National Aeronautics and Space Administration

Final

Remedial Investigation Report

Formerly Used Defense Sites Project 9

Skeet Range MRS

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia

January 2020

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FINAL

REMEDIAL INVESTIGATION REPORT

FORMERLY USED DEFENSE SITES
PROJECT 9
SKEET RANGE MUNITIONS RESPONSE SITE

NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Submitted to:
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia

Submitted by:
Tetra Tech, Inc.
5700 Lake Wright Drive Suite 102
Norfolk, Virginia, 23502

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PREPARED UNDER THE DIRECTION OF:
BY:

ROBERT M. SOK II, P.G.
PROJECT MANAGER
TETRA TECH, INC.
NORFOLK, VIRGINIA

APPROVED FOR SUBMISSION

CHRISTOPHER PIKE
PROGRAM MANAGER
TETRA TECH, INC.
PITTSBURGH, PENNSYLVANIA

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Appendix I Support Information for ERA

LIST OF ACRONYMS

AGTR	Aircraft Gun Testing Range
ALM	Adult Lead Methodology
ATSDR	Agency for Toxic Substances and Disease Registry
BAF	Bioaccumulation Factors
BERA	Baseline Ecological Risk Assessment
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
Cal EPA	California Environmental Protection Agency
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
cm2	square centimeters
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
DRO	Diesel Range Organics
EC50	Exposure concentration affecting 50 percent of test organisms
Eco SSL	Ecological Soil Screening Levels
EEQ	Ecological Effect Quotient
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ESLs	Ecological Screening Levels
EU	Exposure Unit
FS	Feasibility Study
ft2	square foot
FUDS	Formerly Used Defense Sites
GSFC	Goddard Space Flight Center
HEAST	Health Effects Assessment Summary Tables

LIST OF ACRONYMS

HI	Hazard Index
HQ	Hazard Quotient
IDW	Investigation-Derived Waste
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	Incremental Life-time Cancer Risk
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
kg	kilogram
LANL	Los Alamos National Laboratory
LC50	Lethal concentration affecting 50 percent of test organisms
LOAEL	Lowest Observed Adverse Effect Levels
MBFR	Main Base Firing Range
mg	milligrams
mg/cm^2	milligrams per square centimeter
mg/kg	milligrams per kilogram
mL	milliliters
mm	millimeters
MOA	Memorandum of Agreement
MRS	Munitions Response Site
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NACA	National Advisory Committee for Aviation
NAOTS	Naval Aviation Ordnance Test Station
NASA	National Aeronautics and Space Administration
NCEA	National Center for Environmental Assessment
NOAA	National Oceanic and Atmospheric Administration
NOAELs	No Observed Adverse Effect Levels
NTCRA	Non-Time Critical Removal Action
OLEM	Office of Land and Emergency Management
ORNL	Oak Ridge National Laboratory

LIST OF ACRONYMS

OSWER	Office of Solid Waste and Emergency Response
PAHs	Polycyclic Aromatic Hydrocarbons
PbB	Blood-Lead Level
PEL	Probable Effect Level
PEM/PSS	Palustrine Emergent and Palustrine Scrub-Shrub Wetland
PPRTV	Provisional Peer Reviewed Toxicity Value
PRG	Preliminary Remediation Goal
QA/QC	Quality Assurance/Quality Control
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SI	Site Investigation
SLERA	Screening Level Ecological Risk Assessment
SVOC	Semivolatile Organic Compounds
TAL	Target Analyte List
TCLP	Toxic Characteristic Leaching Procedure
TEL	Threshold Effect Level
Tetra Tech	Tetra Tech, Inc.
TOC	Total Organic Carbon
TOX	Total Organic Halides
TRV	Toxicity Reference Values
TRW	Technical Review Workgroup
UCL	Upper Confidence Limit
USACE	United States Army Corps of Engineers

LIST OF ACRONYMS

USEPA	United States Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
VOC	Volatile Organic Compounds
WFF	Wallops Flight Facility
µg/dL	micrograms per deciliter
µg/kg	micrograms per kilogram
µg/L	micrograms per liter

