0.34	0.34	
Activity (dpm) = (B)/(E)	(F)		dpm		0.14			
Minimum Detectable Activity ((dpm) = (3+4.65*S)	QRT(Cb))/(E*T) (G)	dpm	0	0.64			
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	-3.8	9E-15			
Background "Strip" value (F.1)) Date Updated	4/20-4/21	uCi/ml	7.3	1E-18			
NET Concentration Value = (I	H) - (F1); (F	2)	uCi/ml	-3.9	0E-15			
DAC (or AE) Fraction = (F2)/(I)			-0.	02%			
MDC = MDA/V = (G)/(A) (J)		μCi/ml		2E-14				
MDC Fraction of DAC (or AE)	$= (\mathbf{J})/(\mathbf{I})$ (Goal<	(10%)		0.0)9%			
Final Count?			Yes/No	1	Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	1.		
Performed By: Date:								
Reviewed By	<i>r</i> :					Date:		

		Sec	tion I - Collec	tion Data				
Date:	7/12/2017	Sample ID:			RV	WP: 2017-001		
Occupational (DAC):				μCi/ml (I)	Breathing Zone:	_	Work Area:	
	•	2.0E-11						
Non-Occupational (EC):	I	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μCi/ml]		Radionuclides:	DU (Deple	ted Uranium)	
Location:		Hual Truck			Sampled By:	R Sant	angelo	
Wearer:		Jake Burgess		Act	tivity Performed:	Movin	g Dirt	
Monitored Workers:				Jake Burgess				
Lapel Pump Model: S	KC224-PCXR8		Serial No.	21	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	ninutes)	'	Start	Stop	
6/26/2017	10:00	15:15	3:	15		56.6	56.6	
			()				
		Total Time (Tc):	3	15		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	3.1E+01	Liters		
Comple Volumer	57	(lam)		•		•	Titom (A)	
Sample Volume:		(lpm)	X		(minutes) =	1.8E+04	Liters (A)	
Remarks: Mi	inimum sample vo	plumes identified are necessary to ach	ieve 10% of DAC	or AE value.				
Section II - Analysis Data								
Instrument Information		Serial Number		<i>5 = = = = = = = = = = = = = = = = = = =</i>	Calibra	tion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)	
L2929		158817		736	12/13/2017	12/13/2017	0.344	
N/A		N/A		/A	N/A	N/A	N/A	
						Alpha		
Varia	ables, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count	
Count Date				7/12	2/2017			
Count Time (e.g., noon, 1300, et	tc.)			1	0:00			
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60			
Total Counts			counts		5			
Sample Count Rate			cpm).13			
Background Count Rate			cpm		0.10			
Air Volume (liters)		A)	liters		8E+04	1.8E+04	1.8E+04	
Net count rate		B)	cpm		0.03	0.34	0.34	
Counter Efficiency Collection Efficiency	(C)		cpm/dpm 0.99).99	0.34	0.34	
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34	
Activity $(dpm) = (B)/(E)$	(F)		dpm).09	0.54	0.54	
Minimum Detectable Activity (d		ORT(Cb))/(E*T) (G)	dpm		0.70			
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$			μCi/ml	2.23	3E-15			
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18			
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	2.22	2E-15			
DAC (or AE) Fraction = (F2)/(I))			0.0	01%			
MDC = MDA/V = (G)/(A) (J)		μCi/ml	1.70	6E-14				
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		0.0	09%			
Final Count?			Yes/No		Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	on.		
Performed By:						Date:		
Reviewed By:						Date:		

		Sec	tion I - Collec	tion Data				
Date:	7/12/2017	Sample ID:	201706	526-042	RW	/P: 2017-001		
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		── Work Area: ☐	
Non-Occupational (EC):	_	2.0E-11 [DAC = 2.0E-11μCi/ml (U-238), EC	COE 14. Ci/mi		- 1			
	_		= 0.0E-14µC1/m1					
Location:		Hual Truck			Sampled By:	R Santa	angelo	
Wearer:		Jake Burgess		Act	ivity Performed:	Movin	g Dirt	
Monitored Workers:				Jake Burgess				
Lapel Pump Model:	SKC224-PCXR8		Serial No.	210	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	ninutes)	' <u>'</u>	Start	Stop	
6/26/2017	10:00	15:15	3	15		56.6	56.6	
				0				
		Total Time (Tc):	3	15		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	3.1E+01	Liters		
Comple Volume	57	(1)					Litoro (A)	
Sample Volume:		(lpm)	X		(minutes) =	1.8E+04	Liters (A)	
Remarks: N	Minimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.				
Section II - Analysis Data								
Instrument Information		Serial Number		<i></i>	Calibrati	ion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817		1736	12/13/2017	12/13/2017	0.344	
N/A		N/A	N	/A	N/A	N/A	N/A	
						Alpha		
Vari	iables, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count	
Count Date				7/12/2017				
Count Time (e.g., noon, 1300, e	etc.)			10:00				
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		12			
Sample Count Rate			cpm		0.13			
Background Count Rate			cpm		.10			
Air Volume (liters)		(A)	liters		E+04	1.8E+04	1.8E+04	
Net count rate		B)	cpm		0.03	0.24	0.24	
Counter Efficiency	(C		cpm/dpm 0.99		0.34	0.34	0.34	
Collection Efficiency Efficiency = (C) x (D)	(E)				1.99	0.99	0.34	
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)	<u>'</u>	cpm/dpm dpm		1.09	0.34	0.34	
Minimum Detectable Activity (ORT(Cb))/(F*T) (G)	dpm		1.70			
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	•	Q.1.1(00)),(2 1)(0)	μCi/ml		3E-15			
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18			
NET Concentration Value = (I			uCi/ml		2E-15			
DAC (or AE) Fraction = (F2)/(I	I)				01%			
MDC = MDA/V = (G)/(A) (J)		μCi/ml		6E-14				
MDC Fraction of DAC (or AE)		(10%))9%			
Final Count?			Yes/No	1	Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	n.		
Performed By	Performed By: Date:						_	
Reviewed By	r:					Date:		

		Sec	tion I - Collec	tion Data				
Date:	7/14/2017	Sample ID:	201706	529-043	RW	P: 2017-001		
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		── Work Area: □	
	_	2.0E-11				_ '		
Non-Occupational (EC):	_	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml	4μCi/ml] Radionuclides:		DU (Deplet	ed Uranium)	
Location:		Hual Truck			Sampled By:	R Santa	angelo	
Wearer:		Jake Burgess		Act	ivity Performed:	Movin	g Dirt	
Monitored Workers:				Jake Burgess				
Lapel Pump Model:	SKC224-PCXR8		Serial No.	210	62	Calibration Due Date:	5/2/2018	
Air Pump Model:	NA		Serial No.	N.		Calibration Due Date:		
	101		Seriai 110.	10		•		
Sample Information		Time			Ļ		Rate (lpm)	
Collection Date	Start	Stop		ninutes)	-	Start	Stop	
6/29/2017	10:30	14:00		10	-	56.6	56.6	
		T . 1 T . T		0	-			
		Total Time (Tc):	2	10		Avg. Flow Rate (lpm)	56.6	
			Minimum Air	Sample Volume:	3.3E+01	Liters		
Sample Volume:	57	(lpm)	x	210	(minutes) =	1.2E+04	Liters (A)	
_		olumes identified are necessary to achi			·			
Remarks: IV	illillium sample v	orumes identified are necessary to acm	leve 10% of DAC	of AE value.				
Section II - Analysis Data								
Instrument Information		Serial Number			Calibrati	on Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L2929		158817	164	736	12/13/2017	12/13/2017	0.344	
N/A		N/A	N	/A	N/A	N/A	N/A	
						Alpha		
Vari	iables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count	
Count Date				7/14/2017				
Count Time (e.g., noon, 1300, e	etc.)			10:00				
Sample Count Time (Ts, Tb) =	T		minutes		60			
Total Counts			counts		5			
Sample Count Rate			cpm		.13			
Background Count Rate			cpm		.11			
Air Volume (liters)		(A)	liters		E+04	1.2E+04	1.2E+04	
Net count rate		B)	cpm		0.02	0.24	0.24	
Counter Efficiency	(C		cpm/dpm 0.99		1.34	0.34	0.34	
Collection Efficiency Efficiency = (C) x (D)	(E)		cpm/dpm		1.34	0.34	0.34	
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)	'	dpm		0.06	0.34	0.34	
Minimum Detectable Activity (ORT(Cb))/(E*T) (G)	dpm		1.72			
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	*	2 - 1 (0)	μCi/ml		BE-15			
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18			
NET Concentration Value = (H	I) - (F1); (F	2)	uCi/ml	2,22	2E-15			
DAC (or AE) Fraction = (F2)/(I)			0.0	01%				
MDC = MDA/V = (G)/(A) (J)		μCi/ml		4E-14				
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)		0.1	14%			
Final Count?			Yes/No	7	Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	1,		
Performed By	:					Date:		
Reviewed By	:					Date:		



Iowa Army Ammunition Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Re	port for
Calendar Year 2017	

ATTACHMENT C-1-3

CALENDAR YEAR 2017 WORK AREA AIR SAMPLE REPORTS

(On the CD-ROM on the Back Cover of this Report)

Iowa Army Ammunition Plant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for Calendar Year 2017
THIS PAGE INTENTIONALLY LEFT BLANK

		Sec	tion I - Collec	ction Data					
Date:	5/3/2017	Sample ID:	201705	503-004	R	WP: 2017-001			
Occupational (DAC):		*		μCi/ml (I)	Breathing Zone:	_	Work Area: ✓		
Non-Occupational (EC):		2.00E-11 [DAC = 2.0E-11μCi/ml (U-238), EC:	- 4 OE 1/uCi/ml	1	-	: DU (Deplei			
Location:		Amec Soil Sorting Area	a		Sampled By:	David 1	Berres		
Wearer:		NA		Act	tivity Performed:	N.	A		
Monitored Workers:				NA					
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA		
Air Pump Model:	RV-1		Serial No.	360	64	Calibration Due Date:	3/16/2018		
Sample Information		Time				Flow	Rate (lpm)		
Collection Date	Start	Stop	Total (r	minutes)		Start	Stop		
5/3/2017	8:00	15:00		20		65.0	65.0		
5/5/2017	0.00	15.00	·-	20		05.0	05.0		
		Total Time (Tc):	4.	20		Avg. Flow Rate (lpm)	65.0		
			Minimum Air	Cula Valumai	2.0E . 01				
				Sample Volume:		Liters			
Sample Volume:	65	(lpm)	X	420	(minutes) =	= 2.7E+04	Liters (A)		
Remarks: Mi	nimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.					
			ction II - Anal	ysis Data					
Instrument Information		Serial Number				ation Due Date			
Instrument Type		Meter		ector	Meter	Detector	Efficiency (α)		
L-2929		158817		1736	12/13/2018	12/13/2018	0.344 N/A		
N/A		N/A	IN.	/A	N/A	N/A Alpha	N/A		
Varia	bles, Calculation	ne Recults	Units	1st	Count	2nd Count	3rd Count		
Count Date	DICS, Carcumass.	is, Resures	Uhito	5/12/2017		Ziiti Count	Jiu Count		
Count Time (e.g., noon, 1300, etc	c.)			9:00					
Sample Count Time (Ts, Tb) = T			minutes	60					
Total Counts			counts		11				
Sample Count Rate			cpm).18				
Background Count Rate			cpm	C	0.08				
Air Volume (liters)	((A)	liters	2.7	E+04	2.7E+04	2.7E+04		
Net count rate	0	B)	cpm	0).10				
Counter Efficiency	(C)	cpm/dpm	0).34	0.34	0.34		
Collection Efficiency	(D)	0.99	0).99	0.99	0.99		
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	0).34	0.34	0.34		
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	0).30				
Minimum Detectable Activity (dp	pm) = (3+4.65*Se	QRT(Cb))/(E*T) (G)	dpm	0	0.64				
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$			μCi/ml	5.01	1E-15				
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18				
NET Concentration Value = (H)	- (F1); (F	2)	uCi/ml		0E-15				
DAC (or AE) Fraction = $(F2)/(I)$					02%				
MDC = MDA/V = (G)/(A)	IDC = MDA/V = (G)/(A) (J)		μCi/ml	1.05E-14					
MDC Fraction of DAC (or AE) =	: (J)/(I) (Goal<	:10%)		0.0	05%				
Final Count?			Yes/No	Ţ	Yes				
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notificati	on.			
Performed By:						Date:			

		Sec	tion I - Collec	tion Data				
Date:	5/3/2017	Sample ID:	201705	503-005	RWP	: 2017-001		
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area: ✓	
		2.00E-11			, L	,		
Non-Occupational (EC):	J	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14µCi/ml]		Radionuclides:	DU (Deplet	ted Uranium)	
Location:		Amec Soil Sorting Area	a		Sampled By:	David 1	Berres	
Wearer:		NA		Act	tivity Performed:	N.	A	
Monitored Workers:				NA				
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA	
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop	
5/3/2017	8:00	15:00	42	20		65.0	65.0	
)				
		Total Time (Tc):	43	20		Avg. Flow Rate (lpm)	65.0	
			Minimum Air	Sample Volume:	4.2E+01 Li	ters		
Sample Volume:	65	(lpm)	x	420	(minutes) =	2.7E+04	Liters (A)	
		olumes identified are necessary to ach			·`			
Kellidiks. Wi	minum sample v	brumes identified are necessary to ach	leve 10% of DAC	of AE value.				
Section II - Analysis Data								
Instrument Information		Serial Number			Calibration	n Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)	
L-2929		158817	164	164736 12/13/2018		12/13/2018	0.344	
N/A		N/A	N	/A	N/A	N/A	N/A	
						Alpha		
Varia	ables, Calculation	ns, Results	Units		Count	2nd Count	3rd Count	
Count Date					2/2017			
Count Time (e.g., noon, 1300, et					0:35			
Sample Count Time (Ts, Tb) = T	Γ		minutes		60			
Total Counts			counts		9			
Sample Count Rate			cpm		0.15			
Background Count Rate		(4)	cpm		0.20	2.75.04	2.75.04	
Air Volume (liters)		(A)	liters		E+04	2.7E+04	2.7E+04	
Net count rate Counter Efficiency	(C	B)	cpm		0.05	0.34	0.34	
Collection Efficiency	(L		cpm/dpm 0.99).99	0.34	0.34	
Efficiency = (C) x (D)	(E		cpm/dpm		0.34	0.34	0.34	
Activity $(dpm) = (B)/(E)$	(F)		dpm		0.15	0.54	0.54	
Minimum Detectable Activity (d		ORT(Ch))/(E*T) (G)	dpm).93			
Concentration = $(\mathbf{F})/(2.22E9 \times I)$		~(//(\D \ \) (\O)	μCi/ml		2E-15			
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		1E-18			
NET Concentration Value = (H)) - (F1); (F	2)	uCi/ml	-2.4	3E-15			
DAC (or AE) Fraction = (F2)/(I)			-0.	01%				
MDC = MDA/V = (G)/(A) (J)		μCi/ml		3E-14				
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal	(10%)		0.0	08%			
Final Count?			Yes/No	,	Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification.			
								
Performed By:						Date:		
Reviewed By:						Date:		

		Sec	tion I - Collec	ction Data				
Date:	5/4/2017	Sample ID:	201705	504-009	RV	WP: 2017-001		
Occupational (DAC):	Limit:	2.00E-11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓	
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$:= 6.0E-14µCi/ml	<u>.</u>]	Radionuclides:	DU (Deple	ted Uranium)	
Location:		Amec Soil Sorting Are			Sampled By:	David		
Wearer:			u	Λ	· · · · =			
_		NA		•	tivity Performed:	N	A	
Monitored Workers:				NA				
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA	
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	minutes)	'	Start	Stop	
5/4/2017	7:40	15:10	4	50		65.0	65.0	
5/5/2017	7:45	15:15	4.	50		65	65	
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0	
			Mii Ai-	C1- W-1	2.0E - 01	I it		
				Sample Volume:		Liters		
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)	
Remarks: Mi	inimum sample vo	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.				
Section II - Analysis Data								
Instrument Information	1	Serial Number	cuon II - Anai	lysis Data	Calibra	tion Due Date		
			Dot	a a tau		Detector	Efficiency (a)	
Instrument Type		Meter		ector	Meter 12/13/2018		Efficiency (α)	
L-2929 N/A		158817 N/A		1736 I/A	12/13/2018 N/A	12/13/2018 N/A	0.344 N/A	
IV/A		IV/A	18	l .	IV/A	Alpha	IV/A	
Varia	bles, Calculation	ne Results	Units	1st	Count	2nd Count	3rd Count	
Count Date	ibies, Culculation	is, results	Cints		6/2017	2nd Count	Stu Count	
Count Time (e.g., noon, 1300, et	rc)				0:35			
Sample Count Time (Ts, Tb) = T			minutes		60			
Total Counts			counts		10			
Sample Count Rate			cpm		0.17			
Background Count Rate			cpm		0.08			
Air Volume (liters)	((A)	liters		E+04	5.9E+04	5.9E+04	
Net count rate		B)	cpm		0.09	*******		
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34	
Collection Efficiency	(D		0.99	().99	0.99	0.99	
Efficiency = (C) x (D)	(E)		cpm/dpm	().34	0.34	0.34	
Activity $(dpm) = (B)/(E)$	(F)		dpm).25			
Minimum Detectable Activity (d	pm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	().64			
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$	A)) (H)		μCi/ml	1.90	6E-15			
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18			
NET Concentration Value = (H)) - (F1); (F	2)	uCi/ml	1.9	5E-15			
DAC (or AE) Fraction = (F2)/(I)				0.0	01%			
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	4.92	2E-15			
MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(J)	<10%)	μCi/ml					
	(J)	(10%)	μCi/ml Yes/No	0.0	2E-15			
MDC Fraction of DAC (or AE) =	(J)	(10%) Note: Unexpected DAC or AE	Yes/No	0.0	2E-15 02% Yes	on.		
MDC Fraction of DAC (or AE) =	(J)		Yes/No	0.0	2E-15 02% Yes)n.		
MDC Fraction of DAC (or AE) =	(J) = (J)/(I) (Goal<		Yes/No	0.0	2E-15 02% Yes	Date:		
MDC Fraction of DAC (or AE) = Final Count?	(J) = (J)/(I) (Goal<		Yes/No	0.0	2E-15 02% Yes			

		Sec	tion I - Collec	tion Data				
Date:	5/4/2017	Sample ID:	201705	504-010	RV	VP: 2017-001		
Occupational (DAC):	limit:	•		μCi/ml (I)	Breathing Zone:		Work Area: ✓	
	_	6.00E-14	6 OF 14 GV 18		,			
Non-Occupational (EC):	4	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml]		Radionuclides:	DU (Deple	ted Uranium)	
Location:		Boundry			Sampled By: David Berres			
Wearer:	NA			Act	ivity Performed:	N	A	
Monitored Workers:				NA				
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA	
Air Pump Model:	RV-1		Serial No.	360	67	Calibration Due Date:	3/7/2018	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	ninutes)	' I	Start	Stop	
5/4/2017	7:50	15:15	4	45		65.0	65.0	
5/5/2017	7:50	15:15	4	45		65	65	
		Total Time (Tc):	89	90		Avg. Flow Rate (lpm)	65.0	
			Minimum Air	C1- W-1	0.CE : 02	T 14		
			Minimum Air	Sample Volume:	9.6E+03	Liters		
Sample Volume:	65	(lpm)	X	890	(minutes) =	5.8E+04	Liters (A)	
Remarks: M	/Inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.				
Section II - Analysis Data								
T	1		uon 11 - Anai	ysis Data	G-10h	in Dec Dete		
Instrument Information		Serial Number	Б.			ion Due Date	DCC : (-)	
Instrument Type		Meter		ector	Meter	Detector	Efficiency (α)	
L-2929		158817		736	12/13/2018	12/13/2018	0.344	
N/A		N/A	IN.	/A	N/A	N/A Alpha	N/A	
Vari	iables, Calculation	ac Reculte	Units	1et	Count	2nd Count	3rd Count	
Count Date	indics, Culculation	is, resures	Cints	5/16/2017		2nd Count	Siu count	
Count Time (e.g., noon, 1300, e	etc.)			12:30				
Sample Count Time (Ts, Tb) =			minutes		60			
Total Counts			counts		16			
Sample Count Rate			cpm		1.27			
Background Count Rate			cpm		.08			
Air Volume (liters)	((A)	liters	5.8	E+04	5.8E+04	5.8E+04	
Net count rate		B)	cpm		.19			
Counter Efficiency	(C)	cpm/dpm	0	.34	0.34	0.34	
Collection Efficiency	(D)	0.99	0	1.99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	0	0.34	0.34	0.34	
Activity $(dpm) = (B)/(E)$	(F)		dpm	0	1.55			
Minimum Detectable Activity (dpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	0	0.64			
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	4.27	7E-15			
Background "Strip" value (F.1)) Date Updated	4/20-4/21	uCi/ml	7.3	1E-18			
NET Concentration Value = (I	H) - (F1); (F	2)	uCi/ml	4.20	SE-15			
DAC (or AE) Fraction = (F2)/(I	I)			7.1	10%			
MDC = MDA/V = (G)/(A) (J)		μCi/ml	4.98	BE-15				
MDC Fraction of DAC (or AE)	$= (\mathbf{J})/(\mathbf{I})$ (Goal<	10%)		8.2	29%			
Final Count?			Yes/No	3	Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notificatio	n.		
					-	-	-	
Performed By	Performed By: Date:							
Reviewed By	r:					Date:		

		Sec	tion I - Collec	tion Data			
Date:	5/9/2017	Sample ID:	201705	509-012	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.00E-11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):	_	[DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14uCi/ml		Radionuclides:	DU (Deple	ted Uranium)
Location:		Amec Soil Sorting Area			Sampled By:	David	
_			<u>u</u>		· · ·		
Wearer:		NA			ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
5/8/2017	7:35	13:20	34	45		65.0	65.0
5/9/2017	7:40	8:30	5	0		65	65
5/9/2017	12:15	14:15	12	20		65	65
		Total Time (Tc):	39	95		Avg. Flow Rate (lpm)	65.0
	•		Minimum Air	Sample Volume:	3.1E+01	Liters	•
Comple Volumes	65	Jam)		•			Litoro (A)
Sample Volume:		(lpm)	X	395	(minutes) =	2.6E+04	Liters (A)
Remarks: Mi	nimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculations	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				5/10	5/2017		
Count Time (e.g., noon, 1300, et	c.)			1.	5:00		
Sample Count Time (Ts, Tb) = T	•		minutes		60		
Total Counts			counts		7		
Sample Count Rate			cpm	(0.12		
Background Count Rate			cpm	(0.10		
Air Volume (liters)	(/	A)	liters	2.6	E+04	2.6E+04	2.6E+04
Net count rate	(B	3)	cpm				
C . DCC .		,	срш	(0.02		
Counter Efficiency	(C)	,	cpm/dpm		0.02	0.34	0.34
Counter Efficiency Collection Efficiency	(C) (D)		-	(0.34 0.99	0.34 0.99
•			cpm/dpm	(0.34		
Collection Efficiency	(D)		cpm/dpm 0.99	().34).99	0.99	0.99
Collection Efficiency Efficiency = (C) x (D)	(D) (E) (F)		cpm/dpm 0.99 cpm/dpm	() () ()	0.34 0.99 0.34 0.05	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E)	(D) (E) (F) pm) = (3+4.65*SQ)RT(Cb))/(E*T) (G)	cpm/dpm 0.99 cpm/dpm dpm	() () () () () ()	0.34 0.99 0.34 0.05 0.70 DE-16	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	(D) (E) (F) pm) = (3+4.65*SQ		cpm/dpm 0.99 cpm/dpm dpm	(C) (C) (C) (S.55) (7.3)	0.34 0.99 0.34 0.05 0.70 9E-16 1E-18	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A))	(D) (E) (F) pm) = (3+4.65*SQA)) (H) Date Updated)RT(Cb))/(E*T) (G) 4/20-4/21	cpm/dpm 0.99 cpm/dpm dpm dpm µCi/ml	(C) (C) (C) (S.55) (7.3)	0.34 0.99 0.34 0.05 0.70 DE-16	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (#) Background "Strip" value (F.1)	(D) (E) (F) pm) = (3+4.65*SQ A)) (H) Date Updated (-(F1); (F2))RT(Cb))/(E*T) (G) 4/20-4/21	cpm/dpm 0.99 cpm/dpm dpm dpm	(((((((((((((((((((0.34 0.99 0.34 0.05 0.70 9E-16 11E-18 1E-16	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£ Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(D) (E) (F) pm) = (3+4.65*SC A)) (H) Date Updated (-(F1); (F2)	PRT(Cb))/(E*T) (G) 4/20-4/21	cpm/dpm 0.99 cpm/dpm dpm dpm	(c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	0.34 0.99 0.34 0.05 0.70 9E-16 11E-18 1E-16 00% 2E-14	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£ Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I)	(D) (E) (F) pm) = (3+4.65*SC A)) (H) Date Updated (-(F1); (F2)	PRT(Cb))/(E*T) (G) 4/20-4/21	cpm/dpm 0.99 cpm/dpm dpm dpm µCi/ml uCi/ml	(c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	0.34 0.99 0.34 0.05 0.70 9E-16 11E-18 1E-16	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£ Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(D) (E) (F) pm) = (3+4.65*SC A)) (H) Date Updated (-(F1); (F2)	PRT(Cb))/(E*T) (G) 4/20-4/21)	cpm/dpm 0.99 cpm/dpm dpm dpm μCi/ml uCi/ml μCi/ml Yes/No	(c) (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	0.34 0.99 0.34 0.05 0.70 0PE-16 11E-18 11E-16 00% 02E-14 06%	0.99 0.34	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£ Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(D) (E) (F) pm) = (3+4.65*SC A)) (H) Date Updated (-(F1); (F2)	PRT(Cb))/(E*T) (G) 4/20-4/21	cpm/dpm 0.99 cpm/dpm dpm dpm μCi/ml uCi/ml μCi/ml Yes/No	(c) (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	0.34 0.99 0.34 0.05 0.70 0PE-16 11E-18 11E-16 00% 02E-14 06%	0.99 0.34	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£ Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(D) (E) (F) pm) = (3+4.65*SQ A)) (H) Date Updated O - (F1); (F2) (J) = (J)/(I) (Goal<	PRT(Cb))/(E*T) (G) 4/20-4/21)	cpm/dpm 0.99 cpm/dpm dpm dpm μCi/ml uCi/ml μCi/ml Yes/No	(c) (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	0.34 0.99 0.34 0.05 0.70 0PE-16 11E-18 11E-16 00% 02E-14 06%	0.99	0.99
Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£ Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) = Final Count?	(D) (E) (F) pm) = (3+4.65*SQ (A)) (H) Date Updated (-(F1); (F2) (J) = (J)/(I) (Goal<	PRT(Cb))/(E*T) (G) 4/20-4/21)	cpm/dpm 0.99 cpm/dpm dpm dpm μCi/ml uCi/ml μCi/ml Yes/No	(c) (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	0.34 0.99 0.34 0.05 0.70 0PE-16 11E-18 11E-16 00% 02E-14 06%	0.99	0.99 0.34

		Sec	tion I - Collec	tion Data			
Date:	5/9/2017	Sample ID:	201705	509-013	RW	VP: 2017-001	
Occupational (DAC):	Limit:	C 00F 14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):	-	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E 14uCi/ml			DU (Deple	
		• • •	= 0.0E-14μCI/IIII _.				
Location:		Boundry			Sampled By:	David	Berres
Wearer:		NA		Act	tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	67	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	ninutes)		Start	Stop
5/8/2017	7:30	13:20	3:	50		65.0	65.0
5/9/2017	7:40	8:40	6	50		65	65
5/9/2017	12:15	14:15	1:	20		65	65
		Total Time (Tc):	4	10		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	4.8E+03	Liters	
Sample Volume:	65	(lpm)	x	410	(minutes) =	2.7E+04	Liters (A)
					(minutes) –	2.712704	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	ıbles, Calculation	s, Results	Units	1st	Count	Alpha 2nd Count	3rd Count
Varia Count Date	ables, Calculation	s, Results	Units		Count 8/2107	•	3rd Count
		s, Results	Units	5/13	8/2107 2:30	•	3rd Count
Count Date	c.)	s, Results	Units minutes	5/13	8/2107 2:30 60	•	3rd Count
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts	c.)	s, Results		5/1:	8/2107 2:30 60 7	•	3rd Count
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate	c.)	s, Results	minutes	5/1:	8/2107 2:30 60 7 0.12	•	3rd Count
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate	c.)		minutes counts cpm cpm	5/1;	8/2107 2:30 60 7 0.12 0.01	2nd Count	
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters)	(.)	A)	minutes counts cpm cpm liters	5/1:	8/2107 2:30 60 7 0.12 0.01	•	3rd Count 2.7E+04
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate	(c.)	A) 3)	minutes counts cpm cpm liters cpm	5/1: 1 ((2.7	8/2107 2:30 60 7 0.112 0.01 VE+04	2nd Count 2.7E+04	2.7E+04
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency	(c.)	A) B)	minutes counts cpm cpm liters cpm cpm	5/1: 1 ((2.7	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11	2nd Count 2.7E+04 0.34	2.7E+04 0.34
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency	(c.) (f.) (C.) (D.)	A) B)	minutes counts cpm cpm liters cpm cpm 0.99	5/1: 1 ((2.7	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.334	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D)	(c.) (f.) (C) (D)	A) B)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm	5/1: 1 (((2.7)	8/2107 2:30 60 7 0.12 0.01 /E+04 0.11 0.34 0.99	2nd Count 2.7E+04 0.34	2.7E+04 0.34
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E)	(C) (D) (E) (F)	A) 3)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm	5/1: 1 (((2.7)	8/2107 2:30 60 7 0.12 0.01 /E+04 0.11 0.34 0.99 0.34	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	(c.) (f.) (I) (C) (D) (E) (F) pm) = (3+4.65*S(C)	A) 3)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm	5/1: 1 ((2.7	8/2107 2:30 60 7 0.01 PE+04 0.11 0.34 0.99 0.34 0.31	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A)	(C.) (C.) (D.) (F) (F) (P) (A)) (H)	A) B) QRT(Cb))/(E*T) (G)	minutes counts cpm cpm liters cpm/dpm 0.99 cpm/dpm dpm dpm dpm	5/1: 1 ((2.7 ((((((() () () () () () ()	8/2107 2:30 60 7 7.12 0.01 //E+04 0.11 0.034 0.09 0.34 0.31 0.32 9E-15	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1)	(C.) (C) (C) (E) (F) (F) (F) (H) (H) (Date Updated	A) B) ORT(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml	5/1: 1 (() (2.7 (() (() (() () (5.2) 7.3	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.334 0.99 0.34 0.32 9E-15	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H)	(C.) (C) (C) (E) (F) (F) (F) (H) (H) (H) (H) (H) (H) (F1); (F2)	A) B) ORT(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm/dpm 0.99 cpm/dpm dpm dpm dpm	5/1: 1 (c) (c) (d) (d) (d) (d) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 PE+04 0.11 0.34 0.99 0.34 0.31 0.32 PE-15 HE-18	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (dpm) = (F)/(2.22E9 x (Apple 12) (Apple 12) (Apple 13) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(1)	(C.) (C) (E) (F) (F) (P) (H) (Date Updated (F1); (F2)	A) B) ORT(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm cpm/dpm dpm dpm dpm uCi/ml uCi/ml	5/1: 1 (c) (c) (d) (d) (d) (e) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.334 0.99 0.34 0.331 0.32 9E-15 1E-18 9E-15 81%	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(C.) (C) (E) (F) (F) (H) (Date Updated (F1); (F2) (J)	A) B) PRT(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml	5/1: 1 (c) (c) (d) (d) (d) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 //E+04 0.11 0.34 0.99 0.34 0.331 0.32 9E-15 1E-18 9E-15 81% 1E-15	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(C.) (C) (E) (F) (F) (H) (Date Updated (F1); (F2) (J)	A) B) PRT(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm cpm/dpm dpm dpm dpm uCi/ml uCi/ml	5/1: 1 (c) (c) (d) (d) (d) (e) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.34 0.99 0.34 0.31 0.32 9E-15 1E-18 9E-15 81% 11E-15 01%	2.7E+04 0.34 0.99	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(C.) (C) (E) (F) (F) (H) (Date Updated (F1); (F2) (J)	A) B) PRT(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml uCi/ml	5/1: 1 (c) (c) (d) (d) (d) (e) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.34 0.99 0.34 0.31 0.32 9E-15 1E-18 9E-15 1E-18 91E-15 11E-18 11E-15 11E-18 11E-15 11E-15 11E-18	2.7E+04 2.7E+04 0.34 0.99 0.34	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(C.) (C) (E) (F) (F) (H) (Date Updated (F1); (F2) (J)	A) 3) 2) PRT(Cb))/(E*T) (G) 4/20-4/21 2)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml uCi/ml	5/1: 1 (c) (c) (d) (d) (d) (e) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.34 0.99 0.34 0.31 0.32 9E-15 1E-18 9E-15 1E-18 91E-15 11E-18 11E-15 11E-18 11E-15 11E-15 11E-18	2.7E+04 2.7E+04 0.34 0.99 0.34	2.7E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(C) (E) (F) (F) (F) (H) (G) (H) (H) (H) (H) (H) (H) (H) (H) (H) (H	A) 3) 2) PRT(Cb))/(E*T) (G) 4/20-4/21 2)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml uCi/ml	5/1: 1 (c) (c) (d) (d) (d) (e) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.34 0.99 0.34 0.31 0.32 9E-15 1E-18 9E-15 1E-18 91E-15 11E-18 11E-15 11E-18 11E-15 11E-15 11E-18	2.7E+04 2.7E+04 0.34 0.99 0.34	2.7E+04 0.34 0.99 0.34
Count Date Count Time (e.g., noon, 1300, etc.) Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) = Final Count?	(c.) (f.) (f.) (f.) (f.) (f.) (f.) (f.) (f	A) 3) 2) PRT(Cb))/(E*T) (G) 4/20-4/21 2)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml uCi/ml	5/1: 1 (c) (c) (d) (d) (d) (e) (e) (e) (f) (f) (f) (f) (f) (f) (f) (f	8/2107 2:30 60 7 0.12 0.01 7E+04 0.11 0.34 0.99 0.34 0.31 0.32 9E-15 1E-18 9E-15 1E-18 91E-15 11E-18 11E-15 11E-18 11E-15 11E-15 11E-18	2.7E+04 2.7E+04 0.34 0.99 0.34	2.7E+04 0.34 0.99 0.34

		Sec	tion I - Collec	tion Data			
Date:	5/12/2017	Sample ID:	201705	512-016	RW	/P: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:	_	Work Area: ✓
	,	2.00E-11	6 0F 14 C:/!		- '		
Non-Occupational (EC):	1	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCt/mtj			DU (Deple	ted Uranium)
Location:		Amec Soil Sorting Area	ı		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
5/10/2017	13:30	15:15	10	05		65.0	65.0
5/12/2017	8:00	14:45	40	05		65	65
		Total Time (Tc):	5	10		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-1	2.CE . 01	I 14	
			Minimum Air	Sample Volume:	2.6E+01	Liters	
Sample Volume:	65	(lpm)	X	510	(minutes) =	3.3E+04	Liters (A)
Remarks: M	inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Soo	tion II Anal	rugia Doto			
T	1		tion II - Anal	ysis Data			
Instrument Information		Serial Number				ion Due Date	TIOT 1 ()
Instrument Type		Meter		ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
Vori	ables, Calculation	ne Posulte	Units	1et	Count	Alpha 2nd Count	3rd Count
Count Date	ables, Calculation	is, Results	Cints	5/22/2017		Ziiu Count	314 Count
Count Time (e.g., noon, 1300, e	tc)			9:00			
Sample Count Time (Ts, Tb) = 7			minutes		60		
Total Counts			counts		6		
Sample Count Rate			cpm		0.10		
Background Count Rate			cpm		1.06		
Air Volume (liters)		(A)	liters		E+04	3.3E+04	3.3E+04
Net count rate		B)	cpm		0.04		
Counter Efficiency	(C		cpm/dpm		1.34	0.34	0.34
Collection Efficiency	(D		0.99	0	1.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	0	0.12		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	0	0.57		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	1.60)E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H) - (F1); (F	2)	uCi/ml	1.59	PE-15		
DAC (or AE) Fraction = (F2)/(I)			0.0	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		BE-15		
MDC Fraction of DAC (or AE)		(10%))4%		
Final Count?			Yes/No	,	Yes		
		Note: Unexpected DAC or AE				n.	
Performed By:	:					Date:	
Reviewed By:	<u> </u>					Date:	

		Sec	tion I - Collec	tion Data			
Date:	5/12/2017	Sample ID:			RV	VP: 2017-001	
Occupational (DAC):		<u> </u>		μCi/ml (I)	Breathing Zone:		✓ Work Area:
		6.00E-14					
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml]		Radionuclides:	DU (Deplet	ted Uranium)
Location:		Boundry			Sampled By:	David 1	Berres
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
5/10/2017	13:40	15:10	9	0		65.0	65.0
5/12/2017	7:30	14:40	43	30		65	65
		Total Time (Tc):	52	20		Avg. Flow Rate (lpm)	65.0
	l I		Minimum Air	Sample Volume:	9.6E+03	Litana	
				•		Liters	
Sample Volume:	65	(lpm)	X	520	(minutes) =	3.4E+04	Liters (A)
Remarks: Mi	inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Soc	tion II - Anal	veic Doto			
Instrument Information	1	Serial Number	tion II - Anai	ysis Data	Colibrat	tion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N		N/A	N/A	N/A
11/11		14.1			1771	Alpha	1011
Varia	ables, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date	•			5/2	2/2017		
Count Time (e.g., noon, 1300, et	tc.)			1	2:30		
Sample Count Time (Ts, Tb) = T	Γ		minutes		60		
Total Counts			counts		9		
Sample Count Rate			cpm	(0.15		
Background Count Rate			cpm	(0.08		
Air Volume (liters)	(A)	liters	3.4	E+04	3.4E+04	3.4E+04
Net count rate	(1	B)	cpm	(0.07		
Counter Efficiency	(C)	cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)	ODER(CL)) (FWE) (CL)	dpm		0.21		
Minimum Detectable Activity (d		QR1(Cb))/(E*1) (G)	dpm		0.64 4E 15		
Concentration = (F)/(2.22E9 x (A		4/20-4/21	μCi/ml		4E-15		
Background "Strip" value (F.1) NET Concentration Value = (H)	Date Updated) - (F1); (F2)		uCi/ml		1E-18 3E-15		
		2)	uCi/ml		55%		
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$	(J)		μCi/ml		2E-15		
MDC Fraction of DAC (or AE) =		10%)	μСі/іііі		.19%		
Final Count?	(6),(2)	10,0,	Yes/No		Yes		
. mm count.		Note: Unexpected DAC or AE				n.	
		Tiour Cheaptered Diffe of AE		requires inflicti	and Albo nouncation		
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	tion Data			
Date:	5/16/2017	Sample ID:	201705	516-019	RV	VP: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area: ✓
	_	2.00E-11	6 0F 14 C:/!				
Non-Occupational (EC):	1	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$				DU (Deple	ted Uranium)
Location:		Amec Soil Sorting Area	ı		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
5/15/2017	7:40	15:10	4:	50		65.0	65.0
5/16/2017	7:40	14:45	42	25		65	65
		Total Time (Tc):	8	75		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-1	2.4E . 0.1	T in	
			Minimum Air	Sample Volume:	2.4E+01	Liters	
Sample Volume:	65	(lpm)	X	875	(minutes) =	5.7E+04	Liters (A)
Remarks: M	finimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		G	4 II A 1				
T	1		tion II - Anal	ysis Data	6.11		
Instrument Information		Serial Number				ion Due Date	TIOT : ()
Instrument Type		Meter		ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
Vori	ables, Calculation	ac Paculto	Units	1et	Count	Alpha 2nd Count	3rd Count
Count Date	ables, Calculation	is, Results	Cints	5/26/2017		Ziiu Count	314 Count
Count Time (e.g., noon, 1300, e	etc.)			8:30			
Sample Count Time (Ts, Tb) = 7			minutes		60		
Total Counts	-		counts		28		
Sample Count Rate			cpm		.47		
Background Count Rate			cpm		0.05		
Air Volume (liters)		(A)	liters		E+04	5.7E+04	5.7E+04
Net count rate		B)	cpm		1.42		
Counter Efficiency	(C)	cpm/dpm	0	.34	0.34	0.34
Collection Efficiency	(E	0)	0.99	0	1.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	0	0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	1	.22		
Minimum Detectable Activity (d	dpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	0	0.54		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	9.69	PE-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H	I) - (F1); (F	2)	uCi/ml	9.68	BE-15		
DAC (or AE) Fraction = (F2)/(I	()			0.0)5%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	4.24	4E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	<10%)		0.0	02%		
Final Count?			Yes/No	`	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notificatio	n.	
Performed By:	:					Date:	
Reviewed By:	:					Date:	

		Sec	tion I - Collec	tion Data			
Date:	5/16/2017	Sample ID:	201705	16-020	RW	/P: 2017-001	
Occupational (DAC):	limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	_ 7	[DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14µCi/ml]		Radionuclides:	DU (Deple	_
Location:	_	Boundry	, ,		Sampled By:	David	
_		•					
Wearer:		NA			ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	360	57	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
5/15/2017	7:45	15:15	45	50		65.0	65.0
5/16/2017	7:40	15:15	45	55		65	65
		Total Time (Tc):	90)5		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	8.0E+03	Litoro	
				•		Liters	
Sample Volume:	65	(lpm)	X	905	(minutes) =	5.9E+04	Liters (A)
Remarks: N	Minimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	vsis Data			
Instrument Information		Serial Number	11011111111111	ysis Dutu	Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N ₂		N/A	N/A	N/A
4.17.4.4		1111	2.0		1771	Alpha	11/11
Var	iables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count
Count Date				5/26/2017			
Count Time (e.g., noon, 1300,	etc.)			22:30			
Sample Count Time (Ts, Tb) =	T		minutes		60		
Total Counts			counts		15		
Sample Count Rate			cpm	0	.25		
Background Count Rate			cpm	0	.05		
Air Volume (liters)	((A)	liters	5.9	E+04	5.9E+04	5.9E+04
Net count rate	(B)	cpm	0	.20		
Counter Efficiency	(C)	cpm/dpm	0	.34	0.34	0.34
Collection Efficiency	(E	0)	0.99	0	.99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)	ı	cpm/dpm	0	.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	0	.59		
Minimum Detectable Activity ((dpm) = (3+4.65*S)	QRT(Cb))/(E*T) (G)	dpm	0	.54		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	4.50	E-15		
Background "Strip" value (F.1)) Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (I	H) - (F1); (F	2)	uCi/ml	4.49	DE-15		
DAC (or AE) Fraction = (F2)/(I)				18%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		E-15		
MDC Fraction of DAC (or AE)	$= (\mathbf{J})/(\mathbf{I})$ (Goal<	(10%)			34%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	n.	
Performed By	/:					Date:	
Reviewed By	<i>r</i> :					Date:	

		Sec	tion I - Collec	tion Data			
Date:	5/18/2017	Sample ID:	201705	518-022	RV	VP: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	_ 	[DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14µCi/ml]		Radionuclides:	DU (Deple	_
Location:	_	Boundry			Sampled By:	David	
_		•					
Wearer:		NA			ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	Ĭ	Start	Stop
5/17/2017	7:45	15:05	4	40		65.0	65.0
5/18/2017	8:05	15:10	42	25		65	65
		Total Time (Tc):	86	65		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	9.6E+03	Litoro	
				•		Liters	
Sample Volume:	65	(lpm)	X	865	(minutes) =	5.6E+04	Liters (A)
Remarks: N	Minimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	vsis Data			
Instrument Information		Serial Number	11011 11 111111	y sis Dutu	Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A		/A	N/A	N/A	N/A
11/11		1111			11/11	Alpha	11/11
Var	riables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count
Count Date	·			5/31/2017			
Count Time (e.g., noon, 1300,	etc.)			11:45			
Sample Count Time (Ts, Tb) =	T		minutes		60		
Total Counts			counts		18		
Sample Count Rate			cpm	0	.30		
Background Count Rate			cpm	0	.08		
Air Volume (liters)	((A)	liters	5.6	E+04	5.6E+04	5.6E+04
Net count rate	(B)	cpm	0	.22		
Counter Efficiency	(C)	cpm/dpm	0	.34	0.34	0.34
Collection Efficiency	(E	0)	0.99	0	.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)	ı	cpm/dpm	0	0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	0	1.65		
Minimum Detectable Activity	(dpm) = (3+4.65*S)	QRT(Cb))/(E*T) (G)	dpm	0	.64		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	5.18	3E-15		
Background "Strip" value (F.1) Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (I	H) - (F1); (F	2)	uCi/ml	5.17	7E-15		
DAC (or AE) Fraction = (F2)/((I)			8.0	61%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		2E-15		
MDC Fraction of DAC (or AE)	$= (\mathbf{J})/(\mathbf{I})$ (Goal<	(10%)		8.5	53%		
Final Count?			Yes/No	7	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notificatio	n.	
Performed By	y:					Date:	
Reviewed By	y:					Date:	

		Sec	tion I - Collec	tion Data			
Date:	5/31/2017	Sample ID:	201705	518-023	RV	VP: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		2.00E-11	6 0F 14 Gi/mil				
	1	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$				DU (Deple	
Location:		Amec Soil Sorting Area	a		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	'	Start	Stop
5/17/2017	7:40	15:00	44	40		65.0	65.0
5/18/2017	8:00	15:15	43	35		65	65
		Total Time (Tc):	8	75		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-1	2.05 .01	Literan	
			Minimum Air	Sample Volume:		Liters	
Sample Volume:	65	(lpm)	X	875	(minutes) =	5.7E+04	Liters (A)
Remarks: M	inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sac	tion II - Anal	veic Data			
Instrument Information	I	Serial Number	21011 11 - 211141	ysis Data	Calibrat	tion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N		N/A	N/A	N/A
1011		1711			1011	Alpha	11/11
Varia	ables, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date		-		5/31/2017			
Count Time (e.g., noon, 1300, e	tc.)			11:30			
Sample Count Time (Ts, Tb) = 7	Γ		minutes		60		
Total Counts			counts		25		
Sample Count Rate			cpm	0	.42		
Background Count Rate			cpm	0	.08		
Air Volume (liters)	((A)	liters	5.7	E+04	5.7E+04	5.7E+04
Net count rate	(B)	cpm	0	.34		
Counter Efficiency	(C)	cpm/dpm	0	0.34	0.34	0.34
Collection Efficiency	(D	0)	0.99	0	1.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)	1	cpm/dpm	0	0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	0	1.99		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	0	.64		
Concentration = $(\mathbf{F})/(2.22E9 \times ($	A)) (H)		μCi/ml	7.83	3E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H	(F1); (F	2)	uCi/ml	7.82	2E-15		
DAC (or AE) Fraction = $(F2)/(I$)			0.0)4%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		SE-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)			03%		
Final Count?			Yes/No	1	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notificatio	on.	
Performed By:						Date:	
Reviewed By:	:					Date:	

		Sec	tion I - Collec	tion Data			
Date:	5/25/2017	Sample ID:	201705	525-024	RW	VP: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):	,	2.00E-11	6 0F 14 C:/!		- '		
	1	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$				DU (Deple	
Location:		Amec Soil Sorting Area	ı		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	360	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	! !	Start	Stop
5/22/2017	7:40	9:50		30		65.0	65.0
5/25/2017	7:55	10:05	13	30		65	65
		Total Time (Tc):	20	50		Avg. Flow Rate (lpm)	65.0
			3.51.1		407.04	*	
			Minimum Air	Sample Volume:	2.9E+01	Liters	
Sample Volume:	65	(lpm)	X	260	(minutes) =	1.7E+04	Liters (A)
Remarks: M	inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	ysis Data		-	
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter		ector	Meter	Detector	Efficiency (a)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
		_				Alpha	
	ables, Calculation	ns, Results	Units	1st Count		2nd Count	3rd Count
Count Date				5/31/2017 13:20			
Count Time (e.g., noon, 1300, e							
Sample Count Time (Ts, Tb) = T	I .		minutes		60		
Total Counts			counts		19		
Sample Count Rate			cpm		0.32		
Background Count Rate		(4)	cpm		0.08 E : 04	1.75.04	1.75.04
Air Volume (liters)		(A)	liters		E+04	1.7E+04	1.7E+04
Net count rate	(C	B)	cpm cpm/dpm		1.24	0.34	0.34
Counter Efficiency Collection Efficiency	(C		0.99		1.99	0.99	0.99
Efficiency = (C) x (D)	(E)	•	cpm/dpm		1.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)	,	dpm		1.69	0.54	0.54
Minimum Detectable Activity (d		ORT(Cb))/(F*T) (G)	dpm		1.64		
Concentration = $(\mathbf{F})/(2.22E9 \times (0.0000000000000000000000000000000000$		Q.1.1(ee)),(2 1)(e)	μCi/ml		5E-14		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H	-		uCi/ml		5E-14		
DAC (or AE) Fraction = (F2)/(I		-,	uci/iii		09%		
DAC (or AE) Fraction = $(F2)/(1)$ MDC = MDA/V = $(G)/(A)$ (J)		μCi/ml		DE-14			
MDC Fraction of DAC (or AE)		(10%)	p Carini		92 11		
Final Count?		*	Yes/No		Yes		
		Note: Unexpected DAC or AE				n.	
		The character Bire of HE					
Performed By:	:					Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	tion Data			
Date:	5/31/2017	Sample ID:	201705	531-025	RV	VP: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		2.00E-11	6 0F 14 Gi/mil				
	1	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$				DU (Deple	
Location:		Amec Soil Sorting Area	a		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	54	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
5/30/2017	7:50	15:00		30		65.0	65.0
5/31/2017	7:30	15:15	40	65		65	65
		Total Time (Tc):	89	95		Avg. Flow Rate (lpm)	65.0
					407.04	*	
			Minimum Air	Sample Volume:	2.0E+01	Liters	
Sample Volume:	65	(lpm)	X	895	(minutes) =	5.8E+04	Liters (A)
Remarks: M	inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
·							<u> </u>
	1		tion II - Anal	ysis Data			
Instrument Information		Serial Number	Ī			ion Due Date	
Instrument Type		Meter		ector	Meter	Detector	Efficiency (a)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
¥7	-bl C-ll-d	D14-	Units	1-4	Count	Alpha 2nd Count	3rd Count
Count Date	ables, Calculation	is, Results	Units		/2017	2nd Count	Sru Count
Count Time (e.g., noon, 1300, e	tc)				1:00		
Sample Count Time (Ts, Tb) = 7			minutes		60		
Total Counts			counts		8		
Sample Count Rate			cpm		0.13		
Background Count Rate			cpm		1.03		
Air Volume (liters)		(A)	liters		E+04	5.8E+04	5.8E+04
Net count rate		B)	cpm		0.10	3.0E104	3.0E104
Counter Efficiency	(C		cpm/dpm		1.34	0.34	0.34
Collection Efficiency	(D		0.99		1.99	0.99	0.99
Efficiency = (C) x (D)	(E)	•	cpm/dpm		.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm		.30		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	0	0.45		
Concentration = $(\mathbf{F})/(2.22E9 \times ($	(H)		μCi/ml	2.35	5E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H) - (F1); (F	2)	uCi/ml	2.34	4E-15		
DAC (or AE) Fraction = (F2)/(I)			0.0	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		7E-15		
MDC Fraction of DAC (or AE)		(10%))2%		
Final Count?			Yes/No	,	Yes		
Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.							
Performed By:	:					Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	tion Data			
Date:	6/2/2017	Sample ID:	201706	602-026	RV	VP: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):		[DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14µCi/ml]		Radionuclides:	DU (Deple	_
Location:	_	Boundry			Sampled By:	David	Berres
Wearer:		NA			ivity Performed:	N.	
_		IVA			ivity renomied.	14.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	360	57	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
6/1/2017	7:45	15:00	43	35		65.0	65.0
6/2/2017	7:40	15:10	45	50		65	65
		Total Time (Tc):	88	35		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.0E+04	Liters	
Sample Volume:	65	(lpm)	X	885	(minutes) =	5.8E+04	Liters (A)
_		olumes identified are necessary to achi					,
Kemarks. IV	minimum sample vo	of differential and the decessary to action	leve 10% of DAC	of AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N.	/A	N/A	N/A	N/A
						Alpha	
Vari	iables, Calculatior	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/12	2/2017		
Count Time (e.g., noon, 1300, e	etc.)			12	2:40		
Sample Count Time (Ts, Tb) =	T		minutes		60		
Total Counts			counts		15		
Sample Count Rate			cpm	0	.25		
Background Count Rate			cpm	0	.10		
Air Volume (liters)	((A)	liters	5.8	E+04	5.8E+04	5.8E+04
Net count rate	(B)	cpm	0	.15		
Counter Efficiency	(C		cpm/dpm		.34	0.34	0.34
Collection Efficiency	(D))	0.99	0	.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm		.44		
Minimum Detectable Activity (*	QRT(Cb))/(E*T) (G)	dpm		.70		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$			μCi/ml		5E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H		2)	uCi/ml		E-15		
DAC (or AE) Fraction = $(F2)/(I$					74%		
MDC = MDA/V = (G)/(A)	(J)	4000	μCi/ml		6E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)			10%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	traction > 100%	requires immedi	ate RSO notificatio	n.	
Performed By	:					Date:	
Reviewed By	:					Date:	

		Sec	tion I - Collec	tion Data			
Date:	6/2/2017	Sample ID:	201706	602-027	RV	VP: 2017-001	
Occupational (DAC):	Limit:	2.00E-11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):	i I	[DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14uCi/ml		Radionuclides:	DU (Deple	ted Uranium)
Location:		Amec Soil Sorting Area			Sampled By:	David	
_			4				
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	ı İ	Start	Stop
6/5/2017	7:40	15:05	`	45		65.0	65.0
6/6/2017	7:30	15:15		65		65	65
0/0/2017	7.50	Total Time (Tc):		10		Avg. Flow Rate (lpm)	65.0
					4.07-04		
			Minimum Air	Sample Volume:	4.0E+01	Liters	
Sample Volume:	65	(lpm)	X	910	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample v	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
-							
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/13	3/2017		
Count Time (e.g., noon, 1300, et	tc.)			Ģ	:15		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		23		
Sample Count Rate			cpm	(.38		
Background Count Rate			cpm	(.18		
Air Volume (liters)	((A)	liters	5.9	E+04	5.9E+04	5.9E+04
Net count rate	(B)	cpm	(.20		
Counter Efficiency	(C)	cpm/dpm	(.34	0.34	0.34
Collection Efficiency	(E)	0.99	(.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	C	.60		
	(F)						
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		1.89		
Minimum Detectable Activity (d Concentration = $(\mathbf{F})/(2.22E9 \times (A))$	pm) = (3+4.65*S		•				
	pm) = (3+4.65*S	QRT(Cb))/(E*T) (G) 4/20-4/21	dpm	4.5	1.89		
Concentration = $(\mathbf{F})/(2.22E9 \times (E))$	pm) = (3+4.65*S A)) (H) Date Updated	4/20-4/21	dpm μCi/ml	4.5 5	5E-15		
Concentration = (F)/(2.22E9 x (ABackground "Strip" value (F.1)	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F	4/20-4/21	dpm μCi/ml uCi/ml	4.54 7.3 4.54	0.89 5 E-15 1E-18		
Concentration = (F)/(2.22E9 x (<i>t</i> Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F) (J)	4/20-4/21	dpm μCi/ml uCi/ml	4.55 7.3 4.54 0.0 6.75	.89 5E-15 1E-18 4E-15 02% 5E-15		
Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I)	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F) (J)	4/20-4/21	dpm μCi/ml uCi/ml uCi/ml	4.55 7.3 4.54 0.0 6.75	.89 5E-15 1E-18 4E-15)2%		
Concentration = (F)/(2.22E9 x (<i>t</i> Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F) (J)	4/20-4/21	dpm μCi/ml uCi/ml uCi/ml	4.55 7.3 4.54 0.0 6.75	.89 5E-15 1E-18 4E-15 02% 5E-15		
Concentration = (F)/(2.22E9 x (t Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F) (J)	4/20-4/21	dpm μCi/ml uCi/ml uCi/ml μCi/ml	4.5: 7.3 4.5: 0.0 6.7:	.89 EE-15 IE-18 4E-15)2% EE-15)3% Yes	n.	
Concentration = (F)/(2.22E9 x (t Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F) (J)	4/20-4/21 2)	dpm μCi/ml uCi/ml uCi/ml μCi/ml	4.5: 7.3 4.5: 0.0 6.7:	.89 EE-15 IE-18 4E-15)2% EE-15)3% Yes	n.	
Concentration = (F)/(2.22E9 x (t Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F) (J) = (J)/(I) (Goal-	4/20-4/21 2)	dpm μCi/ml uCi/ml uCi/ml μCi/ml	4.5: 7.3 4.5: 0.0 6.7:	.89 EE-15 IE-18 4E-15)2% EE-15)3% Yes	n. Date:	
Concentration = (F)/(2.22E9 x (<i>t</i> Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) = Final Count?	pm) = (3+4.65*S A)) (H) Date Updated) - (F1); (F) (J) = (J)/(I) (Goal-	4/20-4/21 2)	dpm μCi/ml uCi/ml uCi/ml μCi/ml	4.5: 7.3 4.5: 0.0 6.7:	.89 EE-15 IE-18 4E-15)2% EE-15)3% Yes		

		Sec	tion I - Collec	tion Data			
Date:	6/13/2017	Sample ID:	201706	506-028	RV	VP: 2017-001	
Occupational (DAC):		2.00E-11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):	,	[DAC = 2.0E-11µCi/ml (U-238), EC	= 6.0E 14uCi/mll			DU (Deple	
	,		- 0.0Ε-14μCl/IIII]				
Location:		Amec Soil Area			Sampled By:	D Be	erres
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
6/5/2017	7:40	15:05	44	45		65.0	65.0
6/6/2017	7:30	15:15	40	55		65	65
		Total Time (Tc):	9	10		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	4.0E+01	Liters	
Sample Volume:	65	(lpm)		•			Liters (A)
_		(lpm)	X		(minutes) =	5.9E+04	Liters (A)
Remarks: M	inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	vsis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/13	3/2017		
Count Time (e.g., noon, 1300, e	tc.)			9	1:15		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		23		
Sample Count Rate			cpm		1.38		
Background Count Rate		(1)	cpm		0.18	5 OF - 04	5 OF - 04
Air Volume (liters)		(A) B)	liters		E+04 0.20	5.9E+04	5.9E+04
Net count rate Counter Efficiency	(C		cpm cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99		1.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		1.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		1.60	***	
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm	0	1.89		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	4.55	5E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H	(F1); (F	2)	uCi/ml	4.54	4E-15		
DAC (or AE) Fraction = (F2)/(I)			0.0)2%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	6.75	5E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)		0.0)3%		
Final Count?			Yes/No	`	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notificatio	n.	
Performed By:	:					Date:	
Reviewed By:	:					Date:	

		Sec	tion I - Collec	tion Data			
Date:	6/13/2017	Sample ID:	201706	606-029	RV	VP: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	_ 	[DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14µCi/ml]		Radionuclides:	DU (Deple	_
Location:		FS12 SCA Boundary			Sampled By:	D Be	erres
Wearer:		NA			ivity Performed:	N.	
_		IVA			ivity renormed.	14.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	RV-1		Serial No.	360	57	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
6/5/2017	7:45	15:05	4-	10		65.0	65.0
6/6/2017	7:40	15:10	4:	50		65	65
		Total Time (Tc):	89	90		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.3E+04	Liters	
Sample Volume:	65	(lpm)	x	•	(minutes) =		Liters (A)
_		_			(minutes) –	3.6E+04	Liters (A)
Remarks: N	linimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	vsis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N		N/A	N/A	N/A
	•					Alpha	
Vari	iables, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/13	3/2017		
Count Time (e.g., noon, 1300, e	etc.)			1	1:50		
Sample Count Time (Ts, Tb) =	T		minutes	1	60		
Total Counts			counts		11		
Sample Count Rate			cpm	0	.18		
Background Count Rate			cpm	0	.18		
Air Volume (liters)	((A)	liters	5.8	E+04	5.8E+04	5.8E+04
Net count rate	(B)	cpm	0	.00		
Counter Efficiency	(C)	cpm/dpm	0	.34	0.34	0.34
Collection Efficiency	(D))	0.99	0	.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)	l .	cpm/dpm	0	.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm		.01		
Minimum Detectable Activity (dpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm		.89		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$			μCi/ml		2E-17		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H	I) - (F1); (F	2)	uCi/ml		DE-17		
DAC (or AE) Fraction = $(F2)/(I$	I)				1%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml)E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)			49%		
Final Count?			Yes/No		l'es		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notificatio	n.	
Performed By	::					Date:	
Reviewed By	:					Date:	

		Sec	tion I - Collec	tion Data			
Date:	6/16/2017	Sample ID:	201706	508-030	RW	/P: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area: ✓
	_	2.00E-11			, ,		
Non-Occupational (EC):	_	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml]		Radionuclides:	DU (Deple	ted Uranium)
Location:		FS12 Amec soil area			Sampled By:	D Be	erres
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	360	54	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	<u> </u>	Start	Stop
6/7/2017	7:30	15:10	40	50		65.0	65.0
6/8/2017	7:30	15:10	40	50	Ī	65	65
		Total Time (Tc):	92	20	Ī	Avg. Flow Rate (lpm)	65.0
		· · ·					
			Minimum Air	Sample Volume:	2.4E+01	Liters	
Sample Volume:	65	(lpm)	x	920	(minutes) =	6.0E+04	Liters (A)
Remarks: N	Ainimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
_	_						
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Vari	iables, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/16	5/2017		
Count Time (e.g., noon, 1300, e	etc.)			9	:20		
Sample Count Time (Ts, Tb) =	T		minutes		60		
Total Counts			counts		24		
Sample Count Rate			cpm	0	.40		
Background Count Rate			cpm	0	.05		
Air Volume (liters)		(A)	liters	6.0	E+04	6.0E+04	6.0E+04
Net count rate	(B)	cpm		.35		
Counter Efficiency	(C		cpm/dpm		.34	0.34	0.34
Collection Efficiency	(E		0.99		.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		.03		
Minimum Detectable Activity (QRT(Cb))/(E*T) (G)	dpm		.54		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$			μCi/ml		E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		IE-18		
NET Concentration Value = (F		2)	uCi/ml		BE-15		
DAC (or AE) Fraction = $(F2)/(1$					14%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		BE-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)			2%		
Final Count?			Yes/No		7es		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	n.	
Performed By	7:					Date:	
Reviewed By						Date:	