1.0 INTRODUCTION

This remedial investigation (RI) report has been prepared by Tetra Tech, Inc. (Tetra Tech) for the Skeet Range Munition Response Sites (MRS) of the Main Base Firing Range (MBFR) Complex at National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) Wallops Flight Facility (WFF) located in Accomack County, Virginia (Figure 1-1). This document was prepared under Prime Contract No. NNG14WA44C, Task Order 08-19-2015. This RI report provides a summary of the investigative activities, nature and extent of contamination, and presents the human health risk evaluation, ecological risk assessment, and conclusions for the Skeet Range MRS. This investigation was conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Sampling and Analysis Plan (SAP) (Tetra Tech, 2018a), and the SAP Addendum (Tetra Tech, 2018b).

1.1 Scope and Objectives

The scope of this RI report is to present and interpret the results of soil data collected at the Skeet Range MRS and evaluate the potential risk to human health and ecological receptors. The objectives of the RI were to further delineate the extent of contaminated surface soils, investigate potential contamination in subsurface soils, collect data to confirm and further develop the Preliminary Remediation Goals (PRGs), re-evaluate risk to human health and ecological receptors, and support a Feasibility Study (FS) at the Skeet Range MRS. PRGs were initially developed as a part of the SAP based on the risk to human health and ecological receptors identified in the Site Investigation (SI) (Tetra Tech, 2009a). These PRGs were used to determine data gaps and guide the proposed sampling for this RI. Groundwater was evaluated in the SI and it is was determined that groundwater has not been significantly impacted by the MBFR Complex and no further evaluation was warranted.

1.2 Report Organization

This report consists of eight sections. Section 1.0 provides this introduction, the scope, and general objectives of the RI. Section 2.0 provides a summary of the facility background, site history, and previous site investigations. Section 3.0 provides a summary of site activities conducted during the RI. Section 4.0 details the nature and extent of contamination and Section 5.0 presents the contaminant fate and transport analysis. Section 6.0 details the human health risk evaluation and Section 7.0 presents the ecological risk assessment. Section 8.0 provides the conclusions and recommendations of the RI at the Skeet Range MRS.

2.0 FACILITY AND SITE BACKGROUND

2.1 Facility Description and Background

WFF is located in Accomack County, Virginia, and consists of three land parcels—Main Base, Mainland, and Wallops Island (Figure 1-1). The Main Base is composed of approximately 2,000 acres and is located near the intersection of Virginia Routes 798 and 175. The Mainland parcel consists of approximately 1,200 acres containing about 100 acres of usable land (the remaining acreage is marshland) and is located 6 miles to the south of the Main Base on Virginia Route 679. The Mainland is connected to the Wallops Island parcel by a causeway constructed in 1960. The 3,400-acre Wallops Island parcel is a 7-mile-long barrier island located immediately east of the Mainland. The Town of Chincoteague is located 5 miles east of the Main Base.

NASA and its predecessor, the National Advisory Committee for Aeronautics (NACA), have had a presence at WFF since 1945. In the spring of 1945, NACA leased 1,000 acres from the Wallops Island Association for use as an auxiliary base of the NACA Langley Laboratory to provide a test range for guided missile flight research. Concurrent with NACA use, in 1946 the Navy and the Naval Aviation Ordnance Test Station (NAOTS) began leasing the northern portion of Wallops Island to test, modify, and develop guided missiles, aircraft weapons, and aviation fire control equipment. NACA initially purchased 84.87 acres in July 1947, and then purchased the remaining 3,000 acres of Wallops Island through a Declaration of Taking. NACA then established a use permit with the Navy/NAOTS for the northern portion of Wallops Island in 1952.

NACA established a rocket launch site on the southern portion of Wallops Island (Wallops Station) in 1945 under the direction of the Langley Research Center and launched its first rocket in that year. NACA constructed launch and radar support and experimental facilities in 1946. Access to Wallops Island at that time was by water vessel only. Operations by NACA at WFF were limited to these test facilities until 1959 (Occu-Health, 1999). NASA absorbed Langley Research Center and other NACA field centers and facilities when it was created by the U.S. government in 1958. NASA expanded its presence at WFF with the acquisition of the Main Base and Mainland parcels in 1959. The Wallops Station was named Wallops Flight Center in 1974, and the name was changed to WFF in 1981, when it became part of GSFC of Greenbelt, Maryland.

The Navy operated the Chincoteague Naval Auxiliary Air Station at the Main Base from 1942 until the transfer to NASA in 1959. During that time, the Navy constructed runways, buildings, and other support facilities for naval aviation and aviation ordnance testing and training (Occu-Health, 1999 and USACE, 2005). NASA continues to maintain the runways and occupies many of the structures and buildings that were present at the time of the property transfer from the Navy. The infrastructure has changed over the years. NASA has expanded, constructed, decommissioned, and removed buildings to support its mission and provide support to other tenant organizations.

The mission of WFF has undergone several changes since it was established in 1959, but the main focus has been and continues to be rocket research, the management of suborbital projects, suborbital and orbital tracking, aeronautical research, and space technology research. NASA

does not manufacture rockets or rocket fuels/propellants at WFF. Rocket motors are transported to the facility from other government facilities.

2.2 Site Background

The MBFR Complex is located in the northern portion of the Main Base, directly north of the intersection of Runway 10-28 and Runway 17-35 (Figure 1-1). The entire MBFR Complex measures approximately 40 acres, encompassing the former Pistol Range, former Rifle Range, former Aircraft Gun Testing Range (AGTR), and the Skeet Range MRS. The buildings and shooting stations associated with the Skeet Range MRS no longer exist.

The Skeet Range MRS consists of two skeet range configurations. The first skeet range at NASA WFF was constructed in 1944 with a northeasterly direction of fire and was referred to as the Shotgun Range or High Tower Range (Figure 2-1). Sometime between 1945 and 1948, the High Tower Range was replaced with a reconfigured skeet range with an easterly direction of fire. The older northeast-facing skeet range will be referred to herein as the High Tower Range and the more recent skeet range will be referred to as the east-facing skeet range. The AGTR (also referred to as the Machine-Gun Range) was also constructed in 1944 after the completion of the airfield runways. The AGTR was converted into the Pistol Range in 1948 and the Rifle Range was constructed adjacent to and east of the Pistol Range in 1951 (USACE, 2005). Most of the original High Tower Range is overlapped by the east-facing skeet range, the former Rifle Range, former Pistol Range, and the former AGTR (Figure 2-1). The former AGTR, Pistol, and Rifle Ranges have been investigated and addressed under separate actions including a non-time critical removal action (NTCRA) for soil in 2016 with a signed Concurrence for No Further Action Decision (Tetra Tech, 2017).

The study area identified in this RI as the Skeet Range MRS consists of the High Tower Range with a 500-foot danger zone and the east-facing skeet range with a 900-foot safety fan, estimated to be 29.4 acres, see Figure 2-1. The primary contaminants generated by range operations include lead from lead shot and PAHs from clay pigeons (PAHs). The safety fan represents the fallout zone of lead shot fired at the clay pigeons. Lead shot is of particular interest since it is of similar size to the grit ingested by certain bird species, see Section 7.0 for the Ecological Risk Assessment.

The RI divided the Skeet Range MRS into four exposure areas: Northern Range Area, Southern Range Area (with an overlapping Skeet Range Shooting Area to evaluate polycyclic aromatic hydrocarbons [PAHs]), and the High Tower Range Area, see Figure 2-2. The High Tower Range Area is comprised of two areas of the High Tower Range not overlapped by the previously investigated MBFR Complex ranges (i.e. AGTF, Pistol, and Rifle Ranges) or the National Oceanic and Atmospheric Administration (NOAA) facility. The High Tower Range Area consists of old field grasslands and deciduous scrub. The Northern Range Area encompasses the northern portion of the east-facing skeet range, north of the NOAA facility. The Northern Range Area is a drainage swale consisting of deciduous scrub and palustrine forested wetland. The drainage swale conveys water to Little Mosquito Creek. A culvert located on the NOAA facility connects the southern and northern portions of the east-facing skeet range. The Southern Range Area

encompasses the southern portion of the east-facing skeet range, west and south of the NOAA facility. The Southern Range Area consists of an area NOAA cleared in 2011 during antennae tower construction (now a Loblolly Pine Forest) and a flat grassy area (mowed). The NOAA facility was not included in the exposure areas because it has been significantly reworked since the Skeet Range MRS was last operational.