		Sec	tion I - Collec	tion Data			
Date:	6/16/2017	Sample ID:	201706	508-031	R	WP: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area:
Non-Occupational (EC):		6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC	= 6.0E 14uCi/mll			DU (Deple	_
Location:		FS12 SCA Boundary			Sampled By:	D Be	erres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
6/7/2017	7:30	15:00		50		65.0	65.0
6/8/2017	7:40	15:10		50		65	65
0.0.201		Total Time (Tc):		00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	8.0E+03	Liters	
Sample Volume:	65	(lpm)	X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample v	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibra	tion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
	bles, Calculation	ns, Results	Units		Count	2nd Count	3rd Count
Count Date					5/2017		
Count Time (e.g., noon, 1300, et					0:50		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		10		
Sample Count Rate			cpm).17		
Background Count Rate			cpm		0.05		
Air Volume (liters)		(A)	liters		E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm		0.12		
Counter Efficiency	(C		cpm/dpm).34	0.34	0.34
Collection Efficiency	(I	,	0.99).99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E))	cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)	ODER(CL)) ((EWE) (C)	dpm		0.34		
Minimum Detectable Activity (d		QR1(Cb))/(E*1) (G)	dpm		0.54 4E 15		
Concentration = (F)/(2.22E9 x (A		4/20-4/21	μCi/ml		4E-15 1E-18		
Background "Strip" value (F.1) NET Concentration Value = (H)	Date Updated		uCi/ml				
	. ,,	2)	uCi/ml		3E-15		
DAC (or AE) Fraction = $(F2)/(I)$			G: / 1		38% DE 15		
MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(J) - (I)/(I) (Goals	-10%)	μCi/ml		2E-15 87%		
	= (J)/(I) (Goals	(10%)	37 07				
Final Count? Yes/No Yes Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification.							
		Note: Unexpected DAU or AE	1racuon > 100%	requires immedi	ate KSO notification	л.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	tion Data			
Date:	6/19/2017	Sample ID:	201706	512-032	RV	VP: 2017-001	
Occupational (DAC):		•		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):	_	2.00E-11	6 0F 14 C:/!		-		
	_	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$				DU (Deple	
Location:		FS12 Amec Soil Sort Ar	ea		Sampled By:	D Be	erres
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:		NA					
Lapel Pump Model:	NA		Serial No.	N.	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	360	54	Calibration Due Date:	3/16/2018
Sample Information	1	Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
6/9/2017	7:45	11:30		25		65.0	65.0
6/12/2017	7:45	15:10		45		65	65
0/12/2017	71.15	Total Time (Tc):		70		Avg. Flow Rate (lpm)	65.0
						g (-F)	
			Minimum Air	Sample Volume:	3.8E+01	Liters	
Sample Volume:	65	(lpm)	x	670	(minutes) =	4.4E+04	Liters (A)
Remarks: N	Minimum sample v	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Var	iables, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/19	9/2017		
Count Time (e.g., noon, 1300,	etc.)			8	:45		
Sample Count Time (Ts, Tb) =	T		minutes		60		
Total Counts			counts		24		
Sample Count Rate			cpm	0	.40		
Background Count Rate			cpm	0	.16		
Air Volume (liters)		(A)	liters	4.4	E+04	4.4E+04	4.4E+04
Net count rate	(B)	cpm		.24		
Counter Efficiency	(C		cpm/dpm		.34	0.34	0.34
Collection Efficiency	(E		0.99		.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)	1	cpm/dpm		.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		.70		
Minimum Detectable Activity (*	QRT(Cb))/(E*T) (G)	dpm		.84		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	` ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	190 191	μCi/ml		DE-15		
Background "Strip" value (F.1		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (I		2)	uCi/ml		BE-15		
DAC (or AE) Fraction = (F2)/(04%		
MDC = MDA/V = (G)/(A)	(J)	100/)	μCi/ml		2E-15		
MDC Fraction of DAC (or AE)	$= (\mathbf{J})/(\mathbf{I})$ (Goal<	10%))4%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	traction > 100%	requires immedi	ate RSO notificatio	n.	
Performed By	/:					Date:	
Reviewed By	<i>/</i> :					Date:	

		Sac	tion I - Collec	tion Data			
Data	6/10/2017	Sample ID:			DV	VP: 2017-001	
Date:	6/19/2017	Sample ID:		μCi/ml (I)		-	We als A accord
Occupational (DAC):		6.00E-14		μενιιι (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	J	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	$= 6.0E-14\mu Ci/ml$		Radionuclides:	DU (Deple	ted Uranium)
Location:		FS12 SCA Boundary			Sampled By:	D Be	erres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
_	NA		Serial No.	N.	Δ	Calibration Due Date:	NA
Lapel Pump Model:							
Air Pump Model:	LV-1		Serial No.	360	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	` <u> </u>	Start	Stop
6/9/2017	7:45	11:30	22	25		65.0	65.0
6/12/2017	7:45	15:10	44	45		65	65
		Total Time (Tc):	67	70		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.3E+04	Liters	
Sample Volume:	65	(lpm)	X	670	(minutes) =	4.4E+04	Liters (A)
_		_					
Remarks: M	minimum sample vo	olumes identified are necessary to achi	leve 10% of DAC	of AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N.	/A	N/A	N/A	N/A
					1	Alpha	1
	ables, Calculation	ns, Results	Units		Count	2nd Count	3rd Count
Count Date					9/2017		
Count Time (e.g., noon, 1300, et					3:00		
Sample Count Time (Ts, Tb) = T	I .		minutes		60 13		
Total Counts Sample Count Rate			counts		1.22		
Background Count Rate			cpm		0.16		
Air Volume (liters)		(A)	liters		E+04	4.4E+04	4.4E+04
Net count rate		B)	cpm		.06		
Counter Efficiency	(C		cpm/dpm		.34	0.34	0.34
Collection Efficiency	(D))	0.99	0	.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	0	0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	0	.17		
Minimum Detectable Activity (d	lpm) = (3+4.65*S6)	QRT(Cb))/(E*T) (G)	dpm	0	0.84		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	(A)) (H)		μCi/ml	1.72	2E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H	(F1); (F2)	2)	uCi/ml	1.71	IE-15		
DAC (or AE) Fraction = (F2)/(I)					36%		
MDC = MDA/V = (G)/(A)	(J)	4000	μCi/ml		2E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal<	(10%)			54%		
Final Count? Yes/No Yes							
		Note: Unexpected DAC or AE	iraction > 100%	requires immedi	ate KSO notificatio	n.	
Performed By:	:					Date:	
Reviewed By:	:					Date:	

		Sec	tion I - Collec	ction Data			
Date:	6/26/2017	Sample ID:	20170	615-034	RV	VP: 2017-001	
Occupational (DAC):	Limit:	•		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):		[DAC = 2.0E-11µCi/ml (U-238), EC:	'- 6 0F-14uCi/ml	<u>-</u>	- '		
		•	•	-	Radionuclides: DU (Depleted Uranium)		
Location:		FS12 Amec Soil Sort Are	rea		Sampled By:	R Sant	angelo
Wearer:		NA		_ Ac	tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.		A	Calibration Due Date:	NA
Air Pump Model:		•	Serial No.		i64	Calibration Due Date:	
	T A - 1	•	Sellai 110.			,	
Sample Information		Time			Ų Į	Flow	Rate (lpm)
Collection Date	Start	Stop		minutes)		Start	Stop
6/13/2017	7:30	15:00		150		65.0	65.0
6/15/2017	7:30	15:00		150		65	65
		Total Time (Tc):	9	900	<u>l</u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
-		olumes identified are necessary to achi	ieve 10% of DAC	or AE value.	- "		
	r	numes ruentined at 11111111111111111111111111111111111	ieve roze	, 01 112 1			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N/A N/			N/A	N/A
			T			Alpha	
	bles, Calculation	is, Results	Units		Count	2nd Count	3rd Count
Count Date	- \				6/2017		
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T			minutes		2:00		
Total Counts			counts		25		+
Sample Count Rate			cpm		0.42		+
Background Count Rate		-	cpm		0.10		
Air Volume (liters)		(A)	liters		9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm		0.32		1
Counter Efficiency	(C)	cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D	0)	0.99	(0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	(0.93		
Minimum Detectable Activity (dp	ρ m) = (3+4.65*Se	QRT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$			μCi/ml		6E-15		
Background "Strip" value (F.1)	Date Updated		uCi/ml		1E-18		
NET Concentration Value = (H)		2)	uCi/ml		5E-15		
DAC (or AE) Fraction = $(F2)/(I)$					04% 7F: 15		
MDC = MDA/V = (G)/(A) $MDC = MDA/V = (G)/(A)$	(J) (Cool of	100/3	μCi/ml		7E-15		
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	.10%)	37 -/NI-		03%		
Final Count?		N. C. T	Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immea	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	6/26/2017	Sample ID:	201700	515-035	RW	P: 2017-001	
Occupational (DAC):	Limit:	C 00F 14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
	<u>.</u>	6.00E-14	6 OF 14 C'/ 1	<u>-</u>			
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14µC1/m1		_	DU (Deplet	ted Uranium)
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
_			G : 137				27.6
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	Ι	Start	Stop
6/13/2017	7:30	15:00	4	50		65.0	65.0
6/12/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.0E+04	Liters	
0 1 1 1 1		a >		•			T :
Sample Volume:	65	(lpm)	X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	lvsis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	//A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/2	6/2017		
Count Time (e.g., noon, 1300, et	c.)			1	3:00		
Sample Count Time $(Ts, Tb) = T$?		minutes		60		
Total Counts			counts		14		
Sample Count Rate			cpm		0.23		
Background Count Rate			cpm		0.10		
Air Volume (liters)		A)	liters		0E+04	5.9E+04	5.9E+04
Net count rate		3)	cpm		0.13	0.24	0.24
Counter Efficiency	(C)		cpm/dpm 0.99).34	0.34	0.34
Collection Efficiency Efficiency = (C) x (D)	(D (E))	cpm/dpm		0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm		0.39	0.54	0.54
Minimum Detectable Activity (d	* /	ORT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \times (4.22E9 \times ($	•	2(),(μCi/ml		1E-15		
Background "Strip" value (F.1)	· · · · · ·	4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)		2)	uCi/ml	3.0	1E-15		
DAC (or AE) Fraction = (F2)/(I))				01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		7E-15		
MDC Fraction of DAC (or AE) =		10%)	·		95%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	1.	
Performed By:						Date:	
·							
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	6/27/2017	Sample ID:	201700	519-036	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	<u>-</u>	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>.</u>	_		
		•	= 6.0E-14µC1/m1		_	DU (Deplet	ted Uranium)
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:			Serial No.	N	A	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time			<u> </u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)		Start	Stop
6/16/2017	7:30	15:00	4	50		65.0	65.0
6/19/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00	L	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.2E+04 I	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
_					(minutes) –	3,7E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	lysis Data			
Instrument Information		Serial Number		•	Calibratio	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	//A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				6/2	7/2017		
Count Time (e.g., noon, 1300, et	c.)			8	3:00		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		16		
Sample Count Rate			cpm	(0.27		
Background Count Rate			cpm	(0.13		
Air Volume (liters)		A)	liters	5.9	E+04	5.9E+04	5.9E+04
Net count rate	(I		cpm		0.14		
Counter Efficiency	(C)		cpm/dpm).34	0.34	0.34
Collection Efficiency	(D))	0.99).99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)	DET(CL))/(E*T) (C)	dpm		0.40		
Minimum Detectable Activity (d Concentration = $(\mathbf{F})/(2.22E9 \times I)$		(R1(C0))/(E*1) (G)	dpm Ci/ml		9E-15		
Background "Strip" value (F.1)	· · · · · · · · · · · · · · · · · · ·	4/20-4/21	μCi/ml uCi/ml		1E-18		
NET Concentration Value = (H)			uCi/ml		8E-15		
DAC (or AE) Fraction = (F2)/(I)		.,	uci/iiii		14%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		6E-15		
MDC Fraction of DAC (or AE) =		10%)	μει/ΙΙΙΙ		94%		
Final Count?		•	Yes/No		Yes		
		Note: Unexpected DAC or AE				1.	
		Total Catapteted Dife of AE	30000 > 100 /0		Mod notification		
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	6/19/2017	Sample ID:		519-037	RW	/P: 2017-001	
Occupational (DAC):	Limit:	_		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
	<u>-</u>	2.00E-11			-		
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μCı/ml		_	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Sant	angelo
Wearer:		NA			tivity Performed:	N	A
Monitored Workers:				NA			<u>.</u>
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:			Serial No.		64	Calibration Due Date:	
		m:			<u> </u>		
Sample Information		Time			ļ		Rate (lpm)
Collection Date	Start	Stop	-	minutes)	_	Start	Stop
6/16/2017	7:30	15:00		50	-	65.0	65.0
6/19/2017	7:30	15:00		50	-	65	65
		Total Time (Tc):	9	00	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.5E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.	_		
	1						
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
			1		1	Alpha	1
	bles, Calculation	s, Results	Units		Count	2nd Count	3rd Count
Count Date					7/2017		
Count Time (e.g., noon, 1300, et					2:00		
Sample Count Time $(Ts, Tb) = T$			minutes		60		
Total Counts			counts		11		
Sample Count Rate			cpm	(0.18		
Background Count Rate			cpm	(0.13		
Air Volume (liters)	(A)	liters	5.9	9E+04	5.9E+04	5.9E+04
Net count rate		3)	cpm	(0.05		
Counter Efficiency	(C)		cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	(0.16		
Minimum Detectable Activity (d	pm) = (3+4.65*S0)	QRT(Cb))/(E*T) (G)	dpm).77		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	1.2	1E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value $= (\mathbf{H})$) - (F1); (F2	2)	uCi/ml	1.2	0E-15		
DAC (or AE) Fraction = $(F2)/(I)$)			0.	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		6E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		0.	03%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	6/29/2017	Sample ID:	201700	621-038	RW	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	-	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	- 6 0E 14uCi/ml	<u>.</u> 1	,	_	
–		•		J	•	DU (Deple	
Location:		FS12 SCA Boundary			Sampled By:	R Sant	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:	_		_	NA			
Lapel Pump Model:			Serial No.		IA.	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	36	667	Calibration Due Date:	3/7/2018
Sample Information		Time			<u> </u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)]	Start	Stop
6/20/2017	7:30	15:00		50	<u> </u>	65.0	65.0
6/21/2017	7:30	15:00		.50		65	65
		Total Time (Tc):	9	00	<u>l</u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.1E+04	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		_		-	(minutes)		Liters (12)
Kemarks. wii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					9/2017		
Count Time (e.g., noon, 1300, etc				+	9:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts	 	8 0.13		_
Sample Count Rate Background Count Rate			cpm		0.13		
Air Volume (liters)		(A)	cpm		9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	1	0.02	J.JE+04	3.5E+04
Counter Efficiency	(C)		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99	1	0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.07		
Minimum Detectable Activity (dp	pm) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm	(0.72		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$	A)) (H)		μCi/ml	5.2	8E-16		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value $=$ (H)	- (F1); (F2	2)	uCi/ml	5.2	0E-16		
DAC (or AE) Fraction = (F2)/(I)					87%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		8E-15		
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	10%)		-	29%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/12/2017	Sample ID:	201700	626-040	RW	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	 '	General Area:	Work Area: □
	<u>.</u>	6.00E-14	0F 14Ci/ml	-	,		
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC=$	= 6.0E-14µCı/mı	-	-	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	Α
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	IA.	Calibration Due Date:	NA
Air Pump Model:			Serial No.		667	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	minutes)	Ť Ť	Start	Stop
6/23/2017	7:30	15:00	-	.50	1	65.0	65.0
6/26/2017	7:30	15:00		.50	1	65	65
** **		Total Time (Tc):		00	1	Avg. Flow Rate (lpm)	
			Minimum Air	Sample Volume:	1.25±04		
				•		Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Son	L'am II Ana'				
			ction II - Anal	ysis Data	T 0.17		
Instrument Information		Serial Number				ion Due Date	Dec : (-)
Instrument Type		Meter		ector	Meter	Detector	Efficiency (α)
L-2929		158817		4736	12/13/2018	12/13/2018	0.344
N/A	<u> </u>	N/A	N	I/A	N/A	N/A	N/A
Vonio	11 Colombation	D14_	Tinita	1 _{ot}	C1	Alpha	2I Count
	ables, Calculation	s, Results	Units	1	Count	2nd Count	3rd Count
Count Time (a.g., poop, 1300, etc.	·- >			1	7/2017 8:00		+
Count Time (e.g., noon, 1300, etc			minutes	 	60		+
Sample Count Time (Ts, Tb) = T Total Counts					19		
Sample Count Rate			counts		0.32		
Background Count Rate			cpm	 	0.13		+
Air Volume (liters)		(A)	liters		9E+04	5.9E+04	5.9E+04
Net count rate		A) B)	cpm		9E+04 0.19	J.5LTU4	J.7ET04
Counter Efficiency	(C)		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D)		0.99	1	0.99	0.34	0.34
Efficiency = (C) x (D)	(E)		cpm/dpm	†	0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	 	0.55	0.54	0.54
Minimum Detectable Activity (dp	. ,	ORT(Cb))/(E*T) (G)	dpm	1	0.77		+
Concentration = $(\mathbf{F})/(2.22\text{E9 x})$		ZKI(CO),(2 1)(G)	μCi/ml	1	2E-15		+
Background "Strip" value (F.1)		4/20-4/21	μCi/ml		31E-18		+
NET Concentration Value = (H)			uCi/ml		1E-15		
DAC (or AE) Fraction = (F2)/(I)		9	ucı	+	02%		+
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		6E-15		+
MDC Fraction of DAC (or AE) =		:10%)	μει		94%		+
Final Count?	(6)/(-)	10,0)	Yes/No	1	Yes		+
rillai Count:		Note: Unexpected DAC or AE				n	
		Note: Onexpected Dire of 112.	Haction > 100 ,0	Tequires ininies.	ate ROO nomeano.	11.	
Performed By:						Date:	
1						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/12/2017	Sample ID:	201700	526-041	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	<u>-</u>	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>.</u>			
		•			_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	Ĭ	Start	Stop
6/20/2017	7:30	15:00		50	1	65.0	65.0
6/26/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-l	1.2E+04	f ia	
			Minimum Air	Sample Volume:		Liters	
Sample Volume:	65	(lpm)	X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Saa	tion II - Anal	lvoic Doto			
T	I		tion II - Ana	lysis Data	C-17	D D.t.	
Instrument Information Instrument Type		Serial Number Meter	Dat	a a tau	Meter	on Due Date	Efficiency (a)
L-2929		158817		ector 1736	12/13/2018	Detector 12/13/2018	0.344
N/A		N/A		/A	N/A	N/A	N/A
IV/A		N/A	10	I .	N/A	Alpha	IV/A
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	ioles, culculation	5, 110,0010	· · · · ·		2/2017	Ziid Codiii	Dru Count
Count Time (e.g., noon, 1300, et	c.)				0:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		21		
Sample Count Rate			cpm	(0.35		
Background Count Rate			cpm	(0.13		
Air Volume (liters)	(.	A)	liters	5.9	0E+04	5.9E+04	5.9E+04
Net count rate	(I	3)	cpm	().22		
Counter Efficiency	(C)		cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	().34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.65		
Minimum Detectable Activity (d	pm) = (3+4.65*SC)	QRT(Cb))/(E*T) (G)	dpm	(0.77		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	4.9	7E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	4.9	7E-15		
DAC (or AE) Fraction = (F2)/(I))			8.	28%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	5.9	6E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		9.	94%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/14/2017	Sample ID:	201700	629-044	RV	VP: 2017-001	
Occupational (DAC):	Limit:	· ·		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC=	'- 6 0E 14uCi/ml	-	,		
–			•	J	•	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	Α
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.		IA.	Calibration Due Date:	NA
		•				•	
Air Pump Model:	LV-1		Serial No.		667	Calibration Due Date:	3/7/2018
Sample Information		Time			J	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)]	Start	Stop
6/27/2017	7:30	15:00		50	<u> </u>	65.0	65.0
6/29/2017	7:30	15:00		50	<u> </u>	65	65
		Total Time (Tc):	9	900	<u>l</u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	1.1E+04	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =		Liters (A)
		• -		-	(Illinuics)	JUE: U.	Liters (11)
Remarks: Mi	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (α)
L-2929		158817		4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	J/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					4/2017	ļ	
Count Time (e.g., noon, 1300, etc					1:00		
Sample Count Time (Ts, Tb) = T	4		minutes		60	 	
Total Counts			counts	†	20	 	
Sample Count Rate			cpm		0.33	 	
Background Count Rate			cpm		0.11	7 OF - 04	5 OF - 04
Air Volume (liters)		(A)	liters	•	9E+04 0.22	5.9E+04	5.9E+04
Net count rate Counter Efficiency	(C	B)	cpm cpm/dpm	1	0.22	0.34	0.34
Collection Efficiency	(D		0.99	1	0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(B)/(E)$	(F)		dpm		0.66		
Minimum Detectable Activity (dp		QRT(Cb))/(E*T) (G)	dpm	1	0.72		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$			μCi/ml	†	5E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml	1	31E-18		<u></u>
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	5.0	4E-15		
DAC (or AE) Fraction = (F2)/(I)				8.	40%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		8E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)		9.	29%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Df 1 D						Data	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/14/2017	Sample ID:	20170	629-045	RW	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)		General Area:	Work Area:
Non-Occupational (EC):	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	4 COE 1/mCi/ml	-	,	_	
–		•	•	J	•	DU (Deple	
Location:		FS12 SCA Boundary			Sampled By:	R Sant	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:	_		_	NA			
Lapel Pump Model:	NA		Serial No.		A	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time			[] [Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	[[Start	Stop
6/27/2017	7:30	15:00	4	150		65.0	65.0
6/29/2017	7:30	15:00		50		65	65
		Total Time (Tc):	9	900		Avg. Flow Rate (lpm)	65.0
	_		Minimum Air	r Sample Volume:	1.1E+04	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =		Liters (A)
		_		-	(IIIIIuco)	J.J.E. U.	Liters (12)
Kemarks: wii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information	1	Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817		4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	J/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date			ļ		4/2017		
Count Time (e.g., noon, 1300, etc					9:30		
Sample Count Time (Ts, Tb) = T]		minutes	1	60		
Total Counts			counts	 	7		
Sample Count Rate			cpm		0.12		_
Background Count Rate Air Volume (liters)		(A)	cpm		0.11 0E+04	5.9E+04	5.9E+04
Net count rate		A) B)	cpm	1	0.01	J.5ETU4	J.7ETU4
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99	1).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.02		
Minimum Detectable Activity (dp	pm) = (3+4.65*S6)	QRT(Cb))/(E*T) (G)	dpm).72		
Concentration = (F)/(2.22E9 x (A	A)) (H)		μCi/ml	1.5	1E-16		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	1.4	3E-16		
DAC (or AE) Fraction = (F2)/(I)	1			0.	24%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		8E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)			29%		
Final Count?			Yes/No	1	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
•		-					
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/17/2017	Sample ID:		706-047	RW	/P: 2017-001	
Occupational (DAC):		_		μCi/ml (I)	Breathing Zone:		Work Area: ✓
	<u>-</u>	2.00E-11	400 11 GU I	-			
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μC1/ml		_	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	ea		Sampled By:	R Sant	angelo
Wearer:		NA			tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:			Serial No.			Calibration Due Date:	
All Fullip Model.	LV-1		Seliai No.		64	Canbration Due Date.	3/10/2018
Sample Information		Time			ļ Į	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	_	Start	Stop
6/30/2017	7:30	15:00		50		65.0	65.0
7/6/2017	7:30	15:00		50		65	65
		Total Time (Tc):	9	00	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	2.9E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		lumes identified are necessary to ach	ieve 10% of DAC	or AE value	-		
Remarks. Mi	minum sample ve	runes identified the necessary to their	ieve 1070 of Brie	or rib value.			
		Sec	tion II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	[/A	N/A	N/A	N/A
						Alpha	1
	ables, Calculation	s, Results	Units		Count	2nd Count	3rd Count
Count Date					7/2017		
Count Time (e.g., noon, 1300, et					30 PM		
Sample Count Time (Ts, Tb) = T	<u> </u>		minutes		60		
Total Counts Sample Count Rate			counts		0.18		
Background Count Rate			cpm		0.08		
Air Volume (liters)		A)	liters		9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	1	0.10	3.52.101	332101
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99	().99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.30		
Minimum Detectable Activity (d	pm) = (3+4.65*S0)	QRT(Cb))/(E*T) (G)	dpm	().64		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	2.3	4E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value $= (\mathbf{H})$) - (F1); (F2	2)	uCi/ml	2.3	3E-15		
DAC (or AE) Fraction = $(F2)/(I)$)			0.0	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		2E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)			02%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/17/2017	Sample ID:	20170	706-046	RW	VP: 2017-001	
Occupational (DAC):	Limit:	· ·		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):		6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC=	'- 6 0E 14uCi/ml	-			
–			•	-	-	DU (Deple	
Location:		FS12 SCA Boundary			Sampled By:	R Sant	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:	_		_	NA			
Lapel Pump Model:	NA		Serial No.		ÍΑ	Calibration Due Date:	NA
		•				•	
Air Pump Model:	LV-1		Serial No.		67	Calibration Due Date:	3/7/2018
Sample Information		Time			J Į	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	[[Start	Stop
6/30/2017	7:30	15:00		50		65.0	65.0
7/6/2017	7:30	15:00		50		65	65
		Total Time (Tc):	9	900	<u>l</u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	9.6E+03	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		• -		-	(21000 (-2)
Remarks. wii	nimum sampie ve	olumes identified are necessary to achi	ieve 10% oi DAC	of AE value.			
		Sec	ction II - Anal	lys <u>is Data</u>			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
			,		1	Alpha	
	ables, Calculation	ıs, Results	Units		Count	2nd Count	3rd Count
Count Date			 		7/2017		
Count Time (e.g., noon, 1300, etc					1:00		
Sample Count Time (Ts, Tb) = T	-		minutes	+	7		_
Total Counts Sample Count Rate			counts	 	0.12		
Background Count Rate			cpm		0.08		
Air Volume (liters)		(A)	liters		9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	•	0.04	3,52.0.	3,52,101
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.11		
Minimum Detectable Activity (dp	pm) = (3+4.65*Se	QRT(Cb))/(E*T) (G)	dpm	†	0.64		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$			μCi/ml	•	9E-16		
Background "Strip" value (F.1)			uCi/ml		1E-18		
NET Concentration Value = (H)		2)	uCi/ml		2E-16		
DAC (or AE) Fraction = (F2)/(I)			ļ		37%		
MDC = MDA/V = (G)/(A) $MDC = MDA/V = (G)/(A)$	(J)	4000	μCi/ml		2E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	.10%)	** 01		20%		
Final Count?		27 - 17 - 1 IDIG 15	Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/19/2017	Sample ID:	20170	712-048	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	<u>-</u>	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>.</u>			
		•			_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	Ī	Start	Stop
7/7/2017	7:30	15:00		50		65.0	65.0
7/12/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-l	8.0E+03		
			Minimum Air	Sample Volume:		Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Coo	tion II - Anal	lvoic Doto			
T	I		tion II - Ana	lysis Data	C-10	D D	
Instrument Information		Serial Number	Dat	a a tau	Meter	on Due Date	Efficiency (%)
Instrument Type L-2929		Meter 158817		ector 1736	12/13/2018	Detector 12/13/2018	Efficiency (α) 0.344
N/A		N/A		/A	N/A	N/A	N/A
IV/A		IV/A	10	I .	IV/A	Alpha	IV/A
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	ioles, culculation	5, 110,0110	· · · · ·		9/2017	Ziid Codiii	Dru count
Count Time (e.g., noon, 1300, et	c.)				9:45		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		15		
Sample Count Rate			cpm	(0.25		
Background Count Rate			cpm	(0.05		
Air Volume (liters)	(.	A)	liters	5.9	0E+04	5.9E+04	5.9E+04
Net count rate	(I	3)	cpm	(0.20		
Counter Efficiency	(C)		cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D))	0.99	().99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	().34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	().59		
Minimum Detectable Activity (d	pm) = (3+4.65*SC)	QRT(Cb))/(E*T) (G)	dpm	(0.54		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	4.5	2E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	4.5	1E-15		
DAC (or AE) Fraction = (F2)/(I))			7.	52%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	4.1	2E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		6.	87%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/19/2017	Sample ID:		712-049	RW	P: 2017-001	
Occupational (DAC):	Limit:	_		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
	_	2.00E-11			-		
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μC1/ml		-	DU (Deplet	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			<u>.</u>
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	30	64	Calibration Due Date:	3/16/2018
Sample Information		Time			<u> </u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)		Start	Stop
7/7/2017	7:30	15:00		50	_	65.0	65.0
7/12/2017	7:30	15:00		50	_	65	65
		Total Time (Tc):	9	00	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	2.4E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
					_		,
Remarks: Mi	minum sample vo	lumes identified are necessary to ach	leve 10% of DAC	of AE value.			
		Sec	tion II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	1
	bles, Calculation	s, Results	Units		Count	2nd Count	3rd Count
Count Date					9/2017		
Count Time (e.g., noon, 1300, et					1:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		23		
Sample Count Rate Background Count Rate			cpm		0.05		
Air Volume (liters)		A)	liters		0E+04	5.9E+04	5.9E+04
Net count rate	(I		cpm		0.33	3.5E+04	3.9E+04
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D)		0.99).99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	().34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	().98		
Minimum Detectable Activity (d	pm) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm	().54		
Concentration = $(\mathbf{F})/(2.22E9 \times (E))$	A)) (H)		μCi/ml	7.5	4E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value $= (\mathbf{H})$	- (F1); (F2	3)	uCi/ml	7.5	3E-15		
DAC (or AE) Fraction = (F2)/(I)				0.0	04%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		2E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)			02%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/24/2017	Sample ID:	201707	717-050	RV	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):		2.00E-11 [DAC = 2.0E-11μCi/ml (U-238), EC	- 6 0E 14uCi/ml	<u>.</u> 1		_	
				-	_	DU (Deplet	
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	angelo
Wearer:		NA		Act	tivity Performed:	N.	A
Monitored Workers:	_		_	NA		_	
Lapel Pump Model:	NA		Serial No.		ÍΑ	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	- 50	664	Calibration Due Date:	3/16/2018
Sample Information		Time			Į —Į	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	[]	Start	Stop
7/14/2017	7:30	15:00		50		65.0	65.0
7/17/2017	7:30	15:00		50		65	65
		Total Time (Tc):	9	00	<u>l</u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.3E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		_			(IIIIIaco)		Liters (12)
Kemarks: wiii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% oi Dac	or AE value.			
		Sec	ction II - Anal	lysis Data		<u></u>	
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	[/A	N/A	N/A	N/A
						Alpha	
	bles, Calculation	is, Results	Units		Count	2nd Count	3rd Count
Count Date					4/2017		
Count Time (e.g., noon, 1300, etc					9:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		0.28		
Sample Count Rate Background Count Rate			cpm		0.11	1	
Air Volume (liters)		(A)	cpm		9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	1	0.17	3.20104	J./L104
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.51		
Minimum Detectable Activity (dp	pm) = (3+4.65*S6)	QRT(Cb))/(E*T) (G)	dpm		0.72		
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$	A)) (H)		μCi/ml	3.92	2E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)	- (F1); (F2	2)	uCi/ml	3.9	1E-15		
DAC (or AE) Fraction = $(F2)/(I)$					02%		<u> </u>
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		8E-15		
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	10%)			03%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/24/2017	Sample ID:	20170	717-051	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	<u>-</u>	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>-</u> 1			
					_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	' <u>'</u>	Start	Stop
7/14/2017	7:30	15:00		50		65.0	65.0
7/17/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-h	1.15.04		
				Sample Volume:		Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Saa	tion II - Anal	lvaia Data			
Instrument Information	I		tion II - Ana	iysis Data	C-10	D D	
Instrument Type		Serial Number Meter	Dat	a a to #	Meter	on Due Date	Efficiency (α)
L-2929		158817		ector 1736	12/13/2018	Detector 12/13/2018	0.344
N/A		N/A		I/A	N/A	N/A	N/A
1071		11//1	1.		1071	Alpha	1071
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	,	.,			4/2017		0.0.00
Count Time (e.g., noon, 1300, et	c.)				0:45		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		8		
Sample Count Rate			cpm	().13		
Background Count Rate			cpm	().11		
Air Volume (liters)	(A)	liters	5.9	E+04	5.9E+04	5.9E+04
Net count rate	(1	3)	cpm	(0.02		
Counter Efficiency	(C)		cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(B)/(E)$	(F)		dpm		0.07		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.72		
Concentration = $(\mathbf{F})/(2.22E9 \times (E_1))$	· · · · · ·	100 101	μCi/ml		8E-16		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)		2)	uCi/ml		0E-16		
DAC (or AE) Fraction = $(F2)/(I)$			G' / 1		87%		
MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(J) = (J)/(I) (Goal<	10%)	μCi/ml		8E-15 29%		
` ′	- (3)/(1) (Goal<	10%)	Vaa/Na		Yes		
Final Count?		Note: Unexpected DAC or AE	Yes/No			.	
		Mote. Onexpected DAC of AE	11 aCHOH > 100%	requires inimed	acc Koo nouncation	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/28/2017	Sample ID:		719-052	RW	P: 2017-001	
Occupational (DAC):	Limit:	_		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
	· -	2.00E-11			_		
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC= 6.0E-14\mu Ci/ml]$			_	DU (Deplet	ted Uranium)
Location:		FS12 Amec Soil Sort Area			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	30	64	Calibration Due Date:	3/16/2018
Sample Information		Time			<u> </u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)		Start	Stop
7/18/2017	7:30	15:00		50	_	65.0	65.0
7/19/2017	7:30	15:00		50	_	65	65
		Total Time (Tc):	9	00	L	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.3E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		-			_		,
Remarks: Mi	illinium sample vo	lumes identified are necessary to ach	leve 10% of DAC	of AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
			ı		1	Alpha	
	ables, Calculation	s, Results	Units		Count	2nd Count	3rd Count
Count Date					8/2017		
Count Time (e.g., noon, 1300, et					9:30		
Sample Count Time (Ts, Tb) = T	<u>r</u>		minutes		60		
Total Counts Sample Count Rate			counts		18		
Background Count Rate			cpm		0.11		
Air Volume (liters)	(A)	liters		0E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm).19	332101	33,2101
Counter Efficiency	(C		cpm/dpm).34	0.34	0.34
Collection Efficiency	(D		0.99	().99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	().34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	().56		
Minimum Detectable Activity (d	pm) = (3+4.65*S0)	QRT(Cb))/(E*T) (G)	dpm	().72		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	4.30	0E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (\mathbf{H})) - (F1); (F2	2)	uCi/ml	4.29	9E-15		
DAC (or AE) Fraction = $(F2)/(I)$					02%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		8E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)			03%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/28/2017	Sample ID:	20170	719-053	RW	VP: 2017-001	
Occupational (DAC):	Limit:	· ·		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):		6.00E-14	'- 6 0E 14uCi/ml	-	,		
–		[DAC = $2.0\text{E}-11\mu\text{Ci/ml}$ (U-238), EC= $6.0\text{E}-14\mu\text{Ci/ml}$]			•	DU (Deple	
Location:		FS12 SCA Boundary			Sampled By:	R Sant	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.		ΙA	Calibration Due Date:	NA
Air Pump Model:			Serial No.		667	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	Ï	Start	Stop
7/18/2017	7:30	15:00	4	150	1 [65.0	65.0
7/19/2017	7:30	15:00	4	150	[65	65
		Total Time (Tc):	9	000] [Avg. Flow Rate (lpm)	65.0
	<u>, </u>		Minimum Air	r Sample Volume:	6.7E+03	Liters	
Culo Volumo	(5	<i>a</i>		•			T 1: (A)
Sample Volume:		(lpm)	X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lvsis Data			
Instrument Information	T	Serial Number		ly Sio Dum	Calibrat	tion Due Date	
Instrument Type	†	Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817		4736	12/13/2018	12/13/2018	0.344
N/A		N/A		J/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				7/2	8/2017		
Count Time (e.g., noon, 1300, etc	c.)			1	0:45		
Sample Count Time (Ts, Tb) = T	<u> </u>		minutes		60		
Total Counts			counts	†	13		
Sample Count Rate			cpm		0.22		
Background Count Rate			cpm		0.03		
Air Volume (liters)		(A)	liters	1	9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	1	0.19	0.24	0.24
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = $(C) \times (D)$ Activity $(dpm) = (B)/(E)$	(F)		cpm/dpm dpm		0.34 0.55	0.34	0.34
Minimum Detectable Activity (dp	. ,	ORT(Ch))/(E*T) (G)	dpm	1	0.45		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$		ZKI(Co)//(L I) (C)	μCi/ml	†	2E-15	<u>. </u>	
Background "Strip" value (F.1)		4/20-4/21	uCi/ml	•	31E-18		
NET Concentration Value = (H)			uCi/ml		1E-15		
DAC (or AE) Fraction = (F2)/(I)				-	02%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		5E-15		
MDC Fraction of DAC (or AE) =		(10%)	,		74%		
Final Count?			Yes/No	†	Yes		1
		Note: Unexpected DAC or AE		1		n.	
Parformed Ry						Datas	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/31/2017	Sample ID:	20170	721-054	RW	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	_	General Area:	Work Area:
Non-Occupational (EC):	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	'- 6 0E 14uCi/ml	-	,		_
–		•	•	-	-	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Act	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	ΙA	Calibration Due Date:	NA
Air Pump Model:			Serial No.		667	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	ľ	Start	Stop
7/20/2017	7:30	15:00	4	150		65.0	65.0
7/21/2017	7:30	15:00	4	150	[65	65
		Total Time (Tc):	9	000] [Avg. Flow Rate (lpm)	65.0
,	<u>, </u>		Minimum Air	r Sample Volume:	6.7E+03	Liters	
Culo Volumo	(5	<i>a</i>		•			7.5 = (A)
Sample Volume:		(lpm)	X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lvsis Data			
Instrument Information	T	Serial Number		19313 2444	Calibrat	ion Due Date	
Instrument Type	†	Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929	†	158817		4736	12/13/2018	12/13/2018	0.344
N/A		N/A		J/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	is, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				7/3	1/2017		
Count Time (e.g., noon, 1300, etc	c.)			13:45	5:00 AM		
Sample Count Time (Ts, Tb) = T	<u> </u>		minutes		60		
Total Counts			counts		9		
Sample Count Rate			cpm		0.15		
Background Count Rate			cpm		0.03		
Air Volume (liters)		(A)	liters	1	9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm		0.12		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = $(C) \times (D)$ Activity $(dpm) = (B)/(E)$	(E) (F)		cpm/dpm		0.34	0.34	0.34
Minimum Detectable Activity (dp	. ,	ODT/Ch))/(E*T) (C)	dpm dpm		0.45		
Concentration = $(\mathbf{F})/(2.22E9 \times (A)$		2K1(Co)//(L 1) (G)	μCi/ml	†	1E-15		
Background "Strip" value (F.1)		4/20-4/21	μCi/ml	•	31E-18		
NET Concentration Value = (H)	•		uCi/ml		1E-15		
DAC (or AE) Fraction = (F2)/(I)		-7			51%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		5E-15		
MDC Fraction of DAC (or AE) =		:10%)	I		74%		
Final Count?			Yes/No	<u> </u>	Yes		
		Note: Unexpected DAC or AE		1		n.	
Performed By:		•				Date:	
r diffilled by.	-					Date.	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	7/31/2017	Sample ID:	20170	721-055	RV	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):		2.00E-11		-		_	
		[DAC = $2.0\text{E}-11\mu\text{Ci/ml}$ (U-238), EC= $6.0\text{E}-14\mu\text{Ci/ml}$]			'-	DU (Deple	
Location:		FS12 Amec Soil Sort Are	rea		Sampled By:	R Sant	angelo
Wearer:		NA		Act	tivity Performed:	N	A
Monitored Workers:	_		_	NA			
Lapel Pump Model:	NA		Serial No.		ÍΑ	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	[[Start	Stop
7/20/2017	7:30	15:00		50		65.0	65.0
7/21/2017	7:30	15:00		50		65	65
		Total Time (Tc):	9	900	<u>l</u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	2.0E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		_		-	(IIIIIaco)	552	Liters (12)
Kemarks: wiii	nimum sampie vo	olumes identified are necessary to achi	1eve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
	bles, Calculation	s, Results	Units		Count	2nd Count	3rd Count
Count Date			ļ		1/2017		_
Count Time (e.g., noon, 1300, etc					1:30		
Sample Count Time (Ts, Tb) = T			minutes	1	60		
Total Counts Sample Count Rate			counts	+ ,	5		
Background Count Rate			cpm		0.03		
Air Volume (liters)		(A)	liters		9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	•	0.05	5,52.0.	3.52.01
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99	(0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm	(0.16		
Minimum Detectable Activity (dp	pm) = (3+4.65* $S6$	QRT(Cb))/(E*T) (G)	dpm	†	0.45		
Concentration = $(F)/(2.22E9 \times (A))$			μCi/ml	•	1E-15		
Background "Strip" value (F.1)	Date Updated		uCi/ml		31E-18		
NET Concentration Value = (H)	- (F1); (F2	2)	uCi/ml		0E-15		
DAC (or AE) Fraction = (F2)/(I)			 		01% 5F-17		
MDC = MDA/V = (G)/(A) $MDC = months = of DAC (on AE)$	(J)	*****	μCi/ml		5E-15		
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	10%)	77 07		02%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/2/2017	Sample ID:	201707	725-056	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.00E 11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		2.00E-11 AC = 2.0E-11µCi/ml (U-238), EC	= 6.0F-14uCi/ml	I	_		
	-	•		l	Radionuclides: DU (Depleted Uranium)		
Location:		FS12 Amec Soil Sort Ar	ea		Sampled By:	R Sant	angelo
Wearer:		NA		Act	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	ninutes)	Ī	Start	Stop
7/24/2017	7:30	15:00	4.	50		65.0	65.0
7/25/2017	7:30	15:00	4.	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.1F±01 I	Liters	
				•			**:
Sample Volume:			X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample volui	nes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	vsis Data			
Instrument Information		Serial Number		<u></u>	Calibrati	on Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A		/A	N/A	N/A	N/A
	•					Alpha	
Varia	bles, Calculations,	Results	Units	1st	Count	2nd Count	3rd Count
Count Date				8/2	2/2017		
Count Time (e.g., noon, 1300, et	c.)			ģ	9:30		
Sample Count Time (Ts, Tb) = T	7		minutes		60		
Total Counts			counts		16		
Sample Count Rate			cpm	(0.27		
Background Count Rate			cpm	(0.10		
Air Volume (liters)	(A)		liters	5.9	9E+04	5.9E+04	5.9E+04
Net count rate	(B)		cpm	(0.17		
Counter Efficiency	(C)		cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)		0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.49		
Minimum Detectable Activity (d	pm) = (3+4.65*SQR)	$\Gamma(Cb))/(E*T)$ (G)	dpm	(0.70		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	3.7	7E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2)		uCi/ml	3.70	6E-15		
DAC (or AE) Fraction = (F2)/(I)	1			0.0	02%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	5.3'	7E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<10 ⁴	%)		0.0	03%		
Final Count?			Yes/No	•	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	ı .	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/2/2017	Sample ID:	20170	725-057	RW	VP: 2017-001	
Occupational (DAC):	Limit:	· ·		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC): ✓	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC=	'- 6 0E 14uCi/ml	<u>-</u>	,		_
			•	J	•	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	Α
Monitored Workers:				NA			
Lapel Pump Model:			Serial No.		ΙA	Calibration Due Date:	NA
·		•				•	
Air Pump Model:	LV-1		Serial No.		567	Calibration Due Date:	3/7/2018
Sample Information		Time			<u>J</u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)]	Start	Stop
7/24/2017	7:30	15:00		150]	65.0	65.0
7/25/2017	7:30	15:00		150	_	65	65
	<u> </u>	Total Time (Tc):	9	900	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	1.0E+04	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =		Liters (A)
		• -			(Illinuics)	J.J.E	Liters (11)
Remarks: Mii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)
L-2929		158817		4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	V/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					2/2017	,	
Count Time (e.g., noon, 1300, etc					10:45		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		19		
Sample Count Rate			cpm		0.32		
Background Count Rate		(1)	cpm		0.10 0F : 04	5 OE : 04	5 OF 104
Air Volume (liters) Net count rate		(A) B)	liters		9E+04 0.22	5.9E+04	5.9E+04
Counter Efficiency	(C)		cpm cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.64		
Minimum Detectable Activity (dp		QRT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$			μCi/ml	4.9	00E-15		<u></u>
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	4.8	89E-15		
DAC (or AE) Fraction = (F2)/(I)	·			8.	.15%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	5.3	37E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)		8.	.95%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	o requires immed	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:							
Reviewed by.						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/4/2017	Sample ID:	201707	728-058	RW	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):		2.00E-11	- 6 0E 14uCi/ml	<u>-</u> 1			
		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC= 6.0E-14\mu Ci/ml]$			_	DU (Deplet	
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:	_		_	NA			
Lapel Pump Model:	NA		Serial No.		IA.	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	minutes)	[[Start	Stop
7/26/2017	7:30	15:00	4	50		65.0	65.0
7/28/2017	7:30	15:00		50]	65	65
		Total Time (Tc):	9	00	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
				-	(IIIIIuco)	DIVE. U.	Liters (12)
Remarks: MII	nimum sampte vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
	bles, Calculation	ns, Results	Units	1	Count	2nd Count	3rd Count
Count Date					4/2017		
Count Time (e.g., noon, 1300, etc				+	0:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts	1	10 0.17	ı	_
Sample Count Rate Background Count Rate			cpm	+	0.17		
Air Volume (liters)		(A)	cpm	+	9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	1	0.07	3.5E+0 4	3.5E+04
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D	•	0.99	1	0.99	0.99	0.99
Efficiency = (C) x (D)	(E)	•	cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm	(0.20		
Minimum Detectable Activity (dp	om) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm	(0.70		
Concentration = $(F)/(2.22E9 \times (A))$	(H)		μCi/ml	1.5	1E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H)	- (F1); (F2	2)	uCi/ml	1.5	0E-15		
DAC (or AE) Fraction = $(F2)/(I)$					01%		<u> </u>
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		7E-15		
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	(10%)		-	03%	,	
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/4/2017	Sample ID:	20170	725-059	RV	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	_	General Area:	Work Area:
Non-Occupational (EC): ✓	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	4 COE 1/u/Ci/ml	-	,		_
		•	•	1	•	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:		·	_	NA		_	
Lapel Pump Model:			Serial No.		IA.	Calibration Due Date:	NA
-		-				•	
Air Pump Model:	LV-1		Serial No.	36	567	Calibration Due Date:	3/7/2018
Sample Information		Time			<u> </u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)]	Start	Stop
7/26/2017	7:30	15:00	4	50	_	65.0	65.0
7/28/2017	7:30	15:00		50	<u> </u>	65	65
		Total Time (Tc):	9	000	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	1.0E+04	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
				-	(Illinuics)	JUE: U.	Liters (11)
Remarks: IVIII	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)
L-2929		158817		4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					4/2017	<u> </u>	
Count Time (e.g., noon, 1300, etc					0:45	 	
Sample Count Time (Ts, Tb) = T			minutes		60	 	_
Total Counts			counts	ł	17	 	
Sample Count Rate			cpm		0.28	 	
Background Count Rate		(A)	cpm		0.10 0E : 04	5 OF LOA	5 0E+04
Air Volume (liters) Net count rate		(A) B)	liters cpm	1	9E+04 0.18	5.9E+04	5.9E+04
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99	1	0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	1	0.54	<u> </u>	
Minimum Detectable Activity (dp	pm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm		0.70		<u></u>
Concentration = (F)/(2.22E9 x (A	A)) (H)		μCi/ml	4.1	5E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	4.1	4E-15		
DAC (or AE) Fraction = (F2)/(I)	,			6.	.90%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		7E-15	<u> </u>	
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)			.95%		
Final Count?			Yes/No		Yes	l	
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	
ne ne wea By.							

		Sec	tion I - Collec	ction Data			
Date:	8/9/2017	Sample ID:	201708	801-060	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.00E-11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):		2.00E-11 DAC = 2.0E-11μCi/ml (U-238), EC=	'- 6 0F-14uCi/ml	<u>.</u> 1	_		
	_	•		-	Radionuclides: DU (Depleted Uranium)		
Location:		FS12 Amec Soil Sort Are	ea		Sampled By:	R Santa	ingelo
Wearer:		NA			tivity Performed:	N.	<u>A</u>
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.		64	Calibration Due Date:	3/16/2018
					<u> </u>	-	
Sample Information		Time			│		Rate (lpm)
Collection Date	Start	Stop		minutes)	<u> </u>	Start	Stop
7/31/2017	7:30	15:00		50	<u> </u>	65.0	65.0
8/1/2017	7:30	15:00		.50	<u> </u>	Ava Flow Pote (Inm)	65 0
		Total Time (Tc):	91	00	L	Avg. Flow Rate (lpm)	65.0
I			Minimum Air	Sample Volume:	2.0E+01	iters	
Sample Volume:	65 (l ₁	pm)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mir	nimum sample volu	umes identified are necessary to achi	ieve 10% of DAC	or AE value.	•		
	1	,					
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibratio	on Due Date	
Instrument Type	ļ	Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929	ļ	158817	164	4736	12/13/2018	12/13/2018	0.344
N/A	<u> </u>	N/A	N	I/A	N/A	N/A	N/A
			<u> </u>	ļ.,	1	Alpha	
	bles, Calculations,	Results	Units		Count	2nd Count	3rd Count
Count Date			ļ	1	/2017		
Count Time (e.g., noon, 1300, etc				+	1:30		
Sample Count Time (Ts, Tb) = T	_		minutes		60		
Total Counts	_		counts	1	16		
Sample Count Rate Background Count Rate			cpm cpm	1	0.03		
Air Volume (liters)	(A	,	liters	+	0E+04	5.9E+04	5.9E+04
Net count rate	(A) (B)	•	cpm	1	0.24	J.7LTU 1	J./LTU4
Counter Efficiency	(C)		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D)		0.99	1).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	1	0.69	*	
Minimum Detectable Activity (dp		RT(Cb))/(E*T) (G)	dpm	1).45		
Concentration = $(F)/(2.22E9 \times (A))$		V	μCi/ml	1	5E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)		-	uCi/ml		4E-15		1
DAC (or AE) Fraction = (F2)/(I)				0.0	03%		1
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		5E-15		
MDC Fraction of DAC (or AE) =		ე%)		0.0	02%		<u></u>
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	•	
Performed By:						Date:	
Reviewed By:						Date:	_

		Sec	tion I - Collec	ction Data			
Date:	8/9/2017	Sample ID:	201708	801-061	RW	P: 2017-001	
Occupational (DAC):	Limit:	C 00F 14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
	_	6.00E-14	6 OF 14 C'/ 1	-	_		
Non-Occupational (EC):		[DAC = $2.0\text{E}-11\mu\text{Ci/ml}$ (U-238), EC= $6.0\text{E}-14\mu\text{Ci/ml}$]			_	DU (Deplet	ted Uranium)
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
			G : 137			C.II. d. D. D.	27.4
Lapel Pump Model:			Serial No.		A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)		Start	Stop
7/31/2017	7:30	15:00	4	50		65.0	65.0
8/1/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
	I.		Minimum Air	Sample Volume:	6.7E+03 I	Liters	
				•			
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample vo	lumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Saa	tion II - Anal	lugia Data			
T4	ı		tion II - Ana	iysis Data	G-17h	D D	
Instrument Information		Serial Number	Dat	a a to a		on Due Date	Efficiency (%)
Instrument Type L-2929		Meter 158817		ector 1736	Meter 12/13/2018	Detector 12/13/2018	Efficiency (α) 0.344
N/A		N/A		I/A	N/A	N/A	N/A
1071	l	17/21	1.		1071	Alpha	1071
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	,	.,			2/2017		0.0.00
Count Time (e.g., noon, 1300, et	c.)				5:00 pm		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		10		
Sample Count Rate			cpm	(0.17		
Background Count Rate			cpm	(0.03		
Air Volume (liters)	(A)	liters	5.9	E+04	5.9E+04	5.9E+04
Net count rate	(1	3)	cpm	(0.14		
Counter Efficiency	(C)		cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm).34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm		0.40		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.45		
Concentration = (F)/(2.22E9 x (A		4/20 4/21	μCi/ml		9E-15		
Background "Strip" value (F.1) NET Concentration Value = (H)	Date Updated	4/20-4/21	uCi/ml		1E-18 8E-15		
		2)	uCi/ml		14%		
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$	(J)		uCi/ml		5E-15		
MDC = MDA/ $V = (G)/(A)$ MDC Fraction of DAC (or AE) =		10%)	μCi/ml		74%		
Final Count?	(0)/(1) (Conf.)	10/0)	Yes/No		Yes		
I IIII Counti		Note: Unexpected DAC or AE				1.	
		HOLL CHEAPEUR DAC OF AE	11 action > 100 %	, requires ininieur	acc ROO nouncation	••	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/14/2017	Sample ID:	201708	804-062	RV	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):		[DAC = 2.0E-11μCi/ml (U-238), EC	- 6 0E-1/uCi/ml	1		_	
					Radionuclides: DU (Depleted Uranium)		
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	angelo
Wearer:		NA		- Act	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.		ĪΑ	Calibration Due Date:	NA
Air Pump Model:			Serial No.		664	Calibration Due Date:	
	T 4-1		Schai 140.		04		
Sample Information	<u> </u>	Time	-		Ų Ų	Flow	Rate (lpm)
Collection Date	Start	Stop		minutes)		Start	Stop
8/2/2017	7:30	15:00		150		65.0	65.0
8/4/2017	7:30	15:00		150		65	65
	<u> </u>	Total Time (Tc):	91	000	<u>l</u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	2.0E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
-		olumes identified are necessary to achi	nieve 10% of DAC	or AE value.	•		
	т.			, 01			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817		4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
			T	ļ		Alpha	T -10 :
	bles, Calculation	s, Results	Units		Count	2nd Count	3rd Count
Count Date Count Time (e.g., noon, 1300, etc.)	- \				4/2017 9:30	<u> </u>	
Sample Count Time (Ts, Tb) = T			minutes		60		+
Total Counts			counts		28	<u> </u>	
Sample Count Rate			cpm	†	0.47		
Background Count Rate			cpm		0.03		
Air Volume (liters)	((A)	liters	5.9	9E+04	5.9E+04	5.9E+04
Net count rate	()	B)	cpm	(0.44		
Counter Efficiency	(C)	cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	(0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		1.28		
Minimum Detectable Activity (dp		QRT(Cb))/(E*T) (G)	dpm	†	0.45		
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$			μCi/ml	•	7E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		31E-18		
NET Concentration Value = (H)		2)	uCi/ml		7E-15		
DAC (or AE) Fraction = $(F2)/(I)$			C: /1		05% 5E 15		
MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(J) = (J)/(I) (Goal<	1004)	μCi/ml		5E-15 02%		
Final Count?	(J)/(I) (OULL)	10%)	Yes/No		Yes		-
rmai Count?		Note: Unexpected DAC or AE					
		Note: Unexpected DAC of AL	Ifacuon > 100 /0	requires innicu	ate KSO houncado	п.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/14/2017	Sample ID:	201708	804-063	RW	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	='	General Area:	Work Area:
Non-Occupational (EC):	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	COE 1/uCi/ml	-	,	_	
–		•		-	_	DU (Deple	
Location:		FS12 SCA Boundary			Sampled By:	R Sant	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.		ÍΑ	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	36	667	Calibration Due Date:	3/7/2018
Sample Information		Time			<u></u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)] [Start	Stop
8/2/2017	7:30	15:00	4	50	<u> </u>	65.0	65.0
8/4/2017	7:30	15:00		50	<u> </u>	65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
	_		Minimum Air	Sample Volume:	6.7E+03	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =		Liters (A)
		_		-	(IIIIIuco)	DIPE. U.	Liters (11)
Kemarks: wii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	is, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					9/2017		
Count Time (e.g., noon, 1300, etc				+	1:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts	1	14		
Sample Count Rate			cpm	+	0.23		
Background Count Rate Air Volume (liters)		(A)	cpm	+	0.03 9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	1	0.20	J.7ETU4	J.7ETU4
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99	1	0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	1	0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm	(0.60		
Minimum Detectable Activity (dp	pm) = (3+4.65*S0)	QRT(Cb))/(E*T) (G)	dpm	(0.45		
Concentration = (F)/(2.22E9 x (A	A)) (H)		μCi/ml	4.6	0E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	4.5	9E-15		
DAC (or AE) Fraction = (F2)/(I)	1			7.	65%	<u> </u>	
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		5E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		-	74%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	ction I - Collec	ction Data			
Date:	8/17/2017	Sample ID:	20170	808-064	RV	VP: 2017-001	
Occupational (DAC):	Limit:	•		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):	,	2.00E-11 [DAC = 2.0E-11µCi/ml (U-238), EC:	2- 6 0F 14uCi/ml	-	- '		
		•		-	-	DU (Deplet	
Location:		FS12 Amec Soil Sort Are	rea		Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.		JA.	Calibration Due Date:	NA
		•				•	
Air Pump Model:	LV-1		Serial No.	30	564	Calibration Due Date:	3/16/2018
Sample Information	<u> </u>	Time			<u>l</u> l	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	minutes)]	Start	Stop
8/7/2017	7:30	15:00		50		65.0	65.0
8/8/2017	7:30	15:00	1	150		65	65
		Total Time (Tc):	91	000	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	3.3E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		• -		-	_(
Remarks. wii	nimum sampie ve	olumes identified are necessary to achi	ieve 10% oi DAC	of AE value.			
		Sec	ction II - Anal	lys <u>is Data</u>			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	,
	ables, Calculation	ıs, Results	Units		Count	2nd Count	3rd Count
Count Date			├		7/2017		
Count Time (e.g., noon, 1300, etc					1:30	<u></u>	
Sample Count Time (Ts, Tb) = T	<u>`</u>		minutes		60		
Total Counts			counts	+	12 0.20		_
Sample Count Rate Background Count Rate			cpm		0.11		+
Air Volume (liters)		(A)	liters		9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	•	0.09	5,52.0.	3.52.01
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm	(0.26		
Minimum Detectable Activity (dp	pm) = (3+4.65*S)	QRT(Cb))/(E*T) (G)	dpm	(0.72		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$			μCi/ml	2.0	3E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		31E-18		
NET Concentration Value = (H)		2)	uCi/ml		3E-15		
DAC (or AE) Fraction = (F2)/(I)					01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		8E-15		_
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)			03%		
Final Count?			Yes/No	1	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:			_			Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/17/2017	Sample ID:	201708	808-065	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	<u>-</u>	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>.</u>			
		•			_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	Ĭ	Start	Stop
8/7/2017	7:30	15:00		50		65.0	65.0
8/8/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-1	1.1E.04	f ia	
				Sample Volume:		Liters	
Sample Volume:	65	(lpm)	X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Saa	tion II - Anal	lvoic Doto			
T	I		tion II - Ana	lysis Data	C-17bri	D D.t.	
Instrument Information Instrument Type		Serial Number Meter	Dat	a a tau	Meter	on Due Date	Efficiency (a)
L-2929		158817		ector 1736	12/13/2018	Detector 12/13/2018	0.344
N/A		N/A		/A	N/A	N/A	N/A
1071		11//11	1.		17/11	Alpha	1071
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	,	.,			7/2017		
Count Time (e.g., noon, 1300, et	c.)				2:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		11		
Sample Count Rate			cpm	(0.18		
Background Count Rate			cpm	(0.11		
Air Volume (liters)	(.	A)	liters	5.9	0E+04	5.9E+04	5.9E+04
Net count rate	(I	3)	cpm	(0.07		
Counter Efficiency	(C)		cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D))	0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(B)/(E)$	(F)		dpm		0.22		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.72		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	· · · · · · · · · · · · · · · · · · ·		μCi/ml		6E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)		3)	uCi/ml		5E-15		
DAC (or AE) Fraction = $(F2)/(I)$			G' / 1		75%		
MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(J) = (J)/(I) (Goal<	1004)	μCi/ml		8E-15 29%		
` ′	- (3)/(1) (Goal<	10%)	Vaa/Na		Yes		
Final Count?		Note: Unexpected DAC or AE	Yes/No				
		Mote. Onexpected DAC of AE	11 aCHOH > 100%	requires illimed	acc KSO HUHICAHOI	14	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/18/2017	Sample ID:	201708	810-066	RW	VP: 2017-001	
Occupational (DAC):	Limit:	•		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	- 6 0E 14uCi/ml	<u>-</u> 1	,		_
–				-	_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:	_		_	NA		_	
Lapel Pump Model:	NA		Serial No.		JA.	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	36	667	Calibration Due Date:	3/7/2018
Sample Information		Time			<u> </u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)]	Start	Stop
8/9/2017	7:30	15:00		50]	65.0	65.0
8/10/2017	7:30	15:00		.50	<u> </u>	65	65
		Total Time (Tc):	9	00	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	8.0E+03	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
				-	_(Zitelis (12)
Remarks. wii	nimum sample ve	olumes identified are necessary to achi	ieve 10% oi DAC	of AE value.			
		Sec	ction II - Anal	lys <u>is Data</u>			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
			,	<u> </u>		Alpha	
	ables, Calculation	ıs, Results	Units	1	Count	2nd Count	3rd Count
Count Date			 		8/2017		
Count Time (e.g., noon, 1300, etc				+	9:30		
Sample Count Time (Ts, Tb) = T	-		minutes		60	_	
Total Counts Sample Count Rate			counts	1	13 0.22		
Background Count Rate			cpm	+	0.05		
Air Volume (liters)		(A)	liters	+	9E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm	1	0.17	3,52.0.	3.52.01
Counter Efficiency	(C)		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99	(0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	(0.49		
Minimum Detectable Activity (dp	pm) = (3+4.65*S6)	QRT(Cb))/(E*T) (G)	dpm	1	0.54		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$			μCi/ml	1	7E-15		
Background "Strip" value (F.1)	•		uCi/ml		31E-18		
NET Concentration Value = (H)		2)	uCi/ml		6E-15		
DAC (or AE) Fraction = (F2)/(I)			ļ		27%		
MDC = MDA/V = (G)/(A) $MDC = MDA/V = (G)/(A)$	(J)	4000	μCi/ml		2E-15		_
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)	** 01		87%		
Final Count?		27 - 17 - 1 ID1C 1E	Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	ction I - Collec	ction Data			
Date:	8/18/2017	Sample ID:	20170	810-067	RV	VP: 2017-001	
Occupational (DAC):	Limit:	-		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
Non-Occupational (EC):	· .	2.00E-11 [DAC = 2.0E-11µCi/ml (U-238), EC:	- 4 0E 14uCi/ml	-		_	
		•	•	-	'-	DU (Deplet	
Location:		FS12 Amec Soil Sort Are	rea		Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:		· 	_	NA		_	
Lapel Pump Model:	NA		Serial No.		JA.	Calibration Due Date:	NA
		-				•	
Air Pump Model:	LV-1		Serial No.	36	564	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)]	Start	Stop
8/9/2017	7:30	15:00	4	150]	65.0	65.0
8/10/2017	7:30	15:00		50]	65	65
		Total Time (Tc):	9	900	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	r Sample Volume:	2.4E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		-		-	(Illimutes)	JUL. U.	Liters (12)
Kemarks: wiii	nimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	J/A	N/A	N/A	N/A
						Alpha	
Varia	ables, Calculation	as, Results	Units	1st	Count	2nd Count	3rd Count
Count Date			ļ		8/2017	<u> </u>	
Count Time (e.g., noon, 1300, etc					2:30	 	
Sample Count Time (Ts, Tb) = T	<u>:</u>		minutes	<u> </u>	60	 	
Total Counts			counts	<u> </u>	7	 	
Sample Count Rate			cpm		0.12	 	
Background Count Rate		(A)	cpm		0.05	5 OF LOA	5 0E+04
Air Volume (liters) Net count rate		(A) (B)	liters	•	9E+04 0.07	5.9E+04	5.9E+04
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99	1	0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.20	<u> </u>	
Minimum Detectable Activity (dp	pm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm		0.54		<u></u>
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$	A)) (H)		μCi/ml	1.5	1E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	1.5	0E-15		
DAC (or AE) Fraction = (F2)/(I)	1			0.	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		2E-15	<u> </u>	
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	(10%)			02%		
Final Count?			Yes/No		Yes	l	
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:	_		_	_		Date:	_
Reviewed By:						Date:	
1							