2.3 Site History

An SI was performed in 2007 at the MBFR Complex and included the Skeet Range MRS (Tetra Tech, 2009). Sampling at the east-facing skeet range was conducted in two phases. Phase I consisted of collecting and analyzing 39 surface soil samples for PAHs, pH/total organic carbon (TOC), target analyte list (TAL) metals, and grain size. Lead shot counts were also performed in the field by sieving a 1-foot by 1-foot by 6-inch volume of soil (0.5 $feet^3$). Due to the high amount of lead shot found in portions of the Southern Range Area a second phase was required. Phase II included collecting an additional 17 samples to further delineate the nature and extent of lead shot and lead soil contamination. The presence of clay pigeon fragments was also observed.

Lead was detected in samples from 2007 at concentrations ranging from 6.9 milligrams per kilogram (mg/kg) to 1,150 mg/kg. The highest lead concentrations were detected in samples from the Northern Range Area within the drainage swale. The SI determined that this may be a result of drainage patterns in the area and not a widespread occurrence.

Lead shot was identified at many locations in the Southern Range Area in 2007 with counts ranging from 0 to 165 lead shot per square foot (ft^2) from 0 to 6 inches. The areas with the greatest amount of lead shot were identified in the southern and southeastern downrange portions of the Southern Range Area in the flat grassy areas, generally within 600 feet of the firing area. The area cleared by NOAA in the central portion of the Southern Range Area contained very little lead shot. The lead shot was found to be in good condition with no fragmentation and very little oxidation. Lead shot was not observed in the Northern Range Area.

PAH concentrations were highest in samples from the Skeet Range Shooting Area, specifically in areas adjacent to and within about 120 feet of the firing line or shooting stations. Locations with observed clay pigeon fragments coincide with samples exhibiting higher PAH concentrations. Clustering of samples with elevated PAH concentrations were found in two distinct areas near the firing line. The first cluster is located directly in front of the north end of the Skeet Range Shooting Area. The second cluster is located at the southern end of the Skeet Range Shooting Area. Generally, PAH concentrations decrease with increasing distance from these two clusters; however, elevated PAH concentrations were also detected in two isolated areas, approximately 200 feet east and approximately 300 feet southeast of the Skeet Range Shooting Area.

The SI determined that contaminant concentrations detected at the Skeet Range MRS do not present an unacceptable carcinogenic risk to potential industrial users, but they do however present an unacceptable carcinogenic risk to potential residential users. The unacceptable residential risk is primarily associated with PAH contamination detected in samples collected in the Skeet Range Shooting Area. In addition to PAHs, some lead concentrations detected at the

Skeet Range MRS exceeded the United States Environmental Protection Agency (USEPA) Regional Screening Level (RSL) for residential soil of 400 mg/kg (the lead PRG is 200 mg/kg).

The SI evaluated the potential risks to terrestrial plants, invertebrates, and small mammals and birds. The ecological risk screening concluded that lead concentrations present a low risk to plants, invertebrates, and small mammals and birds. Although the overall risk is minimal, most of the samples with elevated contaminant concentrations exceeding ecological screening levels for plants were limited to portions of the Southern Range Area and the Northern Range Area. Lead concentrations did not exceed the ecological soil screening level for invertebrates. Risk to herbivorous and insectivorous mammals is expected to be low with the greatest risk in the Southern Range Area. The ecological risk assessment also evaluated the presence and abundance of lead shot in soil. This evaluation concluded that birds were at risk of ingesting lead shot in soil in the Southern Range Area. The SI concluded that the overall impact to plants and invertebrates from PAHs is not expected to be significant because there are only few locations where PAH concentrations were greater than the plant or invertebrate benchmarks/toxicity levels. Also, it is not likely that the PAHs will be bioavailable because they are bound up in the clay pigeon fragments. Therefore, PAHs were eliminated as COPCs for terrestrial plants and soil invertebrates.

The SI sampling results also showed that the sample locations in the Southern Range Area with lead concentrations above screening criteria coincided with the locations of lead shot counts above the ecological screening criterion of 10 shots per square foot.