		Sec	tion I - Collec	ction Data			
Date:	8/22/2017	Sample ID:	201708	814-068	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	_	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>.</u>			
		•			_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	Ī	Start	Stop
8/11/2017	7:30	15:30		80		65.0	65.0
8/14/2017	7:30	15:30	4	80		65	65
		Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0
	<u> </u>		Minimum Air	C1- W-h	8.6E+03		
			Minimum Air	Sample Volume:		Liters	
Sample Volume:	65	(lpm)	X	960	(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	nimum sample vo	lumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sac	tion II - Anal	veic Data			
Instrument Information		Serial Number	tion II - Ana	lysis Data	Colibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A		//A	N/A	N/A	N/A
1071	l	11//11	1.		17/11	Alpha	1071
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date		-			2/2017		
Count Time (e.g., noon, 1300, et	c.)				3:45		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		11		
Sample Count Rate			cpm	(0.18		
Background Count Rate			cpm	(0.06		
Air Volume (liters)	(.	A)	liters	6.2	2E+04	6.2E+04	6.2E+04
Net count rate	(I	3)	cpm	().12		
Counter Efficiency	(C)		cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	().34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.36		
Minimum Detectable Activity (d	pm) = (3+4.65*SC	QRT(Cb))/(E*T) (G)	dpm	(0.57		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$	A)) (H)		μCi/ml	2.6	1E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	2.6	1E-15		
DAC (or AE) Fraction = (F2)/(I)				4.	34%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	4.1	3E-15		
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	10%)		6.	89%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/24/2017	Sample ID:		814-069	RW	P: 2017-001	
Occupational (DAC):	Limit:	_		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
	<u>-</u>	2.00E-11	4 0 D 4 4 GU 1	-	_		
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μC1/ml		_	DU (Deplet	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	ea		Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			<u>. </u>
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:			Serial No.		64	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	' <u>'</u>	Start	Stop
8/11/2017	7:30	15:30		80		65.0	65.0
8/14/2017	7:30	15:30		80		65	65
		Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0
	1		Minimum Air	Comple Volumes	2.2E+01 I	itomo	
			Minimum Air	Sample Volume:		Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Coo	tion II - Anal	lvaia Data			
T	1		tion II - Ana	iysis Data	C-10	D D	
Instrument Information Instrument Type		Serial Number Meter	Dat	a a to #	Meter	on Due Date	Efficiency (α)
L-2929		158817		ector 1736	12/13/2018	Detector 12/13/2018	0.344
N/A		N/A		I/A	N/A	N/A	N/A
1071	ı	17/11	1.		1071	Alpha	1071
Varia	ables, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	•				2/2017		
Count Time (e.g., noon, 1300, et	tc.)				2:30		
Sample Count Time (Ts, Tb) = T	Γ		minutes		60		
Total Counts			counts		25		
Sample Count Rate			cpm	().42		
Background Count Rate			cpm	().11		
Air Volume (liters)	(A)	liters	6.2	E+04	6.2E+04	6.2E+04
Net count rate	(1	3)	cpm	().31		
Counter Efficiency	(C)		cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.90		
Minimum Detectable Activity (d		QR1(Cb))/(E*1) (G)	dpm		0.72		
Concentration = $(F)/(2.22E9 \times (E))$ Background "Strip" value $(F.1)$		4/20 4/21	μCi/ml		0E-15		
NET Concentration Value = (H)	Date Updated) - (F1); (F2)	4/20-4/21	uCi/ml		1E-18 9E-15		
` '		:)	uCi/ml		9E-15 03%		
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$	(J)		uCi/ml		3E-15		
MDC Fraction of DAC (or AE) =		10%)	μCi/ml		03%		
Final Count?	(0)/(1) (0011)	10/0)	Yes/No		Yes		
i mai Count:		Note: Unexpected DAC or AE				1.	
		THE CHEAPERICA DITE OF ALL		, requires inflicti	and 2000 notification		
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/25/2017	Sample ID:	201708	817-070	RV	VP: 2017-001	
Occupational (DAC):	Limit:			μCi/ml (I)	 '	General Area:	Work Area:
Non-Occupational (EC):	-	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	COE 1/uCi/ml	-	,		
–		•		-	_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:	_		_	NA		_	
Lapel Pump Model:	NA		Serial No.		JA.	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.	36	667	Calibration Due Date:	3/7/2018
Sample Information		Time			<u> </u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)]	Start	Stop
8/15/2017	7:30	15:00	4	50]	65.0	65.0
8/17/2017	7:30	15:30		80]	65	65
		Total Time (Tc):	9	30	1 1	Avg. Flow Rate (lpm)	65.0
	_		Minimum Air	Sample Volume:	9.6E+03	Liters	
Sample Volume:	65	(lpm)	x	930	(minutes) =		Liters (A)
		_		-	(IIIIIIuco)	0.011.0.	Liters (12)
Kemarks: wii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data	<u></u> .		
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
	bles, Calculation	s, Results	Units	1	Count	2nd Count	3rd Count
Count Date				1	25/2017		
Count Time (e.g., noon, 1300, etc				+	1:45		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts	 	7 0.12		_
Sample Count Rate Background Count Rate			cpm	+	0.08		-
Air Volume (liters)		(A)	cpm	+	0E+04	6.0E+04	6.0E+04
Net count rate		B)	cpm	1	0.04	0.02104	0.02104
Counter Efficiency	(C		cpm/dpm	1	0.34	0.34	0.34
Collection Efficiency	(D		0.99	1	0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	(0.11		
Minimum Detectable Activity (dp	pm) = (3+4.65*S6)	QRT(Cb))/(E*T) (G)	dpm	(0.64		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$	A)) (H)		μCi/ml	8.0	2E-16		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H)		2)	uCi/ml	+	5E-16		
DAC (or AE) Fraction = (F2)/(I)					32%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		6E-15		
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	.10%)			94%		_
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/29/2017	Sample ID:		821-071	RW	/P: 2017-001	
Occupational (DAC):		_		μCi/ml (I)	Breathing Zone:		Work Area: ✓
	· -	2.00E-11		-			
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μCı/ml		_	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Sant	angelo
Wearer:		NA		Ac	tivity Performed:	N	A
Monitored Workers:				NA			<u>.</u>
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
						•	
Air Pump Model:	LV-1		Serial No.		64	Calibration Due Date:	3/16/2018
Sample Information		Time			ļ <u>L</u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	<u> </u>	Start	Stop
8/15/2017	7:30	15:30	4	80		65.0	65.0
8/21/2017	7:30	15:30		80		65	65
		Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	2.0E+01	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
		-					
Remarks: MI	inimum sampie vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number		-	Calibrati	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					9/2017		
Count Time (e.g., noon, 1300, et					0:10		
Sample Count Time $(Ts, Tb) = T$	7		minutes		60		
Total Counts			counts		24		
Sample Count Rate			cpm		0.40		
Background Count Rate		A.	cpm		0.03	6 2E - 04	6 2E : 04
Air Volume (liters) Net count rate		A) B)	liters	1	2E+04 0.37	6.2E+04	6.2E+04
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm		1.09		
Minimum Detectable Activity (d	pm) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm	(0.45		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	7.8	4E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	7.8	4E-15		
DAC (or AE) Fraction = $(F2)/(I)$	1			0.	04%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		3E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		0.	02%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	8/29/2017	Sample ID:	20170	821-072	RW	/P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	Work Area:
Non-Occupational (EC):	<u>.</u>	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 0E 14uCi/ml	<u>.</u> 1			
		•	•	-	_	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	Ĭ	Start	Stop
8/18/2017	7:30	15:00	-	50		65.0	65.0
8/21/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Comple Volume	6.7E .02	Litono	
			Minimum Aii	Sample Volume:		Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Soo	stion II Anal	lucia Data			
T	1		ction II - Ana	iysis Data			
Instrument Information		Serial Number				on Due Date	TIOT 1 ()
Instrument Type		Meter		ector	Meter	Detector	Efficiency (α)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	[/A	N/A	N/A Alpha	N/A
Vorie	bles, Calculation	e Doculto	Units	1et	Count	2nd Count	3rd Count
Count Date	ibles, Calculation	s, resuits	Cints		9/2017	8/30/2017	314 Count
Count Time (e.g., noon, 1300, et	·c)				1:13	13:22	
Sample Count Time (Ts, Tb) = T			minutes		60	60	
Total Counts	·		counts		20	10	
Sample Count Rate			cpm	1	0.33	0.17	
Background Count Rate			cpm		0.03	0.08	
Air Volume (liters)	(A)	liters		9E+04	5.9E+04	5.9E+04
Net count rate		3)	cpm		0.30	0.09	***
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99	().99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	().89	0.25	
Minimum Detectable Activity (d	pm) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm	().45	0.64	
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	6.8	6E-15	1.96E-15	
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	6.8	5E-15		
DAC (or AE) Fraction = (F2)/(I))			11	.42%	3.27%	
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		5E-15	4.92E-15	
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		5.	74%	8.20%	
Final Count?			Yes/No		No	Yes	
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	9/1/2017	Sample ID:		324-073	RW	P: 2017-001	
Occupational (DAC):	Limit:	_		μCi/ml (I)	Breathing Zone:		Work Area: ✓
	<u>-</u>	2.00E-11					
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μCı/ml		_	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Sant	angelo
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			<u>. </u>
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:			Serial No.		64	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	, <u> </u>	Start	Stop
8/23/2017	7:30	15:30	-	80		65.0	65.0
8/24/2017	7:30	15:30		80		65	65
0/2 1/2017	7.50	Total Time (Tc):		60		Avg. Flow Rate (lpm)	65.0
					<u> </u>		
			Minimum Air	Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
	1		ction II - Ana	ysis Data			
Instrument Information		Serial Number	1			on Due Date	
Instrument Type		Meter		ector	Meter	Detector	Efficiency (a)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	//A	N/A	N/A	N/A
						Alpha	
	bles, Calculation	s, Results	Units		Count	2nd Count	3rd Count
Count Date					/2017		
Count Time (e.g., noon, 1300, et					1:10		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		11		
Sample Count Rate			cpm		0.18		
Background Count Rate			cpm		0.10	6 2E - 0.4	6 OF 104
Air Volume (liters)		A)	liters		E+04	6.2E+04	6.2E+04
Net count rate		3)	cpm		0.08	0.24	0.24
Counter Efficiency	(C)		cpm/dpm 0.99		0.34	0.34	0.34
Collection Efficiency	(D)				0.34	0.99
Efficiency = (C) x (D) Activity (dpm) = (R)/(F)	(E)		cpm/dpm dpm		0.34	0.34	0.34
Activity (dpm) = (B)/(E) Minimum Detectable Activity (d		DPT(Ch))/(E*T) (C)	dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \times (A)$		(K1(C0))/(E-1) (G)	μCi/ml		7E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	μCi/ml		1E-18		
NET Concentration Value = (H)			uCi/ml		6E-15		
		.,	uCi/iiii		01%		
DAC (or AE) Fraction = $(F2)/(I)$			C:/1				
MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(J) = (J)/(I) (Goal<	10%)	μCi/ml		3E-15 03%		
Final Count?	- (b)/(1) (Goan (10/0)	Yes/No		Yes		
I IIII Count.		Note: Unexpected DAC or AE				1.	
		Total Chespetitu DAC 01 AE	action / 100 /(. requires minieur	and App nonneation	••	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	9/1/2017	Sample ID:	20170	824-074	RV	WP: 2017-001	
Occupational (DAC):	l Limit:	· ·		μCi/ml (I)	_	General Area:	Work Area:
Non-Occupational (EC): ✓	<u>.</u>	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC=	5 OF 14uCi/ml	_	,		_
			•	J	•	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:			_	NA		_	
Lapel Pump Model:			Serial No.		IA.	Calibration Due Date:	NA
		•				•	
Air Pump Model:	LV-1		Serial No.	36	567	Calibration Due Date:	3/7/2018
Sample Information		Time]	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)]	Start	Stop
8/23/2017	7:30	15:30	4	180	_	65.0	65.0
8/24/2017	7:30	15:30		180	_	65	65
	<u> </u>	Total Time (Tc):	9	960]	Avg. Flow Rate (lpm)	65.0
	·		Minimum Air	r Sample Volume:	1.0E+04	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
					(Illinutes)	U.Z.C.	Liters (12)
Kemarks: Iviii	nimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	lysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	V/A	N/A	N/A	N/A
					_	Alpha	
Varia	ables, Calculation	is, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					1/2017		
Count Time (e.g., noon, 1300, etc					11:13		
Sample Count Time (Ts, Tb) = T	<u> </u>		minutes		60		
Total Counts			counts		12		
Sample Count Rate			cpm		0.20		
Background Count Rate Air Volume (liters)		(A)	cpm		0.10 2E+04	6.2E+04	6.2E+04
Net count rate		B)	cpm	1	0.10	0.2ET04	0.2ET04
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)		dpm		0.29		
Minimum Detectable Activity (dp	pm) = (3+4.65*S)	QRT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = (F)/(2.22E9 x (A	A)) (H)		μCi/ml	2.1	2E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	2.1	1E-15		
DAC (or AE) Fraction = (F2)/(I)				3.	.52%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		3E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	:10%)			.39%		
Final Count?			Yes/No		No	Yes	
		Note: Unexpected DAC or AE	fraction > 100%	o requires immed	iate RSO notificatio	n.	
D.C. ID						ъ.	
Performed By:						Date:	
Reviewed By:						Date:	
Reviewed By.							

Instrument Type			Sec	tion I - Collec	ction Data			
Occupational (DAC)	Date:	9/8/2017	Sample ID:	20170	830-075	RV	VP: 2017-001	
Non-Occupational (EC):	Occupational (DAC):	Limit:			μCi/ml (I)	_		Work Area:
NA		<u>.</u>	6.00E-14	4 COE 1/u/Ci/ml	_	,		
Monitored Workers: NA				•	J	•		
Monitored Workers	Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Lapel Pump Model: IA/ Serial No. Serial No. 3667 Calibration Due Dute: NA N/A NA N/A N	Wearer:		NA		Ac	tivity Performed:	N.	Α
Lapel Pump Model: IA/ Serial No. Serial No. 3667 Calibration Due Dute: NA N/A NA N/A N	Monitored Workers:	·			NA			
Sample Information Infor		NA		Serial No.		JA	Calibration Due Date:	NA
Sample Information Surf Stop	-		-				•	
Start	Air Pump Modei:	LV-1		Serial No.	30	167	Calibration Due Date:	3///2018
September Sep	Sample Information		Time			∬ Į	Flow	Rate (lpm)
Standard 1,30	Collection Date	Start	Stop	Total (minutes)]	Start	Stop
Name		1				┧	65.0	65.0
Minimum Air Sample Volume: 1.0E+04 Liters	8/30/2017	7:30				┧		
Sample Volume: 65		<u> </u>	Total Time (Tc):	9	60]	Avg. Flow Rate (lpm)	65.0
Section II - Analysis Data Serial Number Calibration Due Date				Minimum Air	r Sample Volume:	1.0E+04	Liters	
Section II - Analysis Data Serial Number Calibration Due Date	Sample Volume:	65	(lnm)	x	960	(minutes) =	6.2E+04	Liters (A)
Section II - Analysis Data						(IIIIIIiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	UIBE . U .	Liters (11)
Instrument Information	Remarks: Mii	nimum sampie vo	olumes identified are necessary to acm	ieve 10% of DAC	or AE value.			
Instrument Information			Sec	ction II - Ana	lysis Data			
L-2929	Instrument Information					Calibrat	tion Due Date	
L-2929	Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)
Variables, Calculations, Results			158817	164	4736	12/13/2018	12/13/2018	0.344
Variables, Calculations, Results	N/A		N/A	N	J/A	N/A	N/A	N/A
Sount Date							Alpha	
Count Time (e.g., noon, 1300, etc.)		bles, Calculation	ıs, Results	Units			2nd Count	3rd Count
Sample Count Time (Ts, Tb) = T	Count Date							
Counts				ļ			 	_
Sample Count Rate cpm 0.20		<u> </u>					 	
Control Rate							 	
Net volume (liters) (A)	*							_
Counter tate (B) cpm 0.10			(A)				6.2F±04	6.2F±04
Counter Efficiency (C) cpm/dpm 0.34 0.34 0.34 Collection Efficiency (D) 0.99 0.99 0.99 0.99 0.99 Efficiency = (C) x (D) (E) cpm/dpm 0.34 0.34 0.34 Activity (dpm) = (B)/(E) (F) dpm 0.29 0.99 0.99 Minimum Detectable Activity (dpm) = (3+4.65*SQRT(Cb))/(E*T) (G) dpm 0.70 0.70 Concentration = (F)/(2.22E9 x (A)) (H) μCi/ml 2.12E-15 0.70 Sackground "Strip" value (F.1) Date Updated 4/20-4/21 uCi/ml 7.31E-18 0.70 VET Concentration Value = (H) - (F1); (F2) uCi/ml 2.11E-15 0.70	· · · · ·				1		0.2ET0 1	U.ZETU T
Objection Efficiency (D)				•			0.34	0.34
Continue C() x (D) (E) cpm/dpm 0.34 0.	Collection Efficiency							
Activity (dpm) = (B)/(E)	Efficiency = (C) x (D)							
Concentration = (F)/(2.22E9 x (A)) (H)	Activity (dpm) = (B)/(E)				1	0.29	ĺ	
Sackground "Strip" value (F.1) Date Updated 4/20-4/21 uCi/ml 7.31E-18 NET Concentration Value = (H) - (F1); (F2) uCi/ml 2.11E-15 DAC (or AE) Fraction = (F2)/(I) 3.52% MDC = MDA/V = (G)/(A) (J) µCi/ml 5.03E-15 MDC Fraction of DAC (or AE) = (J)/(I) (Goal<10%) No Yes Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification. Performed By: Date:	Minimum Detectable Activity (dr	pm) = (3+4.65*S)	QRT(Cb))/(E*T) (G)	dpm		0.70		
VET Concentration Value = (H) - (F1); (F2)	Concentration = (F)/(2.22E9 x (A	A)) (H)		μCi/ml	2.1	2E-15		
DAC (or AE) Fraction = (F2)/(I) 3.52%	Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
MDC = MDA/V = (G)/(A) (J) μCi/ml 5.03E-15 MDC Fraction of DAC (or AE) = (J)/(I) (Goal<10%) 8.39% Final Count? Yes/No No Yes Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification. Performed By:	NET Concentration Value = (H)	- (F1); (F	2)	uCi/ml	2.1	1E-15		
MDC Fraction of DAC (or AE) = (J)/(J) (Goal<10%) Final Count? Yes/No No Yes Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification. Performed By: Date:	DAC (or AE) Fraction = (F2)/(I)				3.	52%		
Performed By: Yes/No No Yes	MDC = MDA/V = (G)/(A)			μCi/ml			<u> </u>	
Note: Unexpected DAC or AE fraction > 100% requires immediate RSO notification. Performed By: Date:		: (J)/(I) (Goal<	:10%)	<u> </u>				
Performed By: Date:	Final Count?							
			Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
	Paufaumand Day						Dotor	
Reviewed By: Date:	Performed by:						Date:	
	Reviewed By:						Date:	

		Sec	ction I - Collec	ction Data				
Date:	9/8/2017	Sample ID:	201708	830-076	RV	VP: 2017-001		
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓	
Non-Occupational (EC):	,	2.00E-11 [DAC = 2.0E-11μCi/ml (U-238), EC	C= 6 0E 14uCi/ml	<u>-</u> 1				
		•		-	'-	DU (Deplet		
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	ntangelo	
Wearer:		NA		Act	tivity Performed:	N.	A	
Monitored Workers:	_		_	NA				
Lapel Pump Model:	NA		Serial No.		A	Calibration Due Date:	NA	
						•		
Air Pump Model:	LV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018	
Sample Information		Time				Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	minutes)	[Start	Stop	
8/25/2017	7:30	15:30	4	80		65.0	65.0	
8/30/2017	7:30	15:30	1	80		65	65	
	<u> </u>	Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0	
			Minimum Air	Sample Volume:	3.1E+01	Liters		
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)	
		-		-	(IIIIIuco)	U.EL. U.	Liters (11)	
Kemarks: MI	nimum sampie vo	olumes identified are necessary to ach	ieve 10% of DAC	or AE value.				
		Sec	ction II - Anal	lysis Data				
Instrument Information		Serial Number		1	Calibrat	tion Due Date		
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)	
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344	
N/A		N/A	N	I/A	N/A	N/A	N/A	
		· · · · · · · · · · · · · · · · · · ·				Alpha		
Varia	ables, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count	
Count Date			<u> </u>	1	3/2017			
Count Time (e.g., noon, 1300, et			<u> </u>	 	3:15			
Sample Count Time (Ts, Tb) = T	<u> </u>		minutes		60			
Total Counts			counts	1	24			
Sample Count Rate			cpm	 	0.40			
Air Volume (litere)		'A\	cpm	 	0.10	6.2E+04	6 2E I 04	
Air Volume (liters) Net count rate		A) B)	liters	1	2E+04 0.30	6.2E+04	6.2E+04	
Counter Efficiency	(C)		cpm/dpm	1	0.34	0.34	0.34	
Collection Efficiency	(D)		0.99	1).99	0.99	0.99	
Efficiency = (C) x (D)	(E)		cpm/dpm	†).34	0.34	0.34	
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm).88			
	pm) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm		0.70			
Concentration = $(\mathbf{F})/(2.22E9 \text{ x } (A)$	Minimum Detectable Activity (dpm) = $(3+4.65*SQRT(Cb))/(E*T)$ (G)			0.70 6.36E-15				
Background "Strip" value (F.1)	A)) (H)		μCi/ml	0.50				
		4/20-4/21	μCi/ml uCi/ml	1	1E-18			
NET Concentration Value = (H)	Date Updated		1	7.3				
NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I)	Date Updated) - (F1); (F2		uCi/ml	7.3 6.3 5	1E-18			
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$	Date Updated) - (F1); (F2) (J)	2)	uCi/ml	7.3 6.35 0.0 5.03	1E-18 5E-15 03% 3E-15			
DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	Date Updated) - (F1); (F2) (J)	2)	uCi/ml uCi/ml µCi/ml	7.3 6.35 0.0 5.03	1E-18 5E-15 03% 3E-15 03%			
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$	Date Updated) - (F1); (F2) (J)	2)	uCi/ml uCi/ml	7.3 6.35 0.0 5.03	1E-18 5E-15 03% 3E-15			
DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	Date Updated) - (F1); (F2) (J)	2)	uCi/ml uCi/ml μCi/ml Υes/No	7.3 6.35 0.0 5.03	1E-18 5E-15 03% 3E-15 03% Yes	n.		
DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	Date Updated) - (F1); (F2) (J) = (J)/(I) (Goal<	(10%)	uCi/ml uCi/ml μCi/ml Υes/No	7.3 6.35 0.0 5.03	1E-18 5E-15 03% 3E-15 03% Yes	n. Date:		

		Sec	tion I - Collec	tion Data			
Date:	9/8/2017	Sample ID:	201709	01-077	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):		DAC = 2.0E-11μCi/ml (U-238), EC	6 OF 14 G		_	_ `	
			= 6.0E-14µCi/mi		_	DU (Deplet	led Uranium)
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	67	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
8/31/2017	7:30	15:00	4.	50		65.0	65.0
9/1/2017	7:30	15:00	4.	50		65	65
		Total Time (Tc):	9	00	_	Avg. Flow Rate (lpm)	65.0
	•		Minimum Air	Sample Volume:	1.0E+04 I	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
					(illilities) = _	3.5ET04	Liters (A)
Remarks: Mi	inimum sample vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibratio	on Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				9/8	/2017		
Count Time (e.g., noon, 1300, et	c.)			9	9:30		
Sample Count Time $(Ts, Tb) = T$			minutes		60		
Total Counts			counts		8		
Sample Count Rate			cpm		0.13		
Background Count Rate			cpm		0.10		
Air Volume (liters)		A)	liters		E+04	5.9E+04	5.9E+04
Net count rate		3)	cpm		0.03		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D)	0.99		0.99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	(F) nm) = (3±4.65*\$6	DPT(Ch))/(F*T) (C)	dpm dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$		(K1(C0))/(E-1) (G)	μCi/ml		4E-16		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)	1		uCi/ml		6E-16		
DAC (or AE) Fraction = (F2)/(I)		,			24%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		7E-15		
MDC Fraction of DAC (or AE) =		10%)	j		95%		
Final Count?	*		Yes/No		No	Yes	
		Note: Unexpected DAC or AE					•
		-					
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	rtion Data			
Date:	9/8/2017	Sample ID:		901-078	RW	/P: 2017-001	
Occupational (DAC):		_		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11		•			
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μCi/ml]	Radionuclides:	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Sant	angelo
Wearer:		NA			tivity Performed:		A
Monitored Workers:				NA			
_			Serial No.		Α.	Colibration Due Date	NI A
Lapel Pump Model:				N	A	Calibration Due Date:	
Air Pump Model:	LV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	Ι	Start	Stop
8/31/2017	7:30	15:30	4	80		65.0	65.0
9/1/2017	7:30	15:30	4	80		65	65
		Total Time (Tc):	9	60	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =		Liters (A)
		-		-	(minutes) –	0.215+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	lysis Data			
Instrument Information		Serial Number		-	Calibrati	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					3/2017		
Count Time (e.g., noon, 1300, et					0:30		
Sample Count Time $(Ts, Tb) = T$	7		minutes		60		
Total Counts			counts		9		
Sample Count Rate			cpm		0.15		
Background Count Rate		A.	cpm		0.10	6 2E : 04	6 2E - 04
Air Volume (liters)		A) B)	liters		2E+04 0.05	6.2E+04	6.2E+04
Net count rate Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.15		
Minimum Detectable Activity (d	pm) = (3+4.65*Se	QRT(Cb))/(E*T) (G)	dpm	(0.70		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	1.0	6E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F	2)	uCi/ml	1.0	5E-15		
DAC (or AE) Fraction = (F2)/(I))			0.	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	5.0	3E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		0.	03%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	9/13/2017	Sample ID:		906-079	RW	/P: 2017-001	
Occupational (DAC):	Limit:	_		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
	<u>-</u>	2.00E-11		-			
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μCı/ml		_	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Sant	angelo
Wearer:		NA			tivity Performed:	N	A
Monitored Workers:				NA			<u>.</u>
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:			Serial No.	36	64	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)		Start	Stop
9/5/2017	7:30	15:30	-	80	Ī	65.0	65.0
9/6/2017	7:30	15:30		80	ļ	65	65
		Total Time (Tc):	9	60	Ī	Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-1	7.05.01	I 14	
			Minimum Aii	Sample Volume:	7.0E+01	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		G	.4 IT A	l			
T T	1		ction II - Ana	iysis Data	G 17	. D. D.	
Instrument Information		Serial Number	D.4			ion Due Date	DEC -: (m)
Instrument Type		Meter		ector	Meter	Detector 12/13/2018	Efficiency (α)
L-2929		158817 N/A		1736 I/A	12/13/2018		0.344 N/A
N/A		N/A	N	I/A	N/A	N/A Alpha	N/A
Varia	bles, Calculation	e Daeulte	Units	1et	Count	2nd Count	3rd Count
Count Date	ibies, Calculation	s, Results	Cints		3/2017	2na Count	Stu Count
Count Time (e.g., noon, 1300, et	rc)				00 AM		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		19		
Sample Count Rate			cpm		0.32		
Background Count Rate			cpm).66		
Air Volume (liters)	(A)	liters		E+04	6.2E+04	6.2E+04
Net count rate		B)	cpm		0.34		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99	().99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm	().34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	-	1.01		
Minimum Detectable Activity (d	pm) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm	1	1.56		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	-7.2	8E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2	2)	uCi/ml	-7.2	8E-15		
DAC (or AE) Fraction = (F2)/(I))			-0.	04%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	1.13	3E-14		
MDC Fraction of DAC (or AE) =		10%)			06%		
Final Count?			Yes/No	,	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	9/15/2017	Sample ID:	201709	908-080	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓
	<u>-</u>	2.00E-11	6 OF 14 C'/ 1	-	-		
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μC1/ml		_	DU (Deplet	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	ea		Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			<u>.</u>
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:			Serial No.		64	Calibration Due Date:	
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	† 	Start	Stop
9/7/2017	7:30	15:30		80		65.0	65.0
9/8/2017	7:30	15:30		80		65	65
	'	Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-1	2.1E.01	f ia	
				Sample Volume:		Liters	
Sample Volume:	65	(lpm)	X	960	(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Soo	tion II Anol	lucia Data			
T T	I		tion II - Anal	iysis Data	G 17 .:	D D :	
Instrument Information		Serial Number	D-4			on Due Date	DCC -: (m)
Instrument Type L-2929		Meter 158817		ector 1736	Meter 12/13/2018	Detector 12/13/2018	Efficiency (α) 0.344
N/A		N/A		I/A	N/A	N/A	N/A
IV/A		IV/A	10	I	IV/A	Alpha	IV/A
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	ioles, culculation	5, 110,0110	· · · · ·		5/2017	Ziid Codiii	Dru Count
Count Time (e.g., noon, 1300, et	c.)				9:40		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		16		
Sample Count Rate			cpm	().27		
Background Count Rate			cpm	(0.10		
Air Volume (liters)	(.	A)	liters	6.2	2E+04	6.2E+04	6.2E+04
Net count rate	(I	3)	cpm	(0.17		
Counter Efficiency	(C)	ı	cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D))	0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm).49		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = $(F)/(2.22E9 \times (A))$			μCi/ml		3E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)		2)	uCi/ml		3E-15		
DAC (or AE) Fraction = $(F2)/(I)$					02%		
MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(J) = (J)/(I) (Goal<	1004)	μCi/ml		3E-15 03%		
` ′	- (J)/(L) (Goal<	1070)	Vac At-				
Final Count?		Note: Unernated DAC 4E	Yes/No		Yes		
		Note: Unexpected DAC or AE	rracuon > 100%	requires immedi	iate KSO notification	ı.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	9/15/2017	Sample ID:		908-081	RW	P: 2017-001	
Occupational (DAC):		_		μCi/ml (I)	Breathing Zone:		── Work Area: ✓
	<u>-</u>	2.00E-11					
Non-Occupational (EC):	l	$[DAC = 2.0E-11\mu Ci/ml (U-238), EC]$	= 6.0E-14μC1/ml		_	DU (Deplet	ed Uranium)
Location:		FS12 Amec Soil Sort Ar	ea		Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:			Serial No.			Calibration Due Date:	
All Fullip Model.	LV-1		Serial No.		64	Cantilation Due Date.	3/10/2018
Sample Information		Time			ļ <u>L</u>	Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	<u> </u>	Start	Stop
9/7/2017	7:30	15:30	4	80		65.0	65.0
9/8/2017	7:30	15:30		80	_	65	65
		Total Time (Tc):	9	60	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
		olumes identified are necessary to ach		-			
Remarks: Wi	inimum sampie vo	numes identified are necessary to ach	leve 10% of DAC	of AE value.			
		Sec	tion II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date					5/2017		
Count Time (e.g., noon, 1300, et					0:45		
Sample Count Time $(Ts, Tb) = T$	7		minutes		60		
Total Counts			counts		18		
Sample Count Rate			cpm		0.30		
Background Count Rate			cpm		0.10		
Air Volume (liters)		A)	liters		2E+04	6.2E+04	6.2E+04
Net count rate		3)	cpm		0.20		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)	DECEMBER (C)	dpm		0.59		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \times (E_1))$		100.101	μCi/ml		4E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)		2)	uCi/ml		3E-15		
DAC (or AE) Fraction = $(F2)/(I)$					02%		
MDC = MDA/V = (G)/(A) $MDC = MDA/V = (G)/(A)$	(J)	100()	μCi/ml		3E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)	V 07		03%		
Final Count?		Mater Harris (1D10 - 17	Yes/No		Yes	_	
		Note: Unexpected DAC or AE	iraction > 100%	requires immedi	ate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	9/22/2017	Sample ID:	201709	912-082	RW	P: 2017-001	
Occupational (DAC):	Limit:	COOF 14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	_	6.00E-14 [DAC = 2.0E-11μCi/ml (U-238), EC:	COE 1/uCi/ml	<u>.</u>			
		•		-	Radionuclides: DU (Depleted Uranium)		
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA		Act	tivity Performed:	N.	Α
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	minutes)	[Start	Stop
9/11/2017	7:30	15:00	4:	50	<u> </u>	65.0	65.0
9/12/2017	7:30	15:00	4:	50	<u> </u>	65	65
		Total Time (Tc):	91	00	l <u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	1.1E+04	Liters	
Sample Volume:	65	(lpm)	x	•	(minutes) =		Liters (A)
		-			(iiiiiates)	302104	Liters (FL)
Kemarks: wiii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	//A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date			ļ		2/2017		
Count Time (e.g., noon, 1300, etc			ļ		9:30		
Sample Count Time $(Ts, Tb) = T$			minutes		60		
Total Counts			counts		11		
Sample Count Rate			cpm		0.18		
Background Count Rate			cpm		0.12		
Air Volume (liters)		A)	liters		E+04	5.9E+04	5.9E+04
Net count rate		B)	cpm		0.06		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = (B)/(E)	(F)	COMPANY (A)	dpm		0.19		
Minimum Detectable Activity (dp	• • • • • • • • • • • • • • • • • • • •	QRT(Cb))/(E*T) (G)	dpm).75		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$		120 101	μCi/ml		3E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)	- (F1); (F2	2)	uCi/ml		2E-15		
DAC (or AE) Fraction = $(F2)/(I)$			ļ		37%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		7E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)		1	62%		
Final Count?			Yes/No	L	No	Yes	
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data				
Date:	9/22/2017	Sample ID:	201709	912-083	RV	VP: 2017-001		
Occupational (DAC):	Limit:			μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓	
Non-Occupational (EC):		2.00E-11 [DAC = 2.0E-11μCi/ml (U-238), EC	- 4 0E 14uCi/ml	-		_		
		•	,	-	-	DU (Deplet		
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	ntangelo	
Wearer:		NA		Ac	tivity Performed:	N.	Α	
Monitored Workers:	_		_	NA		_		
Lapel Pump Model:	NA		Serial No.		IA.	Calibration Due Date:	NA	
						•		
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/16/2018	
Sample Information		Time			<u>, </u>	Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (1	minutes)	[Start	Stop	
9/11/2017	7:30	15:30		80]	65.0	65.0	
9/12/2017	7:30	15:30		80		65	65	
		Total Time (Tc):	9	960	<u>l</u>	Avg. Flow Rate (lpm)	65.0	
			Minimum Air	r Sample Volume:	3.4E+01	Liters		
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)	
		-		-	(IIIIIIIII)	VIII	Liters (12)	
Kemarks: wiii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% oi dac	or AE value.				
		Sec	ction II - Anal	lysis Data				
Instrument Information		Serial Number			Calibrat	tion Due Date		
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)	
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344	
N/A		N/A	N	I/A	N/A	N/A	N/A	
			1			Alpha		
	bles, Calculation	s, Results	Units		Count	2nd Count	3rd Count	
Count Date					2/2017	 		
Count Time (e.g., noon, 1300, etc			<u> </u>		0:45	 		
Sample Count Time (Ts, Tb) = T			minutes		60	 		
Total Counts			counts	†	16 0.27			
Sample Count Rate Background Count Rate			cpm		0.12			
Air Volume (liters)		(A)	liters		0.12 2E+04	6.2E+04	6.2E+04	
Net count rate		B)	cpm	1	0.15	0.22104	0.22104	
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34	
Collection Efficiency	(D		0.99		0.99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34	
Activity (dpm) = (B)/(E)	(F)		dpm	(0.43			
Minimum Detectable Activity (dp	(2m) = (3+4.65*S6)	QRT(Cb))/(E*T) (G)	dpm	(0.75			
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$	A)) (H)		μCi/ml	3.1	1E-15	ļ		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		31E-18			
NET Concentration Value = (H)	- (F1); (F2	2)	uCi/ml		0E-15			
DAC (or AE) Fraction = $(F2)/(I)$			ļ		02%	<u> </u>		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		1E-15	 	_	
MDC Fraction of DAC (or AE) =	(J)/(I) (Goal<	.10%)			03%			
Final Count?			Yes/No		Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	n.		
Performed By:						Date:		
Reviewed By:						Date:		

		Sec	tion I - Collec	ction Data			
Date:	9/22/2017	Sample ID:	201709	914-084	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	<u>-</u>	DAC = 2.0E-11μCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>-</u> 1			
		•		-	-	DU (Deplet	
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
Wearer:		NA			tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)	' <u>'</u>	Start	Stop
9/13/2017	7:30	15:30		80		65.0	65.0
9/14/2017	7:30	15:30	4	80		65	65
		Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0
			Minimum Air	C1- W-h	1.15.04		
			Minimum Air	Sample Volume:		Liters	
Sample Volume:	65	(lpm)	X	960	(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	inimum sample vo	lumes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Soc	tion II - Anal	lveic Data			
Instrument Information	1	Serial Number	tion II - Ana	lysis Data	Colibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A		I/A	N/A	N/A	N/A
1071		17/11	1.		17/11	Alpha	1071
Varia	bles, Calculation	s. Results	Units	1st	Count	2nd Count	3rd Count
Count Date	*				2/2017		
Count Time (e.g., noon, 1300, et	c.)				1:30		
Sample Count Time (Ts, Tb) = T	?		minutes		60		
Total Counts			counts		9		
Sample Count Rate			cpm	().15		
Background Count Rate			cpm	(0.12		
Air Volume (liters)	(A)	liters	6.2	E+04	6.2E+04	6.2E+04
Net count rate	(1	3)	cpm	(0.03		
Counter Efficiency	(C)	l .	cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	().34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	(0.09		
Minimum Detectable Activity (d	pm) = (3+4.65*S0)	QRT(Cb))/(E*T) (G)	dpm).75		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$	A)) (H)		μCi/ml	6.3	6E-16		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value $= (\mathbf{H})$) - (F1); (F2	2)	uCi/ml	6.2	9E-16		
DAC (or AE) Fraction = (F2)/(I)	1			1.	05%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		1E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	10%)			02%		
Final Count?			Yes/No		No	Yes	
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	ate RSO notification	1.	
Performed By:						Date:	
Reviewed By:						Date:	
J.							

		Sec	ction I - Collec	ction Data				
Date:	9/25/2017	Sample ID:	20170	914-085	RV	VP: 2017-001		
Occupational (DAC):	Limit:	•		μCi/ml (I)	Breathing Zone:	General Area:	Work Area: ✓	
Non-Occupational (EC):		2.00E-11 [DAC = 2.0E-11μCi/ml (U-238), EC:	2- 6 0F 14uCi/ml	<u>-</u>		_		
				-	'-	DU (Deple		
Location:		FS12 Amec Soil Sort Are	rea		Sampled By:	R Sant	Santangelo	
Wearer:		NA		Ac	tivity Performed:	N.	Α	
Monitored Workers:	_		_	NA				
Lapel Pump Model:	NA		Serial No.		IA.	Calibration Due Date:	NA	
						•		
Air Pump Model:	LV-1		Serial No.		564	Calibration Due Date:	3/7/2018	
Sample Information		Time			<u>J</u>	Flow	Rate (lpm)	
Collection Date	Start	Stop	Total (r	minutes)		Start	Stop	
9/13/2017	7:30	15:30		180	1	65.0	65.0	
9/14/2017	7:30	15:30	1	180	-	65	65	
		Total Time (Tc):	9	960	1 1	Avg. Flow Rate (lpm)	65.0	
			Minimum Air	r Sample Volume:	3.4E+01	Liters		
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)	
					_(Zitero (12)	
Kemarks: wiii	nimum sampie vo	olumes identified are necessary to achi	ieve 10% of DAC	or AE value.				
		Sec	ction II - Anal	lysis Data				
Instrument Information		Serial Number			Calibrat	tion Due Date		
Instrument Type		Meter	Det	tector	Meter	Detector	Efficiency (a)	
L-2929		158817	164	4736	12/13/2018	12/13/2018	0.344	
N/A		N/A	N	I/A	N/A	N/A	N/A	
				<u> </u>		Alpha	1	
	bles, Calculation	is, Results	Units		Count	2nd Count	3rd Count	
Count Date			├		25/2017			
Count Time (e.g., noon, 1300, etc					10:45			
Sample Count Time (Ts, Tb) = T			minutes		60			
Total Counts			counts		18 0.30			
Sample Count Rate Background Count Rate			cpm		0.12			
Air Volume (liters)		(A)	cpm		2E+04	6.2E+04	6.2E+04	
Net count rate		B)	cpm		0.18	0.2L+0+	0.2E+04	
Counter Efficiency	(C)		cpm/dpm	1	0.34	0.34	0.34	
Collection Efficiency	(D		0.99	1	0.99	0.99	0.99	
Efficiency = $(C) \times (D)$	(E)	,	cpm/dpm	(0.34	0.34	0.34	
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.53			
Minimum Detectable Activity (dp	pm) = (3+4.65*S0	QRT(Cb))/(E*T) (G)	dpm	(0.75			
Concentration = $(\mathbf{F})/(2.22E9 \times (\mathbf{A}))$	A)) (H)		μCi/ml	3.8	2E-15			
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18			
NET Concentration Value = (H)	- (F1); (F2	2)	uCi/ml	3.8	31E-15			
DAC (or AE) Fraction = (F2)/(I)				0.0	.02%			
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		1E-15			
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<	.10%)			.03%			
Final Count?			Yes/No		Yes			
		Note: Unexpected DAC or AE	fraction > 100%	requires immedi	iate RSO notificatio	n.		
Performed By:						Date:		
Reviewed By:						Date:		

		g ,		. D.			
			ion I - Collec				
Date:	10/2/2017	Sample ID:	201709			VP: 2017-001	_
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:[General Area:	✓ Work Area:
Non-Occupational (EC):	[D	AC = 2.0E-11µCi/ml (U-238), EC=	= 6.0E-14µCi/ml]	Radionuclides:	DU (Deplet	ted Uranium)
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
		NA		Acı	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	יי ר	Start	Stop
9/25/2017	7:30	15:00	1	50	}	65.0	65.0
9/27/2017	7:30	15:00		50	1	65	65
7/2//2017	7.50	Total Time (Tc):		00	}	Avg. Flow Rate (lpm)	65.0
		Total Time (Te).			L	Trig. Tion Take (ipin)	05.0
			Minimum Air	Sample Volume:	1.1E+04	Liters	
Sample Volume:	65 (lp:	m)	x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	inimum sample volui	mes identified are necessary to achi	eve 10% of DAC	or AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number				ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
 .					~ · I	Alpha	1
	bles, Calculations,	Results	Units		Count	2nd Count	3rd Count
Count Date					2/2017		
Count Time (e.g., noon, 1300, et			minutas		1:30		
Sample Count Time (Ts, Tb) = T	Į.		minutes		8		
Total Counts			counts				
Sample Count Rate			cpm		0.08		
Background Count Rate	(4)		cpm		0.12 0E+04	5 OE : 04	5.9E+04
Air Volume (liters)	(A)		liters		0.04	5.9E+04	3.9E+04
Net count rate Counter Efficiency	(B) (C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D)		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm		0.12	0.34	0.34
Minimum Detectable Activity (d		PT(Ch))/(F*T) (G)	dpm).75		
Concentration = $(\mathbf{F})/(2.22E9 \times (A))$	• • • • • • • • • • • • • • • • • • • •	((C0))/(L 1) (G)	μCi/ml		4E-16		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (\mathbf{H})	•	,,20 ,,21	uCi/ml		2E-16		
			uci/iiii		52%		
DAC (or AE) Fraction = $(F2)/(I)$ MDC = MDA/V = $(G)/(A)$	(J)		μCi/ml		7E-15		
MDC Fraction of DAC (or AE) =		%)	μCI/IIII		62%		
Final Count?	= (3)/(1) (Goal<10	70)	Yes/No		No	Yes	
rinai Count:		Note: Unexpected DAC or AE					
		Note: Unexpected DAC or AE	14CHOH > 100%	requires immed	IAW NOO HUUHICAHO	ш.	
Performed By:						Date	
1 cironica by.							
Reviewed By:						Date:	
2							

		Sec	tion I - Colle	ction Data			
Date:	10/2/2017	Sample ID:	20170	927-087	RW	VP: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		$2.00E-11$ [DAC = $2.0E-11\mu$ Ci/ml (U-238), EC	- 6 0F 14: Ci/ml		,		
• • • • •			·	J	•	DU (Deple	ted (Fanium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Sant	angelo
Wearer:		NA		Ac	tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	ſA	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/7/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)] [Start	Stop
9/25/2017	7:30	15:30	4	80		65.0	65.0
9/27/2017	7:30	15:30	4	80		65	65
		Total Time (Tc):	9	60]	Avg. Flow Rate (lpm)	65.0
	•		Minimum Air	Sample Volume:	2.9E+01	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
		-			(minutes) –	0.22104	Elicis (H)
Remarks: M1	inimum sample v	olumes identified are necessary to ach	nieve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	Ī/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				10/	2/2017		
Count Time (e.g., noon, 1300, et	tc.)				9:45		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		17		
Sample Count Rate			cpm		0.28		
Background Count Rate			cpm		0.08		
Air Volume (liters)	(.	A)	liters	6.3	2E+04	6.2E+04	6.2E+04
Net count rate	(I	3)	cpm		0.20		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99		0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.60		
Minimum Detectable Activity (d	• • • • • • • • • • • • • • • • • • • •	QRT(Cb))/(E*T) (G)	dpm		0.64		
Concentration = $(\mathbf{F})/(2.22E9 \times (2.22E9 \times ($		100 101	μCi/ml		1E-15		
Background "Strip" value (F.1)			uCi/ml		SIE-18		
NET Concentration Value = (\mathbf{H}_{1})		2)	uCi/ml		0E-15		
DAC (or AE) Fraction = $(F2)/(I)$					02%		
MDC = MDA/V = (G)/(A)	(J)	1000	μCi/ml		1E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal-	<10%)			02%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	on.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Colle	ction Data			
Date:	10/12/2017	Sample ID:	20170	929-088	RW	VP: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11		-	,	_	
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/ml	J	Radionuclides:	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	ÍA	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)] [Start	Stop
9/28/2017	7:30	15:30	4	80		65.0	65.0
9/29/2017	7:30	15:30	4	80		65	65
		Total Time (Tc):	9	60] [Avg. Flow Rate (lpm)	65.0
	•		Minimum Air	Sample Volume:	2.6E+01	Liters	
Sample Volume:	65	(lpm)	x	960	(minutes) =	6.2E+04	Liters (A)
		-			(minutes) –	0.22.104	Elicis (H)
Remarks: Mi	inimum sample v	olumes identified are necessary to ach	nieve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				10/1	12/2017		
Count Time (e.g., noon, 1300, et	tc.)				9:45		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		14		
Sample Count Rate			cpm	(0.23		
Background Count Rate			cpm	(0.06		
Air Volume (liters)	(.	A)	liters	6.2	2E+04	6.2E+04	6.2E+04
Net count rate	(I	3)	cpm	(0.17		
Counter Efficiency	(C)		cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	(0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm		0.51		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.57		
Concentration = $(\mathbf{F})/(2.22E9 \times ($			μCi/ml		7E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		31E-18		
NET Concentration Value = (H		2)	uCi/ml		7E-15		
DAC (or AE) Fraction = $(F2)/(I)$					02%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		3E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal-	<10%)			02%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sect	tion I - Collec	tion Data			
Date:	10/12/2017	Sample ID:	201709	29-089	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC): ✓	[DA	AC = 2.0E-11µCi/ml (U-238), EC:	= 6.0F-14uCi/ml	I	Radionuclides:	DU (Deplet	— — — ted Uranium)
		•	•		_		
Location:					<u> </u>	R Santa	
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	IA	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	Í [Start	Stop
9/28/2017	7:30	15:30	4	80	[65.0	65.0
9/29/2017	7:30	15:30	4:	80	. L	65	65
		Total Time (Tc):	9	50		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	8.6E+03 I	Liters	
Sample Volume:	65 (lnn	2)	X	960	(minutes) =	6.2E+04	Liters (A)
	_				(minutes) =	0.2E+04	Liters (A)
Remarks: Mi	nimum sample volum	nes identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (α)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
					•	Alpha	
Varia	bles, Calculations, R	tesults	Units	1st	Count	2nd Count	3rd Count
Count Data				101			
Count Date				10/1	12/2017		
Count Date Count Time (e.g., noon, 1300, et	c.)				12/2017 1:30		
Count Time (e.g., noon, 1300, et			minutes	1			
Count Time (e.g., noon, 1300, et			minutes counts	1	1:30		
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T				1	1:30 60		
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate	,		counts cpm cpm	(1:30 60 5 0.08 0.06		
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters)	(A)		counts cpm cpm liters	((6.2	1:30 60 5 0.08 0.06 0.2E+04	6.2E+04	6.2E+04
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters)	(A) (B)		counts cpm cpm liters cpm	6.2	1:30 60 5 0.08 0.06 2E+04 0.02		
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency	(A) (B) (C)		counts cpm cpm liters cpm cpm/dpm	6.2	1:30 60 5 0.08 0.06 2E+04 0.02 0.34	0.34	0.34
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency	(A) (B) (C) (D)		counts cpm cpm liters cpm cpm/dpm 0.99	6.2	1:30 60 5 0.08 0.06 2E+04 0.02 0.34 0.99	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D)	(A) (B) (C) (D) (E)		counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm	6.2	1:30 60 5 0.08 0.06 2E+04 0.02 0.34 0.99	0.34	0.34
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E)	(A) (B) (C) (D) (E)	P(Ch))/(E*T) (C)	counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm	6.2	1:30 60 5 0.08 0.06 2E+04 0.02 0.34 0.99 0.34 0.06	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQR*	Γ(Cb))/(E*T) (G)	counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm	(((((((((((((((((((1:30 60 5 0.08 0.06 0.06 0.02 0.34 0.09 0.34 0.06 0.57	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRTA)) (H)		counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml	(((((((((((((((((((1:30 60 5 0.08 0.06 2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRTA)) (H) Date Updated	Γ(Cb))/(E*T) (G) 4/20-4/21	counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml uCi/ml	() () () () () () () () () () () () () (1:30 60 5 0.08 0.06 2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRTA) (H) Date Updated (-(F1); (F2)		counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml	() () () () () () () () () () () () () (1:30 60 5 0.08 0.06 2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16 3IE-18 7E-16	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQR7A)) (H) Date Updated (-(F1); (F2)		counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml	1 (((((((((((((((((((1:30 60 5 0.08 0.08 0.06 2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16 81E-18 7E-16 69%	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQR7A) (H) Date Updated (-(F1); (F2)	4/20-4/21	counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml uCi/ml	1 (((((((((((((((((((1:30 60 5 0.08 0.06 2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16 3IE-18 7E-16	0.34 0.99	0.34 0.99
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQR7A) (H) Date Updated (-(F1); (F2)	4/20-4/21	counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml	1 (((((((((((((((((((1:30 60 5 0.08 0.06 0.2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16 61E-18 7E-16 69% 3E-15 89%	0.34 0.99 0.34	0.34 0.99
Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQR7A) (H) Date Updated (-(F1); (F2)	4/20-4/21	counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml pCi/ml	1 (((((((((((((((((((1:30 60 5 0.08 0.06 0.2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16 0.1E-18 7E-16 69% 3E-15 89% No	0.34 0.99 0.34	0.34 0.99
Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRTA)) (H) Date Updated (-(F1); (F2) (J) = (J)/(I) (Goal<10%	4/20-4/21	counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml pCi/ml	1 (((((((((((((((((((1:30 60 5 0.08 0.06 0.2E+04 0.02 0.34 0.99 0.34 0.06 0.57 4E-16 0.1E-18 7E-16 69% 3E-15 89% No	0.34 0.99 0.34 Yes	0.34 0.99 0.34

		Cont	ion I. Colleg	tion Data			
Deter	10/12/2017		ion I - Collec		Dit	VD: 2017 001	
Date:	10/13/2017	Sample ID:	201710		•	VP: 2017-001	_
Occupational (DAC):		6.00E-14		μCi/ml (I)	Breathing Zone:[General Area:	✓ Work Area:
Non-Occupational (EC):	[DA	$C = 2.0E-11\mu Ci/ml$ (U-238), EC=	= 6.0E-14µCi/ml	1	Radionuclides:	DU (Deplet	ted Uranium)
Location:		FS12 SCA Boundary			Sampled By:	R Santa	angelo
				Act	ivity Performed:	N.	Α
				-			·
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)		Start	Stop
10/2/2017	7:30	15:00	4:	50		65.0	65.0
10/4/2017	7:30	15:00	4:	50		65	65
		Total Time (Tc):	90	00		Avg. Flow Rate (lpm)	65.0
	•		Minimum Air	Sample Volume:	6.7E+03	Liters	
Comple Volumer	65 (lmm	A		•			Litana (A)
	65 (lpm		X		(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample volum	es identified are necessary to achi	eve 10% of DAC	or AE value.			
		Sec	tion II - Anal	vsis Data			
Instrument Information		Serial Number			Calibrat	ion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculations, R	esults	Units	1st	Count	2nd Count	3rd Count
Count Date				10/1	3/2017		
Count Time (e.g., noon, 1300, et	c.)			1	0:30		
Sample Count Time $(Ts, Tb) = T$			minutes		60		
Total Counts			counts		16		
Sample Count Rate			cpm		0.08		
Background Count Rate	(4)		cpm		0.03	5 OF 04	5.00.04
Air Volume (liters)	(A)		liters		0E+04	5.9E+04	5.9E+04
Net count rate	(B) (C)		cpm).05).34	0.34	0.34
Counter Efficiency Collection Efficiency	(D)		cpm/dpm 0.99).99	0.99	0.34
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm).15	0.54	0.54
Minimum Detectable Activity (d		(Cb))/(E*T) (G)	dpm).45		
Concentration = $(\mathbf{F})/(2.22E9 \times (2.22E9 \times ($	• /	(// - / (- /	μCi/ml		3E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)) - (F1); (F2)		uCi/ml	1.13	2E-15		
DAC (or AE) Fraction = (F2)/(I))			1.	87%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	3.4	5E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<10%			5.	74%		
Final Count?			Yes/No		No	Yes	
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	on.	
Performed By:						Date:	
.						_	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	10/13/2017	Sample ID:	201710	004-091	RW	/P: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11		-	,	_	
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	≔ 6.0E-14μCı/ml	J	Radionuclides:	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	Ī	Start	Stop
10/2/2017	7:30	15:30	4	80	1	65.0	65.0
10/4/2017	7:30	15:30	4	80		65	65
		Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0
	I		Minimum Air	Sample Volume:	2.0E+01	Liters	
C1- V-1	65	(1)		•			T : (A)
Sample Volume:		(lpm)	X		(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	inimum sample vo	olumes identified are necessary to ach	nieve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	s, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				10/1	3/2017		
Count Time (e.g., noon, 1300, et	tc.)				9:15		
Sample Count Time (Ts, Tb) = T	Γ		minutes		60		
Total Counts			counts		8		
Sample Count Rate			cpm	(0.13		
Background Count Rate			cpm	(0.03		
Air Volume (liters)	(,	A)	liters	6.2	2E+04	6.2E+04	6.2E+04
Net count rate	(I	3)	cpm	(0.10		
Counter Efficiency	(C)	ı	cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	(0.99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.30		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	(0.45		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	2.1	9E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F	2)	uCi/ml	2.1	8E-15		
DAC (or AE) Fraction = $(F2)/(I)$)			0.	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		3E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal-	(10%)		0.	02%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE				n.	•
Performed By:						Date:	
Reviewed By:	•					Date:	

		G.	. I G II	4: D.4			
			tion I - Collec				
Date:	10/17/2017	Sample ID:				VP: 2017-001	_
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	[Da	AC = 2.0E-11μCi/ml (U-238), EC	= 6.0E-14µCi/ml]	I	Radionuclides:	DU (Deplet	ted Uranium)
Location:		FS12 SCA Boundary			'	R Santa	
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	64	Calibration Due Date:	3/16/2018
Sample Information		Time			J Į		Rate (lpm)
Collection Date	Start	Stop	Total (r	,		Start	Stop
10/5/2017	7:30	15:00		50		65.0	65.0
10/10/2017	7:30	15:00		50		65	65
		Total Time (Tc):	90	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	6.7E+03	Liters	
Sample Volume:	65 (lpr	n)	X	900	(minutes) =	5.9E+04	Liters (A)
		nes identified are necessary to ach	ieve 10% of DAC	or AE value	•		
		Sec	tion II - Anal	ysis Data			
Instrument Information		Serial Number			Calibrat	tion Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	736	12/13/2018	12/13/2018	0.344
N/A		N/A	N.	/A	N/A	N/A	N/A
					1	Alpha	1
	bles, Calculations, I	Results	Units		Count	2nd Count	3rd Count
Count Date					7/2017		
Count Time (e.g., noon, 1300, et					0:30		
Sample Count Time $(Ts, Tb) = T$			minutes		60		
Total Counts			counts		0.08		
Sample Count Rate Background Count Rate			cpm cpm		0.03		
Air Volume (liters)	(A)		liters		E+04	5.9E+04	5.9E+04
Net count rate	(B)		cpm		0.05	3.52101	3.52101
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D)		0.99).99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	().15		
Minimum Detectable Activity (d	pm) = (3+4.65* SQR	$\Gamma(Cb)/(E*T)$ (G)	dpm	().45		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	1.13	3E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F2)		uCi/ml	1.12	2E-15		
DAC (or AE) Fraction = $(F2)/(I)$)			1.5	87%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		5E-15		
MDC Fraction of DAC (or AE) =	$= (\mathbf{J})/(\mathbf{I})$ (Goal<109)	%)		5.	74%		
Final Count?			Yes/No		No	Yes	
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notification	on.	
Performed By:						Date:	
Performed By: Reviewed By:						Date:	_