Samples were collected from five monitoring wells during the SI to characterize site contaminants in groundwater at the MBFR. Appendix A provides the sample location figure, analytical table, and field documentation for the two monitoring wells (RR-MW-02 and RR-MW-03) located within the footprint of the Skeet Range MRS (just east of the Skeet Range Shooting Area and in downrange portion of the Southern Range Area, see Figure 1 of Appendix A).

Groundwater samples from these two monitoring wells were analyzed for the Skeet Range MRS site contaminants: lead (TAL metals [total]) and PAHs. Table 1 of Appendix A provides the analytical data and applicable screening criteria. Lead and PAHs concentrations were below USEPA Tapwater RSLs and MCLs. Lead concentrations ranged from 0.97 to 1.2 micrograms per liter (µg/L), which are well below the USEPA Tapwater RSL and MCL (both of which are 15 µg/L). PAHs were not detected in groundwater. Although manganese is not a site contaminant, concentrations did exceed the USEPA Tapwater RSL at RR-MW-03, however, this appears to be related to the geochemistry (reducing conditions) and geology (clayey silt) at this well location. Appendix A provides the field log sheets, boring logs, well installation details, and development logs. The SI Report recommended that no further evaluation of groundwater was necessary and future actions be taken to address potential risks associated with soils.

In 2009, eight additional surface soil samples from the drainage swale in the Northern Range Area were collected and analyzed for lead (Tetra Tech, 2009b). These samples had lead concentrations ranging from 325 to 1,400 mg/kg. Lead shot was not observed in these samples.

In 2010, the U.S. Army Corps of Engineers (USACE) conducted further historical review of the MBFR Complex and identified the existence of the northeast-facing High Tower Range, which is documented in the USACE SI Report (USACE, 2012). The High Tower Range Area had not previously been investigated.

In 2011, NASA collected additional soil samples from the eastern downrange portion of the Southern Range Area to support NOAA construction of new antenna towers that encroached upon the former east-facing skeet range (see Figure 2-1). Three samples were collected from the planned footprint of each NOAA Antennae Site (Sites 5 and 8) and analyzed for Toxic Characteristic Leaching Procedure (TCLP) lead and total lead (Meyer, 2011). Results indicated total lead averages (114 mg/kg and 62 mg/kg, respectively) were below the USEPA Residential RSL of 400 mg/kg and the PRG of 200 mg/kg at each antennae site. In 2011, NOAA cleared the trees in the central portion of Skeet Range MRS and began construction on the new antennae sites (shown on Figures 2-1 and 2-2). Samples from the SI indicated PAH concentrations in the vicinity did not pose an unacceptable carcinogenic risk; therefore, samples were not collected for PAH analysis at the Antennae Sites.

Further investigation at the Skeet Range MRS was put on hold as the USACE and NASA determined their respective roles and responsibilities under the USACE Formerly Used Defense Sites (FUDS) program. In 2015, a Memorandum of Agreement (MOA) was entered into between the Department of the Army and NASA in regard to environmental restoration work at certain locations on WFF. This MOA documents that NASA, as the land holding agency for the WFF is the most suitable agency to conduct all response actions on the facility under CERCLA or the Resource Conservation and Recovery Act (RCRA). As such, the environmental response at the Skeet Range MRS (FUDS Project 9) is being conducted by NASA.

2.4 Surface Features, Geology, and Hydrogeology

NASA WFF is located on the Eastern Shore of Virginia within the Atlantic Coastal Plain physiographic province. The geology of the Eastern Shore of Virginia can be characterized as a series of layered, unconsolidated, sedimentary units deposited in the Salisbury Embayment (Meng and Harsh, 1988). The sediments comprise an eastward-thickening wedge that dips to the northeast towards the Atlantic Ocean. In the vicinity of the NASA WFF, approximately 7,000 feet of sediment lie atop crystalline basement rock. The two stratigraphic groups encountered at the WFF are the Chesapeake Group and the overlying Columbia Group.