		Sec	tion I - Collec	ction Data			
Date:	10/17/2017	Sample ID:	201710	010-093	RW	/P: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11	1 COE 14 C'/ 1	-	,	_	
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μC1/m1	J	Radionuciides:	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	R Santa	angelo
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	ÍΑ	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	Ī	Start	Stop
10/5/2017	7:30	15:30	4	80		65.0	65.0
10/10/2017	7:30	15:30	4	80		65	65
		Total Time (Tc):	9	60		Avg. Flow Rate (lpm)	65.0
	I		Minimum Air	Sample Volume:	2.0E+01	Liters	
Comple Volumer	65	(lam)		•			Titom (A)
Sample Volume:		(lpm)	X		(minutes) =	6.2E+04	Liters (A)
Remarks: Mi	inimum sample v	olumes identified are necessary to ach	nieve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number		-	Calibrat	ion Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				10/1	17/2017		
Count Time (e.g., noon, 1300, et	tc.)				9:15		
Sample Count Time (Ts, Tb) = T	Γ		minutes		60		
Total Counts			counts		12		
Sample Count Rate			cpm	(0.20		
Background Count Rate			cpm	(0.03		
Air Volume (liters)	(.	A)	liters	6.2	2E+04	6.2E+04	6.2E+04
Net count rate	(I	3)	cpm	(0.17		
Counter Efficiency	(C)	ı	cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	(0.99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	(0.50		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	(0.45		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	3.6	0E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	31E-18		
NET Concentration Value = (H) - (F1); (F	2)	uCi/ml	3.6	0E-15		
DAC (or AE) Fraction = (F2)/(I)			0.	02%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	3.2	3E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal-	<10%)		0.	02%	·	
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	tion Data			
Date:	10/24/2017	Sample ID:	201710	18-094	RWI	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC): ✓	IDAC	= 2.0E-11µCi/ml (U-238), EC	- 6 OF 14C:/ml		_	-	_
• , , , —	_	•	,	=	Radionuclides: DU (Dep		
Location:		FS12 SCA Boundary			Sampled By:	David	Berres
Wearer:		NA		Act	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	ÍΑ	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	T T	Start	Stop
10/17/2017	7:30	15:00	4:	50		65.0	65.0
10/18/2017	7:30	15:00	4:	50		65	65
	•	Total Time (Tc):	90	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	8.0F±03 I	iters	
				•			
Sample Volume:	65 (lpm)		X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample volumes	identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	veic Data			
Instrument Information		Serial Number	cuon ii zinai	ysis Data	Calibratio	n Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A	N		N/A	N/A	N/A
11/11		11/11	1		1771	Alpha	11/11
Varia	bles, Calculations, Res	ults	Units	1st	Count	2nd Count	3rd Count
Count Date	· · · · · · · · · · · · · · · · · · ·			10/2	24/2017		
Count Time (e.g., noon, 1300, et	c.)			ç	9:30		
Sample Count Time (Ts, Tb) = T	•		minutes		60		
Total Counts							
			counts		4		
Sample Count Rate			counts	(4 0.08		
•							
•	(A)		cpm	(0.08	5.9E+04	5.9E+04
Background Count Rate	(A) (B)		cpm cpm	5.9	0.08	5.9E+04	5.9E+04
Background Count Rate Air Volume (liters)			cpm cpm liters	5.9	0.08 0.05 PE+04	5.9E+04 0.34	5.9E+04 0.34
Background Count Rate Air Volume (liters) Net count rate	(B)		cpm cpm liters cpm	5.9	0.08 0.05 0E+04 0.03		
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency	(B) (C) (D) (E)		cpm cpm liters cpm cpm/dpm	() 5.9 () ()	0.08 0.05 9E+04 0.03 0.34 0.99 0.34	0.34	0.34
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E)	(B) (C) (D) (E) (F)		cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm	() 5.9 () ()	0.08 0.05 0E+04 0.03 0.34 0.99 0.34 0.09	0.34 0.99	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(C)	.'b))/(E*T) (G)	cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm	() 5.9 () () ()	0.08 0.05 0E+04 0.03 0.34 0.99 0.34 0.09 0.54	0.34 0.99	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(CA)) (H)		cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm µCi/ml	(5.9 (((((6.7)	0.08 0.05 0.05 0.03 0.34 0.99 0.34 0.09 0.54 8E-16	0.34 0.99	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated	Cb))/(E*T) (G) 4/20-4/21	cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml uCi/ml	5.9 ((((((6.7; 7.3	0.08 0.05 0.05 0.03 0.34 0.09 0.34 0.09 0.54 8E-16	0.34 0.99	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated		cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm µCi/ml	5.9 (((((6.7) 7.3	0.08 0.05 0E+04 0.03 0.34 0.99 0.34 0.09 0.54 8E-16 HE-18	0.34 0.99	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated () - (F1); (F2)		cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml	5.9 (((((6.7) 7.3 6.7	0.08 0.05 0E+04 0.03 0.34 0.99 0.34 0.09 0.54 8E-16 11E-18	0.34 0.99	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated () - (F1); (F2)		cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml uCi/ml	5.9 (((((6.73 7.3 6.7 1.	0.08 0.05 0.05 0.03 0.03 0.34 0.09 0.34 0.09 0.54 8E-16 0.1E-18 1E-16 12% 2E-15	0.34 0.99	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated () - (F1); (F2)		cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml	5.5 () () () () () () () () () ()	0.08 0.05 0E+04 0.03 0.34 0.09 0.54 8E-16 01E-18 1E-16 12% 2E-15 87%	0.34 0.99 0.34	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated () - (F1); (F2) (J) (J) = (J)/(I) (Goal<10%)	4/20-4/21	cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm μCi/ml uCi/ml μCi/ml	5.5 () () () () () () () () () ()	0.08 0.05 0.05 0.05 0.05 0.04 0.03 0.34 0.09 0.54 8E-16 0.1E-18 1E-16 12% 2E-15 87% No	0.34 0.99 0.34	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated () - (F1); (F2) (J) (J) = (J)/(I) (Goal<10%)		cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm μCi/ml uCi/ml μCi/ml	5.5 () () () () () () () () () ()	0.08 0.05 0.05 0.05 0.05 0.04 0.03 0.34 0.09 0.54 8E-16 0.1E-18 1E-16 12% 2E-15 87% No	0.34 0.99 0.34	0.34 0.99
Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(CA)) (H) Date Updated () - (F1); (F2) (J) = (J)/(I) (Goal<10%)	4/20-4/21	cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm μCi/ml uCi/ml μCi/ml	5.5 () () () () () () () () () ()	0.08 0.05 0.05 0.05 0.05 0.04 0.03 0.34 0.09 0.54 8E-16 0.1E-18 1E-16 12% 2E-15 87% No	0.34 0.99 0.34	0.34 0.99 0.34

		Sec	tion I - Collec	tion Data			
Date:	10/24/2017	Sample ID:	201710)18-095	RWF	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC): ✓	IDAC	= 2.0E-11µCi/ml (U-238), EC	S- 6 OF 14. Ci/ml		_		_
-		• , , , , ,		-	Radionuclides: DU (Dep		
Location:		FS12 SCA Boundary			Sampled By:	David	Berres
Wearer:		NA		Act	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	64	Calibration Due Date:	<u> </u>
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	i –	Start	Stop
10/17/2017	7:30	15:00	4:	50		65.0	65.0
10/18/2017	7:30	15:00	4:	50		65	65
	•	Total Time (Tc):	90	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	8.0F±03 I	iters	
				•			
Sample Volume:	65 (lpm)		x	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample volumes	identified are necessary to ach	ieve 10% of DAC	or AE value.			
		Sec	ction II - Anal	vsis Data			
Instrument Information		Serial Number	<u> </u>	ysis Data	Calibratio	n Due Date	
Instrument Type		Meter	Dete	ector	Meter	Detector	Efficiency (a)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N/		N/A	N/A	N/A
11/11		1771	1		1111	Alpha	11/11
Varia	bles, Calculations, Res	alts	Units	1st	Count	2nd Count	3rd Count
Count Date	· ·			10/2	24/2017		
Count Time (e.g., noon, 1300, et	c.)			ç	9:30		
Sample Count Time (Ts, Tb) = T	•		minutes		60		
Total Counts			counts		6		
Sample Count Rate							
Background Count Rate			cpm	(0.08		
Background Count Rate			cpm cpm		0.08		
Air Volume (liters)	(A)			(5.9E+04	5.9E+04
	(A) (B)		cpm	5.9	0.05	5.9E+04	5.9E+04
Air Volume (liters)			cpm liters	5.9	0.05 PE+04	5.9E+04 0.34	5.9E+04 0.34
Air Volume (liters) Net count rate	(B)		cpm liters cpm	5.9	0.05 DE+04 0.03		
Air Volume (liters) Net count rate Counter Efficiency	(B) (C) (D) (E)		cpm liters cpm cpm/dpm	()	0.05 DE+04 0.03 0.34 0.99 0.34	0.34	0.34
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E)	(B) (C) (D) (E) (F)		cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm	()	0.05 DE+04 0.03 0.34 0.99 0.34 0.09	0.34 0.99	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(C)	b))/(E*T) (G)	cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm	() 5.9 () () ()	0.05 DE+04 0.03 0.34 0.99 0.34 0.09 0.54	0.34 0.99	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (£)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H)		cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml	(5.9 ((((((6.7)	0.05 DE+04 0.03 0.34 0.99 0.34 0.09 0.54 8E-16	0.34 0.99	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(CA)) (H) Date Updated	Cb))/(E*T) (G) 4/20-4/21	cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml uCi/ml	5.9 (((((((6.7;	0.05 DE+04 D.03 D.34 D.99 D.34 D.09 D.54 BE-16 DE+18	0.34 0.99	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated (-(F1); (F2)		cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml	5.9 ((((((6.7) 7.3	0.05 DE+04 0.03 0.34 0.99 0.34 0.09 0.54 8E-16 ElE-18	0.34 0.99	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated (-(F1); (F2)		cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml	5.9 (((((6.7) 7.3 6.7	0.05 DE+04 D.03 D.34 D.99 D.34 D.09 D.54 BE-16 DE-18 DE-16 DE-16 DE-16 DE-16	0.34 0.99	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated (-(F1); (F2)		cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm pCi/ml uCi/ml	5.9 (((((6.73 7.33 6.7 1.	0.05 0.05 0.03 0.34 0.09 0.34 0.09 0.54 8E-16 1E-18 1E-16 12% 2E-15	0.34 0.99	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT((A)) (H) Date Updated (-(F1); (F2)		cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml	5.5 () () () () () () () () () ()	0.05 0.05 0.03 0.34 0.09 0.34 0.09 0.54 8E-16 0.1E-18 1E-16 12% 2E-15 87%	0.34 0.99 0.34	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(OA)) (H) Date Updated (-(F1); (F2) (J) (J) (Goal<10%)	4/20-4/21	cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml yes/No	5.5 () () () () () () () () () ()	0.05 0.05 0.03 0.34 0.09 0.34 0.09 0.54 8E-16 1E-18 1E-16 12% 2E-15 87% No	0.34 0.99 0.34	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(OA)) (H) Date Updated (-(F1); (F2) (J) (J) (Goal<10%)		cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml yes/No	5.5 () () () () () () () () () ()	0.05 0.05 0.03 0.34 0.09 0.34 0.09 0.54 8E-16 1E-18 1E-16 12% 2E-15 87% No	0.34 0.99 0.34	0.34 0.99
Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(B) (C) (D) (E) (F) pm) = (3+4.65*SQRT(CA)) (H) Date Updated (F1); (F2) (J) (J) (Goal<10%)	4/20-4/21	cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml yes/No	5.5 () () () () () () () () () ()	0.05 0.05 0.03 0.34 0.09 0.34 0.09 0.54 8E-16 1E-18 1E-16 12% 2E-15 87% No	0.34 0.99 0.34	0.34 0.99 0.34

		Sec	tion I - Collec	ction Data			
Date:	10/30/2017	Sample ID:	201710	020-096	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC): ✓	ID A	C = 2.0E-11µCi/ml (U-238), EC	- 6 OF 14C:/ml	<u>.</u>	_		
• , , , —	-	•	• -			DU (Deple	
Location:		FS12 SCA Boundary			Sampled By:	David	Berres
Wearer:		NA		Ac	tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	ÍΑ	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	minutes)	Ĭ Ī	Start	Stop
10/19/2017	9:30	15:00	3.	30	1	65.0	65.0
10/20/2017	7:30	15:00	4.	50	1	65	65
	•	Total Time (Tc):	7	80	i F	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	5 9F±03 I	iters	
				•			
Sample Volume:	65 (lpm))	X	780	(minutes) =	5.1E+04	Liters (A)
Remarks: Mi	nimum sample volume	es identified are necessary to ach	ieve 10% of DAC	C or AE value.			
		Sec	ction II - Anal	veic Data			
Instrument Information		Serial Number	cuon ii zina	19515 Data	Calibratio	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (α)
L-2929		158817		1736	12/13/2018	12/13/2018	0.344
N/A		N/A		//A	N/A	N/A	N/A
11/11		17/11		1	1771		1771
Varia	bles, Calculations, Re	esults	Units	1st	Count	Alpha 2nd Count	3rd Count
Varia Count Date	bles, Calculations, Ro	esults	Units		Count 30/2017	-	3rd Count
		esults	Units	10/3		-	3rd Count
Count Date	c.)	esults	Units minutes	10/3	30/2017	-	3rd Count
Count Date Count Time (e.g., noon, 1300, etc.	c.)	esults		10/3	30/2017 9:30	-	3rd Count
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T	c.)	esults	minutes	10/3	80/2017 9:30 60	-	3rd Count
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts	c.)	esults	minutes counts	10/3	80/2017 9:30 60 10	-	3rd Count
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate	c.)	esults	minutes counts cpm	10/3	80/2017 9:30 60 10	-	3rd Count 5.1E+04
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate	c.)	esults	minutes counts cpm cpm	10/3	80/2017 9:30 60 10 0.08	2nd Count	
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters)	(A)	esults	minutes counts cpm cpm liters	((5.1	80/2017 9:30 60 10 0.08 0.02 1E+04	2nd Count	
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate	(A) (B)	esults	minutes counts cpm cpm liters	(((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06	2nd Count 5.1E+04	5.1E+04
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency	(A) (B) (C)	esults	minutes counts cpm cpm liters cpm	(((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34	2nd Count 5.1E+04 0.34	5.1E+04 0.34
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency	(A) (B) (C) (D)	esults	minutes counts cpm cpm liters cpm cpm/dpm	(((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99	5.1E+04 0.34 0.99	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D)	(A) (B) (C) (D) (E)		minutes counts cpm cpm liters cpm cpm/dpm dpm dpm	10/3 () () () () () () () () () () () () ()	80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39	5.1E+04 0.34 0.99	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT		minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm	10/3 () () () () () () () () () () () () ()	80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18	5.1E+04 0.34 0.99	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT		minutes counts cpm cpm liters cpm cpm/dpm dpm dpm	10/3 () () () () () () () () () () () () ()	80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15	5.1E+04 0.34 0.99	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, etc Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A))	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT (A)) (H) Date Updated	(Cb))/(E*T) (G)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm dpm	10/3 9 (0 5.1) (0 (0 (1 1.5) 7.3	80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15 81E-18	5.1E+04 0.34 0.99	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT (A)) (H) Date Updated (-(F1); (F2)	(Cb))/(E*T) (G)	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml	10/3 9 (((((((((((((((((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15 81E-18 6E-15 60%	5.1E+04 0.34 0.99	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT (A)) (H) Date Updated (-(F1); (F2)	(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml	10/3 9 (((((((((((((((((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15 81E-18 6E-15 60% 8E-15	5.1E+04 0.34 0.99	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT (A)) (H) Date Updated (-(F1); (F2)	(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml	10/3 9 (((((((((((((((((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15 31E-18 6E-15 60% 8E-15 81%	2nd Count 5.1E+04 0.34 0.99 0.34	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A)	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT (A)) (H) Date Updated (1-(F1); (F2) (J) (Goal<10%	(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml uCi/ml	10/3 9 (((((((((((((((((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15 81E-18 6E-15 60% 8E-15 81% No	2nd Count 5.1E+04 0.34 0.99 0.34	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT (A)) (H) Date Updated (1-(F1); (F2) (J) (Goal<10%	(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml uCi/ml	10/3 9 (((((((((((((((((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15 81E-18 6E-15 60% 8E-15 81% No	2nd Count 5.1E+04 0.34 0.99 0.34	5.1E+04 0.34 0.99
Count Date Count Time (e.g., noon, 1300, et Sample Count Time (Ts, Tb) = T Total Counts Sample Count Rate Background Count Rate Air Volume (liters) Net count rate Counter Efficiency Collection Efficiency Efficiency = (C) x (D) Activity (dpm) = (B)/(E) Minimum Detectable Activity (d) Concentration = (F)/(2.22E9 x (A) Background "Strip" value (F.1) NET Concentration Value = (H) DAC (or AE) Fraction = (F2)/(I) MDC = MDA/V = (G)/(A) MDC Fraction of DAC (or AE) =	(A) (B) (C) (D) (E) (F) pm) = (3+4.65*SQRT (A)) (H) Date Updated (-(F1); (F2) (J) = (J)/(I) (Goal<10%	(Cb))/(E*T) (G) 4/20-4/21	minutes counts cpm cpm liters cpm cpm/dpm 0.99 cpm/dpm dpm dpm uCi/ml uCi/ml uCi/ml	10/3 9 (((((((((((((((((((((((((((((((((((80/2017 9:30 60 10 0.08 0.02 1E+04 0.06 0.34 0.99 0.34 0.18 0.39 7E-15 81E-18 6E-15 60% 8E-15 81% No	2nd Count 5.1E+04 0.34 0.99 0.34	5.1E+04 0.34 0.99 0.34

		Sec	tion I - Colle	ction Data			
Date:	10/30/2017	Sample ID:	20171	020-097	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		2.00E-11	COE 14C:/1	-			
•		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	•	J	-	DU (Deple	
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)		Start	Stop
10/19/2017	7:30	15:00	4	50		65.0	65.0
10/20/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	2.0E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
					(minutes) – _	3.5ET04	Liters (A)
Remarks: Mi	inimum sample v	olumes identified are necessary to ach	nieve 10% of DA	C or AE value.			-
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				10/3	0/2017		
Count Time (e.g., noon, 1300, et	tc.)			9:00	:00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		24		
Sample Count Rate			cpm	(0.40		
Background Count Rate			cpm	(0.03		
Air Volume (liters)	(.	A)	liters	5.9	E+04	5.9E+04	5.9E+04
Net count rate	(I	3)	cpm	(0.37		
Counter Efficiency	(C))	cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	1	.09		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	GQRT(Cb))/(E*T) (G)	dpm	().45		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	8.3	7E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H) - (F1); (F	(2)	uCi/ml	8.3	6E-15		
DAC (or AE) Fraction = (F2)/(I)			0.0	04%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		5E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal-	<10%)		0.0	02%		
Final Count?			Yes/No	,	Yes		
		Note: Unexpected DAC or AE				n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sect	tion I - Collec	tion Data			
Date:	10/31/2017	Sample ID:	201710)25-098	RW	P: 2017-001	
Occupational (DAC):	Limit:	6.00E-14		μCi/ml (I)	Breathing Zone:	General Area:	✓ Work Area:
Non-Occupational (EC):	ID.	AC = 2.0E-11μCi/ml (U-238), EC:	- 6 0E 14uCi/ml		Padionualidas	DU (Deplei	_
		•	•	I	-		
Location:		FS12 SCA Boundary	Sampled I		Sampled By:	David 1	Berres
Wearer:		NA		Ac	tivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	[A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	36	664	Calibration Due Date:	3/16/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (r	ninutes)	Ī	Start	Stop
10/23/2017	7:30	15:00	4:	50] [65.0	65.0
10/25/2017	7:30	15:00	4:	50	[65	65
		Total Time (Tc):	90	00	[Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	9.1E+03	Liters	
0 1 77 1				•			X **
Sample Volume:			X	900	(minutes) =	5.9E+04	Liters (A)
Remarks: Mi	nimum sample volu	mes identified are necessary to achi	ieve 10% of DAC	or AE value.			
		Sec	tion II - Anal	veic Data			
Instrument Information	<u> </u>	Serial Number	tion II - Anai	ysis Data	Calibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817		736	12/13/2018	12/13/2018	0.344
N/A		N/A		/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculations,	Results	Units	1st	Count	2nd Count	3rd Count
Count Date	, i			10/3	31/2017		
Count Time (e.g., noon, 1300, et	c.)			Ģ	9:30		
Sample Count Time (Ts, Tb) = T			minutes		60		
Total Counts			counts		14		
Sample Count Rate			cpm	(0.08		
Background Count Rate			cpm	(0.07		
Air Volume (liters)	(A)		liters	5.9	9E+04	5.9E+04	5.9E+04
Net count rate	(B)		cpm	(0.01		
Counter Efficiency	(C)		cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)		0.99	(0.99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm		0.03		
Minimum Detectable Activity (d		RT(Cb))/(E*T) (G)	dpm		0.61		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$,, , ,	4/20, 4/21	μCi/ml		6E-16		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		S1E-18		
NET Concentration Value = (H)			uCi/ml		9E-16		
DAC (or AE) Fraction = $(\mathbf{F2})/(\mathbf{I})$					36% 7F: 17		
MDC = MDA/V = (G)/(A) $MDC = MDA/V = (G)/(A)$	(J)	10/ \	μCi/ml		7E-15 79%		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal<10	70)	X/ /NI -			X 7	
Final Count?		NA II A IDAG AF	Yes/No		No	Yes	
		Note: Unexpected DAC or AE	traction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	10/31/2017	Sample ID:	201710	025-099	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11		-	_		
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	≔ 6.0E-14μCı/ml	J	Radionuclides:	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	Α	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	[Start	Stop
10/23/2017	7:30	15:00	4	50		65.0	65.0
10/25/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00		Avg. Flow Rate (lpm)	65.0
	l .		Minimum Air	Sample Volume:	2.7E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		-			(minutes) =	3.5ET04	Liters (A)
Remarks: Mi	inimum sample ve	olumes identified are necessary to ach	nieve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Det	ector	Meter	Detector	Efficiency (a)
L-2929		158817	164	1736	12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				10/3	1/2017		
Count Time (e.g., noon, 1300, et	tc.)			9:00	:00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		10		
Sample Count Rate			cpm	().17		
Background Count Rate			cpm	().07		
Air Volume (liters)	(.	A)	liters	5.9	E+04	5.9E+04	5.9E+04
Net count rate	(I	3)	cpm	().10		
Counter Efficiency	(C	ı	cpm/dpm	().34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(\mathbf{C}) \times (\mathbf{D})$	(E)		cpm/dpm	().34	0.34	0.34
Activity $(dpm) = (B)/(E)$	(F)		dpm	().28		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	().61		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	2.19	9E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H)) - (F1); (F	2)	uCi/ml	2.13	8E-15		
DAC (or AE) Fraction = (F2)/(I))			0.0	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	4.6	7E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal-	<10%)		0.0	02%		
Final Count?			Yes/No	,	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	11/9/2017	Sample ID:	201710	027-100	RW	/P: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11	1 COE 14 C'/ 1	-			
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μC1/m1	J	Radionuclides:	DU (Deple	ted Uranium)
Location:		FS12 Amec Soil Sort Ar	rea		Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	Α	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (1	minutes)		Start	Stop
10/26/2017	7:30	15:00	4	50		65.0	65.0
10/27/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	9	00	<u> </u>	Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	900	(minutes) =	5.9E+04	Liters (A)
		-					
Remarks: Mi	inimum sampie v	olumes identified are necessary to ach	neve 10% of DA	or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (a)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				11/9	9/2017		
Count Time (e.g., noon, 1300, et					0:00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		11		
Sample Count Rate			cpm		0.18		
Background Count Rate		A)	cpm		0.10	5.9E+04	5.9E+04
Air Volume (liters) Net count rate	(1	A)	cpm		DE+04 0.08	3.9E+04	3.9E+04
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.24		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	().70		
Concentration = $(\mathbf{F})/(2.22E9 \times (2.22E9 \times ($			μCi/ml	1.8	8E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H) - (F1); (F	2)	uCi/ml	1.8	8E-15		
DAC (or AE) Fraction = (F2)/(I))			0.0	01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml	5.3'	7E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal-	<10%)		0.0	03%		
Final Count?			Yes/No	,	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	11/9/2017	Sample ID:	201710	027-101	RW	VP: 2017-002	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		2.00E-11	COE 14C:/1	-	,		
• • • • •		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/mi	J	-	DU (Deple	
Location:		M-Yard			Sampled By:	Ed Sie	emers
Wearer:		NA		Ac	tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	[Start	Stop
10/26/2017	9:00	15:00	3	60		65.0	65.0
10/27/2017	7:30	15:00	4	50		65	65
		Total Time (Tc):	8	10		Avg. Flow Rate (lpm)	65.0
	l .		Minimum Air	Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	810	(minutes) =	5.3E+04	Liters (A)
		-			(minutes) =	202104	Elicis (II)
Remarks: Mi	inimum sample v	olumes identified are necessary to ach	neve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (a)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				11/	9/2017		
Count Time (e.g., noon, 1300, et				10:00	0:00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		18		
Sample Count Rate			cpm	(0.30		
Background Count Rate			cpm	(0.10		
Air Volume (liters)	(.	A)	liters	5.3	3E+04	5.3E+04	5.3E+04
Net count rate	(I	3)	cpm	(0.20		
Counter Efficiency	(C)	<u> </u>	cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.59		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$	A)) (H)		μCi/ml	5.0	2E-15		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (\mathbf{H})) - (F1); (F	2)	uCi/ml	5.0	2E-15		
DAC (or AE) Fraction = $(F2)/(I)$)				03%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		6E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal-	<10%)		0.	03%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	11/9/2017	Sample ID:	201710	031-102	RW	VP: 2017-002	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		2.00E-11	COE 14C:/1	_	,		
• • • • •		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μCi/mi	J	-	DU (Deple	
Location:		M-Yard			Sampled By:	Ed Sie	emers
Wearer:		NA		Act	tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	[Start	Stop
10/30/2017	8:00	15:00	4	20		65.0	65.0
10/31/2017	9:00	15:00	3	60		65	65
		Total Time (Tc):	7	80		Avg. Flow Rate (lpm)	65.0
	l .		Minimum Air	r Sample Volume:	3.1E+01	Liters	
Sample Volume:	65	(lpm)	x	780	(minutes) =	5.1E+04	Liters (A)
		-		-	(minutes) =	2.11.104	Liters (11)
Remarks: Mi	inimum sample v	olumes identified are necessary to ach	neve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	ion Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (a)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				11/	9/2017		
Count Time (e.g., noon, 1300, et	tc.)				0:00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		8		
Sample Count Rate			cpm	1	0.13		
Background Count Rate			cpm	(0.10		
Air Volume (liters)	(.	A)	liters	5.1	E+04	5.1E+04	5.1E+04
Net count rate	(I	3)	cpm	(0.03		
Counter Efficiency	(C)		cpm/dpm	(0.34	0.34	0.34
Collection Efficiency	(D)	0.99	().99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm	(0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	1	0.10		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.70		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$			μCi/ml	1	0E-16		
Background "Strip" value (F.1)	•	4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H)		2)	uCi/ml	8.6	2E-16		
DAC (or AE) Fraction = $(F2)/(I)$)				00%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		9E-15		
MDC Fraction of DAC (or AE) =	= (J)/(I) (Goal-	<10%)		0.	03%		
Final Count?			Yes/No	,	Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notificatio	n.	
Performed By:						Date:	
Reviewed By:						Date:	

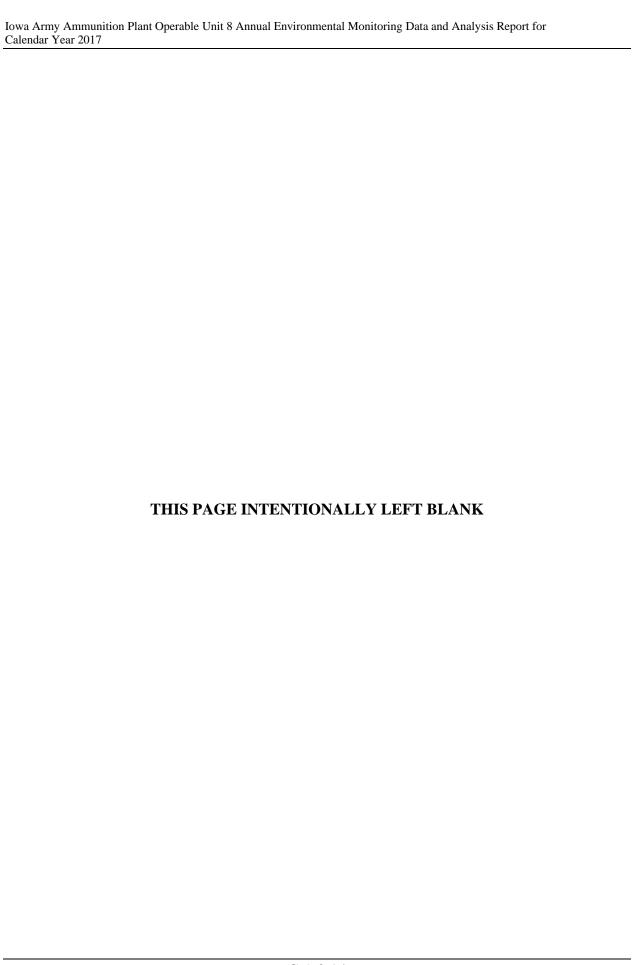
		Sec	tion I - Collec	ction Data			
Date:	11/13/2017	Sample ID:	20171	102-105	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.00E-11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):			COE 14C:/1	-			
•		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	·	J	-	DU (Deple	
Location:		FS12 CRZ Boundry			Sampled By:	David 1	Berres
Wearer:		NA		Act	ivity Performed:	N.	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)		Start	Stop
11/1/2017	8:00	15:00	4	20		65.0	65.0
11/2/2017	8:00	15:00	4	20		65	65
		Total Time (Tc):	8	40		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	4.2E+01	Liters	
Sample Volume:	65	(lpm)	x	840	(minutes) =	5.5E+04	Liters (A)
		-				ULL IVI	Ziters (12)
Remarks: Mi	inimum sampie v	plumes identified are necessary to ach	nieve 10% of DA	or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (a)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				11/1	3/2017		
Count Time (e.g., noon, 1300, et					0:00 AM		
Sample Count Time (Ts, Tb) = T	Γ		minutes		60		
Total Counts			counts		21		
Sample Count Rate			cpm		0.35		
Background Count Rate			cpm		0.20		
Air Volume (liters)		A)	liters		E+04	5.5E+04	5.5E+04
Net count rate	(I	•	cpm		0.15		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D)	0.99).99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.44		
Minimum Detectable Activity (d		QRT(Cb))/(E*T) (G)	dpm		0.93		
Concentration = $(\mathbf{F})/(2.22E9 \times (0.0000000000000000000000000000000000$			μCi/ml		3E-15		
Background "Strip" value (F.1)		4/20-4/21	uCi/ml		1E-18		
NET Concentration Value = (H		2)	uCi/ml		3E-15		
DAC (or AE) Fraction = $(F2)/(I)$					02%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		4E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal-	<10%)			04%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Colle	ction Data			
Date:	11/13/2017	Sample ID:	20171	102-104	RW	P: 2017-002	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):		2.00E-11	C OF 14C:/1	-			
•		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 0.0E-14μC1/mi	J	_	DU (Deple	
Location:		M-Yard			Sampled By:	Ed Sie	emers
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)		Start	Stop
11/1/2017	8:00	15:00	4	20		65.0	65.0
11/2/2017	8:00	15:00	4	20		65	65
		Total Time (Tc):	8	40		Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	4.2E+01	Liters	
Sample Volume:	65	(lpm)	X	840	(minutes) =	5.5E+04	Liters (A)
		-				0.02.10.1	Enters (12)
Remarks: Mi	inimum sampie v	olumes identified are necessary to ach	nieve 10% of DA	or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (α)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				1	3/2017		
Count Time (e.g., noon, 1300, et					0:00 AM		
Sample Count Time $(Ts, Tb) = T$	<u> </u>		minutes		60		
Total Counts			counts		10).17		
Sample Count Rate Background Count Rate			cpm		0.20		
Air Volume (liters)		A)	cpm		5E+04	5.5E+04	5.5E+04
Net count rate	(I		cpm		0.03	J.JET04	3.3ET04
Counter Efficiency	(C		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	-	0.10		
Minimum Detectable Activity (d	lpm) = (3+4.65*S	QRT(Cb))/(E*T) (G)	dpm	().93		
Concentration = $(\mathbf{F})/(2.22E9 \times ($	A)) (H)		μCi/ml	-8.0	7E-16		
Background "Strip" value (F.1)	Date Updated	4/20-4/21	uCi/ml	7.3	1E-18		
NET Concentration Value = (H) - (F1); (F	2)	uCi/ml	-8.1	5E-16		
DAC (or AE) Fraction = (F2)/(I))				00%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		4E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal-	<10%)		0.	04%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Colle	ction Data			
Date:	11/13/2017	Sample ID:	20171	102-105	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11	1 COE 14 C'/ 1	-			
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μC1/mI	J	Radionuciides:	DU (Deple	ted Uranium)
Location:		FS-12 CRZ Boundry			Sampled By:	David	Berres
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	Α	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	[[Start	Stop
11/1/2017	8:00	15:00	4	20		65.0	65.0
11/2/2017	8:00	15:00	4	20		65	65
		Total Time (Tc):	8	40		Avg. Flow Rate (lpm)	65.0
	•		Minimum Air	Sample Volume:	4.2E+01	Liters	
Sample Volume:	65	(lpm)	X	840	(minutes) =	5.5E+04	Liters (A)
		-				0.02.10.1	Enters (12)
Kemarks: Mi	inimum sample v	plumes identified are necessary to ach	nieve 10% of DA	or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (a)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				11/1	3/2017		
Count Time (e.g., noon, 1300, et):00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		21		
Sample Count Rate			cpm).35		
Background Count Rate			cpm		0.20		
Air Volume (liters)		A)	liters		5E+04	5.5E+04	5.5E+04
Net count rate	(I		cpm		0.15	0.24	0.24
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = (C) x (D)	(E) (F)		cpm/dpm).34).44	0.34	0.34
Activity (dpm) = (B)/(E) Minimum Detectable Activity (d	`_	OPT(Ch))/(E*T) (C)	dpm dpm		0.93		
Concentration = $(\mathbf{F})/(2.22E9 \times (1.000))$	• • • • • • • • • • • • • • • • • • • •	QKI(CO))/(E I) (G)	μCi/ml		3E-15		
Background "Strip" value (F.1)		4/20-4/21	μCi/ml		1E-18		
NET Concentration Value = (H			uCi/ml		3E-15		
DAC (or AE) Fraction = $(F2)/(I)$		-,	uci/iii		02%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		4E-15		
MDC Fraction of DAC (or AE)		<10%)	μСІ/ПП		04%		
Final Count?	(5)/(2) (5041	/	Yes/No		Yes		
- Count		Note: Unexpected DAC or AE				n.	1
		rampetera bite of the				-	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	11/13/2017	Sample ID:	20171	106-106	RW	P: 2017-002	
Occupational (DAC):	Limit:	2.005.11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
		2.00E-11	C OF 14C:/1	_			
Non-Occupational (EC):		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	= 6.0E-14μC1/ml	·J	_	DU (Deple	ted Uranium)
Location:		M-Yard			Sampled By:	Ed Sie	emers
Wearer:		NA		Act	ivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)		Start	Stop
11/3/2017	8:00	15:00	4	20		65.0	65.0
11/6/2017	8:00	15:00	4	20		65	65
		Total Time (Tc):	8	40		Avg. Flow Rate (lpm)	65.0
	l .		Minimum Air	r Sample Volume:	4.2E+01	Liters	
Sample Volume:	65	(lpm)	x	840	(minutes) =	5.5E+04	Liters (A)
				-	(minutes) =	5151114	Elicis (H)
Remarks: Mi	inimum sample v	olumes identified are necessary to ach	nieve 10% of DA	C or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (a)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
					<u> </u>	Alpha	
Varia	bles, Calculation	ns, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				11/1	3/2017		
Count Time (e.g., noon, 1300, et	tc.)				0:00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		9		
Sample Count Rate			cpm	1).15		
Background Count Rate			cpm	(0.20		
Air Volume (liters)		A)	liters	1	5E+04	5.5E+04	5.5E+04
Net count rate	(I	3)	cpm	-	0.05		
Counter Efficiency	(C))	cpm/dpm	1).34	0.34	0.34
Collection Efficiency	(D		0.99	1).99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm).34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm	1	0.15		
Minimum Detectable Activity (d	• • • • • • • • • • • • • • • • • • • •	(G)(E*T)(G)	dpm		0.93		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$			μCi/ml	1	1E-15		
Background "Strip" value (F.1)			uCi/ml		1E-18		
NET Concentration Value = (H	, , ,,	2)	uCi/ml		2E-15		
DAC (or AE) Fraction = $(F2)/(I)$					01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		4E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal-	<10%)			04%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	

		Sec	tion I - Collec	ction Data			
Date:	11/13/2017	Sample ID:	20171	106-107	RW	P: 2017-001	
Occupational (DAC):	Limit:	2.00E-11		μCi/ml (I)	Breathing Zone:		Work Area: ✓
Non-Occupational (EC):			COE 14C:/1	-			
•		$[DAC = 2.0E-11\mu Ci/ml (U-238), EC$	•	J	_	DU (Deple	
Location:		FS-12 CRZ Boundry			Sampled By:	David	Berres
Wearer:		NA		Ac	tivity Performed:	N	A
Monitored Workers:				NA			
Lapel Pump Model:	NA		Serial No.	N	A	Calibration Due Date:	NA
Air Pump Model:	LV-1		Serial No.	25	91	Calibration Due Date:	9/5/2018
Sample Information		Time				Flow	Rate (lpm)
Collection Date	Start	Stop	Total (minutes)	[Start	Stop
11/3/2017	8:00	15:00	4	20		65.0	65.0
11/6/2017	8:00	15:00	4	20	1	65	65
		Total Time (Tc):	8	40] [Avg. Flow Rate (lpm)	65.0
			Minimum Air	Sample Volume:	4.2E+01	Liters	
Sample Volume:	65	(lpm)	x	840	(minutes) =	5.5E+04	Liters (A)
		olumes identified are necessary to ach			_(
Remarks: MI	inimum sampie v	numes identified are necessary to acr	neve 10% of DA	or AE value.			
		Sec	ction II - Ana	lysis Data			
Instrument Information		Serial Number			Calibrati	on Due Date	
Instrument Type		Meter	Detector		Meter	Detector	Efficiency (a)
L-2929		158817	164736		12/13/2018	12/13/2018	0.344
N/A		N/A	N	I/A	N/A	N/A	N/A
						Alpha	
Varia	bles, Calculation	ıs, Results	Units	1st	Count	2nd Count	3rd Count
Count Date				11/1	3/2017		
Count Time (e.g., noon, 1300, et				14:00	0:00 AM		
Sample Count Time $(Ts, Tb) = T$	Γ		minutes		60		
Total Counts			counts		7		
Sample Count Rate			cpm		0.12		
Background Count Rate			cpm		0.20		
Air Volume (liters)		A)	liters		5E+04	5.5E+04	5.5E+04
Net count rate	(I		cpm		0.08		
Counter Efficiency	(C)		cpm/dpm		0.34	0.34	0.34
Collection Efficiency	(D		0.99).99	0.99	0.99
Efficiency = $(C) \times (D)$	(E)		cpm/dpm		0.34	0.34	0.34
Activity (dpm) = $(\mathbf{B})/(\mathbf{E})$	(F)		dpm		0.24		
Minimum Detectable Activity (d	• • • • • • • • • • • • • • • • • • • •	QRT(Cb))/(E*T) (G)	dpm		0.93		
Concentration = $(\mathbf{F})/(2.22E9 \text{ x})$			μCi/ml		2E-15		
Background "Strip" value (F.1)			uCi/ml		1E-18		
NET Concentration Value = (H		2)	uCi/ml		3E-15		
DAC (or AE) Fraction = $(F2)/(I)$.01%		
MDC = MDA/V = (G)/(A)	(J)		μCi/ml		4E-15		
MDC Fraction of DAC (or AE)	= (J)/(I) (Goal-	<10%)			04%		
Final Count?			Yes/No		Yes		
		Note: Unexpected DAC or AE	fraction > 100%	requires immed	iate RSO notification	n.	
Performed By:						Date:	
Reviewed By:						Date:	



APPENDIX D SURFACE-WATER AND SEDIMENT DATA

APPENDIX D REVISION 0

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX D REVISION 0

Table D-1. Surface Water Data for CY 2017

Station Name	Sample Name	Collection Date	Method	Analyte	Result	Error	Detection Limit	Units	VQ
IAAP100153	IAAP196153	04/25/17	ML-018	Gross Alpha	2.23	5.58	7.05	pCi/L	UJ
IAAP100153	IAAP196153	04/25/17	ML-018	Gross Beta	-1.8	8.39	10.4	pCi/L	UJ
IAAP100153	IAAP196153	04/25/17	ML-015	U-234	1.28	0.568	0.342	pCi/L	=
IAAP100153	IAAP196153	04/25/17	ML-015	U-235	0.13	0.184	0.176	pCi/L	UJ
IAAP100153	IAAP196153	04/25/17	ML-015	U-238	1.31	0.563	0.142	pCi/L	J
IAAP100154	IAAP196157	04/25/17	ML-018	Gross Alpha	-0.00572	5.32	7.05	pCi/L	UJ
IAAP100154	IAAP196157	04/25/17	ML-018	Gross Beta	1.74	8.52	10.3	pCi/L	UJ
IAAP100154	IAAP196157	04/25/17	ML-015	U-234	1.29	0.577	0.152	pCi/L	=
IAAP100154	IAAP196157	04/25/17	ML-015	U-235	0	0	0.187	pCi/L	U
IAAP100154	IAAP196157	04/25/17	ML-015	U-238	0.947	0.485	0.151	pCi/L	J
IAAP100155	IAAP196159	04/25/17	ML-018	Gross Alpha	5.05	5.91	7.06	pCi/L	UJ
IAAP100155	IAAP196159	04/25/17	ML-018	Gross Beta	10.2	8.99	10.5	pCi/L	UJ
IAAP100155	IAAP196159	04/25/17	ML-015	U-234	1.65	0.659	0.149	pCi/L	=
IAAP100155	IAAP196159	04/25/17	ML-015	U-235	0.0678	0.136	0.184	pCi/L	UJ
IAAP100155	IAAP196159	04/25/17	ML-015	U-238	1.26	0.564	0.148	pCi/L	J
IAAP100165	IAAP196163	04/25/17	ML-018	Gross Alpha	2.86	5.66	7.05	pCi/L	UJ
IAAP100165	IAAP196163	04/25/17	ML-018	Gross Beta	-0.771	8.44	10.4	pCi/L	UJ
IAAP100165	IAAP196163	04/25/17	ML-015	U-234	0.782	0.432	0.332	pCi/L	J
IAAP100165	IAAP196163	04/25/17	ML-015	U-235	0.0839	0.197	0.41	pCi/L	UJ
IAAP100165	IAAP196163	04/25/17	ML-015	U-238	0.305	0.254	0.138	pCi/L	J
IAAP100178	IAAP196165	04/25/17	ML-018	Gross Alpha	2.21	5.58	7.05	pCi/L	UJ
IAAP100178	IAAP196165	04/25/17	ML-018	Gross Beta	5.73	8.74	10.4	pCi/L	UJ
IAAP100178	IAAP196165	04/25/17	ML-015	U-234	1.02	0.525	0.163	pCi/L	J
IAAP100178	IAAP196165	04/25/17	ML-015	U-235	0	0	0.201	pCi/L	U
IAAP100178	IAAP196165	04/25/17	ML-015	U-238	0.739	0.457	0.39	pCi/L	J
IAAP100180	IAAP196167	04/25/17	ML-018	Gross Alpha	-0.944	5.21	7.05	pCi/L	UJ
IAAP100180	IAAP196167	04/25/17	ML-018	Gross Beta	-3.09	8.29	10.3	pCi/L	UJ
IAAP100180	IAAP196167	04/25/17	ML-015	U-234	0.672	0.433	0.386	pCi/L	J
IAAP100180	IAAP196167	04/25/17	ML-015	U-235	0.146	0.208	0.198	pCi/L	UJ
IAAP100180	IAAP196167	04/25/17	ML-015	U-238	0.473	0.343	0.16	pCi/L	J
IAAP100187	IAAP196169	04/25/17	ML-018	Gross Alpha	4.47	5.84	7.04	pCi/L	UJ

Table D-1. Surface Water Data for CY 2017

Station Name	Sample Name	Collection Date	Method	Analyte	Result	Error	Detection Limit	Units	VQ
IAAP100187	IAAP196169	04/25/17	ML-018	Gross Beta	-5.15	8.27	10.5	pCi/L	UJ
IAAP100187	IAAP196169	04/25/17	ML-015	U-234	0.43	0.294	0.13	pCi/L	J
IAAP100187	IAAP196169	04/25/17	ML-015	U-235	0	0	0.16	pCi/L	U
IAAP100187	IAAP196169	04/25/17	ML-015	U-238	0.444	0.315	0.31	pCi/L	J
IAAP177509	IAAP196155	04/25/17	ML-018	Gross Alpha	3.49	5.73	7.05	pCi/L	UJ
IAAP177509	IAAP196155	04/25/17	ML-018	Gross Beta	0.839	8.52	10.4	pCi/L	UJ
IAAP177509	IAAP196155	04/25/17	ML-015	U-234	1.08	0.491	0.133	pCi/L	=
IAAP177509	IAAP196155	04/25/17	ML-015	U-235	-0.0404	0.081	0.394	pCi/L	UJ
IAAP177509	IAAP196155	04/25/17	ML-015	U-238	1.03	0.476	0.132	pCi/L	J
IAAP177517	IAAP196171	04/25/17	ML-018	Gross Alpha	-1.59	5.13	7.05	pCi/L	UJ
IAAP177517	IAAP196171	04/25/17	ML-018	Gross Beta	0.321	8.44	10.3	pCi/L	UJ
IAAP177517	IAAP196171	04/25/17	ML-015	U-234	0.114	0.163	0.155	pCi/L	UJ
IAAP177517	IAAP196171	04/25/17	ML-015	U-235	0.0704	0.141	0.191	pCi/L	UJ
IAAP177517	IAAP196171	04/25/17	ML-015	U-238	0.379	0.345	0.459	pCi/L	UJ
IAAP177517	IAAP196171-1	04/25/17	ML-018	Gross Alpha	-0.627	5.25	7.05	pCi/L	UJ
IAAP177517	IAAP196171-1	04/25/17	ML-018	Gross Beta	-2.58	8.32	10.3	pCi/L	UJ
IAAP177517	IAAP196171-1	04/25/17	ML-015	U-234	0.553	0.344	0.136	pCi/L	J
IAAP177517	IAAP196171-1	04/25/17	ML-015	U-235	0.062	0.124	0.168	pCi/L	UJ
IAAP177517	IAAP196171-1	04/25/17	ML-015	U-238	0.7	0.39	0.136	pCi/L	J
IAAP100153	IAAP199553	11/15/17	ML-018	Gross Alpha	-1.01	5.87	7.81	pCi/L	UJ
IAAP100153	IAAP199553	11/15/17	ML-018	Gross Beta	18.5	9.41	10.4	pCi/L	J
IAAP100153	IAAP199553	11/15/17	ML-015	U-234	1.46	0.697	0.445	pCi/L	
IAAP100153	IAAP199553	11/15/17	ML-015	U-235	0	0	0.229	pCi/L	U
IAAP100153	IAAP199553	11/15/17	ML-015	U-238	1.36	0.655	0.185	pCi/L	
IAAP100154	IAAP199557	11/14/17	ML-018	Gross Alpha	-0.4	5.93	7.82	pCi/L	UJ
IAAP100154	IAAP199557	11/14/17	ML-018	Gross Beta	25	9.77	10.4	pCi/L	J
IAAP100154	IAAP199557	11/14/17	ML-015	U-234	0.796	0.491	0.528	pCi/L	J
IAAP100154	IAAP199557	11/14/17	ML-015	U-235	0.0467	0.238	0.566	pCi/L	UJ
IAAP100154	IAAP199557	11/14/17	ML-015	U-238	0.622	0.389	0.153	pCi/L	J
IAAP100155	IAAP199559	11/14/17	ML-018	Gross Alpha	-0.401	5.93	7.82	pCi/L	UJ
IAAP100155	IAAP199559	11/14/17	ML-018	Gross Beta	25.4	9.79	10.4	pCi/L	J

Table D-1. Surface Water Data for CY 2017

Station Name	Sample Name	Collection Date	Method	Analyte	Result	Error	Detection Limit	Units	VQ
IAAP100155	IAAP199559	11/14/17	ML-015	U-234	1.23	0.59	0.167	pCi/L	=
IAAP100155	IAAP199559	11/14/17	ML-015	U-235	0.076	0.153	0.206	pCi/L	UJ
IAAP100155	IAAP199559	11/14/17	ML-015	U-238	1.17	0.571	0.166	pCi/L	=
IAAP100165	IAAP199563	11/14/17	ML-018	Gross Alpha	-2.62	5.69	7.82	pCi/L	UJ
IAAP100165	IAAP199563	11/14/17	ML-018	Gross Beta	23.9	9.68	10.3	pCi/L	J
IAAP100165	IAAP199563	11/14/17	ML-015	U-234	0.514	0.389	0.401	pCi/L	J
IAAP100165	IAAP199563	11/14/17	ML-015	U-235	0.0254	0.183	0.495	pCi/L	UJ
IAAP100165	IAAP199563	11/14/17	ML-015	U-238	0.246	0.249	0.166	pCi/L	UJ
IAAP100178	IAAP199565	11/14/17	ML-018	Gross Alpha	-2.63	5.69	7.82	pCi/L	UJ
IAAP100178	IAAP199565	11/14/17	ML-018	Gross Beta	25.4	9.77	10.3	pCi/L	J
IAAP100178	IAAP199565	11/14/17	ML-015	U-234	1.01	0.5	0.34	pCi/L	=
IAAP100178	IAAP199565	11/14/17	ML-015	U-235	-0.0215	0.177	0.521	pCi/L	UJ
IAAP100178	IAAP199565	11/14/17	ML-015	U-238	0.538	0.363	0.339	pCi/L	J
IAAP100180	IAAP199567	11/14/17	ML-018	Gross Alpha	-3.88	5.55	7.81	pCi/L	UJ
IAAP100180	IAAP199567	11/14/17	ML-018	Gross Beta	19.7	9.44	10.3	pCi/L	J
IAAP100180	IAAP199567	11/14/17	ML-015	U-234	0.82	0.469	0.372	pCi/L	J
IAAP100180	IAAP199567	11/14/17	ML-015	U-235	0	0	0.191	pCi/L	U
IAAP100180	IAAP199567	11/14/17	ML-015	U-238	0.531	0.378	0.371	pCi/L	J
IAAP100187	IAAP199569	11/14/17	ML-018	Gross Alpha	-2.91	5.66	7.81	pCi/L	UJ
IAAP100187	IAAP199569	11/14/17	ML-018	Gross Beta	15.6	9.24	10.3	pCi/L	J
IAAP100187	IAAP199569	11/14/17	ML-015	U-234	0.613	0.401	0.166	pCi/L	J
IAAP100187	IAAP199569	11/14/17	ML-015	U-235	0	0	0.205	pCi/L	U
IAAP100187	IAAP199569	11/14/17	ML-015	U-238	0.427	0.331	0.165	pCi/L	J
IAAP177509	IAAP199555	11/14/17	ML-018	Gross Alpha	-1.98	5.76	7.82	pCi/L	UJ
IAAP177509	IAAP199555	11/14/17	ML-018	Gross Beta	22.6	9.62	10.4	pCi/L	J
IAAP177509	IAAP199555	11/14/17	ML-015	U-234	0.551	0.36	0.149	pCi/L	J
IAAP177509	IAAP199555	11/14/17	ML-015	U-235	0	0	0.184	pCi/L	U
IAAP177509	IAAP199555	11/14/17	ML-015	U-238	0.403	0.326	0.357	pCi/L	J
IAAP177517	IAAP199571	11/14/17	ML-018	Gross Alpha	-1.02	5.87	7.82	pCi/L	UJ
IAAP177517	IAAP199571	11/14/17	ML-018	Gross Beta	21.2	9.56	10.4	pCi/L	J
IAAP177517	IAAP199571	11/14/17	ML-015	U-234	0.338	0.307	0.41	pCi/L	UJ

Table D-1. Surface Water Data for CY 2017

Station Name	Sample Name	Collection Date	Method	Analyte	Result	Error	Detection Limit	Units	VQ
IAAP177517	IAAP199571	11/14/17	ML-015	U-235	-0.0417	0.0836	0.407	pCi/L	UJ
IAAP177517	IAAP199571	11/14/17	ML-015	U-238	0.505	0.329	0.137	pCi/L	J

Negative results are less than the laboratory system's background level.

VQs:

- = Indicates that the data met all QA/QC requirements, and that the parameter has been positively identified and the associated concentration value is accurate.
- J Indicates that the parameter was positively identified; the associated numerical value is the approximate concentration of the parameter in the sample.
- U Indicates that the data met all QA/QC requirements, and that the parameter was analyzed for but was not detected above the reported sample quantitation limit.
- UJ Indicates that the parameter was not detected above the reported sample quantitation limit and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. However, the reported quantitation limit is approximate.

Table D-2. Sediment Data for CY 2017

Station Name	Sample Name	Collection Date	Method	Analyte	Result	Error	Detection Limit	Units	VQ
IAAP100153	IAAP196152	04/25/17	ML-015	U-234	0.753	0.347	0.147	pCi/g	J
IAAP100153	IAAP196152	04/25/17	ML-015	U-235	-0.00902	0.0182	0.182	pCi/g	UJ
IAAP100153	IAAP196152	04/25/17	ML-015	U-238	1.02	0.419	0.0789	pCi/g	J
IAAP100154	IAAP196156	04/25/17	ML-015	U-234	0.544	0.333	0.113	pCi/g	J
IAAP100154	IAAP196156	04/25/17	ML-015	U-235	0.0387	0.107	0.26	pCi/g	UJ
IAAP100154	IAAP196156	04/25/17	ML-015	U-238	0.312	0.251	0.25	pCi/g	J
IAAP100155	IAAP196158	04/25/17	ML-015	U-234	0.665	0.44	0.285	pCi/g	J
IAAP100155	IAAP196158	04/25/17	ML-015	U-235	0	0	0.189	pCi/g	U
IAAP100155	IAAP196158	04/25/17	ML-015	U-238	0.846	0.504	0.153	pCi/g	J
IAAP100164	IAAP196160	04/24/17	ML-015	U-234	1.04	0.538	0.134	pCi/g	J
IAAP100164	IAAP196160	04/24/17	ML-015	U-235	0.0456	0.126	0.306	pCi/g	UJ
IAAP100164	IAAP196160	04/24/17	ML-015	U-238	0.835	0.468	0.133	pCi/g	J
IAAP100165	IAAP196162	04/25/17	ML-015	U-234	0.275	0.219	0.106	pCi/g	J
IAAP100165	IAAP196162	04/25/17	ML-015	U-235	0.0484	0.0976	0.131	pCi/g	UJ
IAAP100165	IAAP196162	04/25/17	ML-015	U-238	0.313	0.235	0.106	pCi/g	J
IAAP100178	IAAP196164	04/25/17	ML-015	U-234	0.409	0.257	0.0923	pCi/g	J
IAAP100178	IAAP196164	04/25/17	ML-015	U-235	0.084	0.121	0.114	pCi/g	UJ
IAAP100178	IAAP196164	04/25/17	ML-015	U-238	0.441	0.268	0.0919	pCi/g	J
IAAP100180	IAAP196166	04/25/17	ML-015	U-234	0.364	0.254	0.188	pCi/g	J
IAAP100180	IAAP196166	04/25/17	ML-015	U-235	0.0345	0.0954	0.232	pCi/g	UJ
IAAP100180	IAAP196166	04/25/17	ML-015	U-238	0.372	0.253	0.101	pCi/g	J
IAAP100187	IAAP196168	04/25/17	ML-015	U-234	0.289	0.25	0.131	pCi/g	J
IAAP100187	IAAP196168	04/25/17	ML-015	U-235	0	0	0.161	pCi/g	U
IAAP100187	IAAP196168	04/25/17	ML-015	U-238	0.36	0.292	0.288	pCi/g	J
IAAP177509	IAAP196154	04/25/17	ML-015	U-234	0.0937	0.11	0.0846	pCi/g	UJ
IAAP177509	IAAP196154	04/25/17	ML-015	U-235	0.077	0.111	0.104	pCi/g	UJ
IAAP177509	IAAP196154	04/25/17	ML-015	U-238	0.311	0.21	0.0843	pCi/g	J
IAAP177517	IAAP196170	04/25/17	ML-015	U-234	0.131	0.12	0.071	pCi/g	J
IAAP177517	IAAP196170	04/25/17	ML-015	U-235	-0.0215	0.0308	0.21	pCi/g	UJ

Table D-2. Sediment Data for CY 2017

Station Name	Sample Name	Collection Date	Method	Analyte	Result	Error	Detection Limit	Units	VQ
IAAP177517	IAAP196170	04/25/17	ML-015	U-238	0.235	0.164	0.0707	pCi/g	J
IAAP100153	IAAP199552	11/15/17	ML-015	U-234	0.37	0.152	0.0821	pCi/g	J
IAAP100153	IAAP199552	11/15/17	ML-015	U-235	-0.0104	0.0208	0.101	pCi/g	UJ
IAAP100153	IAAP199552	11/15/17	ML-015	U-238	0.503	0.179	0.0341	pCi/g	=
IAAP100154	IAAP199556	11/14/17	ML-015	U-234	0.203	0.103	0.0721	pCi/g	J
IAAP100154	IAAP199556	11/14/17	ML-015	U-235	0	0	0.037	pCi/g	U
IAAP100154	IAAP199556	11/14/17	ML-015	U-238	0.136	0.0836	0.0718	pCi/g	J
IAAP100155	IAAP199558	11/14/17	ML-015	U-234	0.184	0.091	0.0277	pCi/g	J
IAAP100155	IAAP199558	11/14/17	ML-015	U-235	0.0378	0.044	0.0342	pCi/g	UJ
IAAP100155	IAAP199558	11/14/17	ML-015	U-238	0.193	0.0933	0.0276	pCi/g	=
IAAP100164	IAAP199560	11/13/17	ML-015	U-234	0.669	0.213	0.0989	pCi/g	J
IAAP100164	IAAP199560	11/13/17	ML-015	U-235	0.0352	0.0563	0.0983	pCi/g	UJ
IAAP100164	IAAP199560	11/13/17	ML-015	U-238	0.805	0.236	0.033	pCi/g	=
IAAP100165	IAAP199562	11/14/17	ML-015	U-234	0.322	0.127	0.0291	pCi/g	J
IAAP100165	IAAP199562	11/14/17	ML-015	U-235	0.00441	0.0318	0.0861	pCi/g	UJ
IAAP100165	IAAP199562	11/14/17	ML-015	U-238	0.196	0.0988	0.0695	pCi/g	J
IAAP100178	IAAP199564	11/14/17	ML-015	U-234	0.502	0.175	0.0332	pCi/g	J
IAAP100178	IAAP199564	11/14/17	ML-015	U-235	0.0503	0.0641	0.0982	pCi/g	UJ
IAAP100178	IAAP199564	11/14/17	ML-015	U-238	0.378	0.148	0.033	pCi/g	=
IAAP100180	IAAP199566	11/14/17	ML-015	U-234	0.232	0.108	0.0299	pCi/g	J
IAAP100180	IAAP199566	11/14/17	ML-015	U-235	0.00454	0.0328	0.0886	pCi/g	UJ
IAAP100180	IAAP199566	11/14/17	ML-015	U-238	0.326	0.134	0.0888	pCi/g	=
IAAP100187	IAAP199568	11/14/17	ML-015	U-234	0.347	0.129	0.0639	pCi/g	J
IAAP100187	IAAP199568	11/14/17	ML-015	U-235	0	0	0.0329	pCi/g	U
IAAP100187	IAAP199568	11/14/17	ML-015	U-238	0.342	0.126	0.0265	pCi/g	=
IAAP100187	IAAP199568-1	11/14/17	ML-015	U-234	0.277	0.12	0.0712	pCi/g	J
IAAP100187	IAAP199568-1	11/14/17	ML-015	U-235	0.009	0.0459	0.109	pCi/g	UJ
IAAP100187	IAAP199568-1	11/14/17	ML-015	U-238	0.294	0.122	0.0295	pCi/g	=
IAAP177509	IAAP199554	11/14/17	ML-015	U-234	0.32	0.228	0.0965	pCi/g	J

Table D-2. Sediment Data for CY 2017

Station Name	Sample Name	Collection Date	Method	Analyte	Result	Error	Detection Limit	Units	VQ
IAAP177509	IAAP199554	11/14/17	ML-015	U-235	-0.011	0.0221	0.221	pCi/g	UJ
IAAP177509	IAAP199554	11/14/17	ML-015	U-238	0.709	0.362	0.0961	pCi/g	J
IAAP177517	IAAP199570	11/14/17	ML-015	U-234	0.172	0.0978	0.0779	pCi/g	J
IAAP177517	IAAP199570	11/14/17	ML-015	U-235	0.0443	0.0516	0.04	pCi/g	UJ
IAAP177517	IAAP199570	11/14/17	ML-015	U-238	0.278	0.126	0.0776	pCi/g	=

Negative results are less than the laboratory system's background level. $\label{eq:laboratory}$

VQs:

⁼ Indicates that the data met all QA/QC requirements, and that the parameter has been positively identified and the associated concentration value is accurate.

J Indicates that the parameter was positively identified; the associated numerical value is the approximate concentration of the parameter in the sample.

U Indicates that the data met all QA/QC requirements, and that the parameter was analyzed for but was not detected above the reported sample quantitation limit.

UJ Indicates that the parameter was not detected above the reported sample quantitation limit and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. However, the reported quantitation limit is approximate.

Iowa Army Ammunition Pla Calendar Year 2017	ant Operable Unit 8 Annual Environmental Monitoring Data and Analysis Report for
	THIS PAGE INTENTIONALLY LEFT BLANK