The MBFR Complex is located on the northern side of the Main Base, east of Runway 17-35, on a peninsula-like feature adjacent to Little Mosquito Creek. The southern half and the central portion of the MBFR Complex, generally coinciding with the former Rifle and Pistol Ranges, is mostly grassy and flat, with little slope. The perimeter of the MBFR Complex consists of gentle slopes ranging from 1 to 4 percent to the northwest, north, and east. There are no streams within or adjacent to the MBFR Complex and drainage is via overland sheet flow. Southern and eastern downrange portions of the former east-facing skeet range drain into a centralized collection area where surface runoff is directed through a concrete drainage culvert, to the Northern Range Area. The Northern Range Area consists of a drainage swale that discharges water to Little Mosquito

Creek and associated wetlands. Little Mosquito Creek is located about 400 feet to the north of the MBFR Complex. Vegetation on the northern and eastern portions of the site consists of conifers, bushes, and tall grasses. The MBFR Complex area is undeveloped and the Facility Master Plan indicates that the area will remain undeveloped because of building height and occupancy restrictions. These restrictions are in place due to the close proximity of the active airport runways, which are important to the facility mission.

At WFF the surficial geology can be characterized as a silty fine-grained sand with varying amounts of clay and gravel. The thickness of this silty fine-grained sand varies but can be as thick as 15 feet or absent altogether. Below the silty fine-grained sand is a coarser well sorted fine to medium-grained sand. Most soil encountered at the Skeet Range MRS during the investigations was silty fine-grained sand with varying amounts of organics and trace amounts of medium to coarse-grained sand.

The local aquifer system at the WFF consists of four aquifers: the upper, middle, and lower Yorktown-Eastover aquifers and the Columbia aquifer (also called the “surficial” aquifer). These aquifers serve as the primary source of water for public and domestic supplies and for agricultural and industrial uses. The hydrogeologic framework is derived from *Hydrogeology and Analysis of the Ground-Water-Flow System of the Eastern Shore, Virginia* (Richardson, 1994).

The Columbia Group extends to a subsurface depth of approximately 60 feet and consists of interbedded sands, gravels, and sandy clays deposited under fluvial and marine conditions. The Columbia Group is overlain by a variably thin (generally about 5 feet) veneer of recent deposits composed chiefly of wind-deposited or fluvial sands, silts, and gravels. Within the Columbia aquifer there are a series of clay, silt, and/or sandy clay lenses. These lenses are not continuous and do not act as a confining layer but do impede vertical flow locally. The water table beneath the WFF typically occurs under unconfined conditions within the recent deposits and Columbia Group at depths of 0 to 30 feet below ground surface (bgs) (Occu-Health, 1999) and groundwater flow generally mimics topography (Tetra Tech, 2004).

2.5 Demography and Land Use

The MBFR Complex is located in a secured industrial area (NASA and NOAA) adjacent to an active airfield and operational antennae towers. Access is very limited due to operations. There are no residences or offices in this area. Current land use is industrial and the land use is expected to remain industrial in the future.

2.6 Ecology

The southern half of the Skeet Range MRS is mostly flat, with little slope. However, along the northern, eastern, and northwestern boundaries of the study area, steep slopes direct surface runoff into low-lying marshes that border Little Mosquito Creek. Approximately 300 to 500 feet of marshland separates Little Mosquito Creek from the MBFR Complex to the north and east. There are no surface water bodies within or immediately adjacent to the MBFR Complex.

The habitats at the MBFR Complex consist primarily of overgrown vegetation, including grasses, shrubs, and trees. The only wetland habitat is situated in the downstream reaches of the drainage swale located north of the NOAA facility, see Figure 2-1. This wetland is best described as a palustrine forested wetland. Based on the habitat at the site, and the lack of surface water on or near the site, only terrestrial receptors were evaluated during the SI. The terrestrial receptors that were evaluated in the SI include plants, invertebrates, and small mammals and birds.

3.0 FIELD ACTIVITIES

Field activities for the RI at the Skeet Range MRS were carried out in March, April, and December 2018, as well as in March 2019. Multiple events were required to assess, plan, and bound lead, PAH, and lead shot contamination. These field events were designed to further characterize the nature and extent of contamination, gather data to evaluate the risk to human health and ecological receptors, and support future corrective action decisions at the Skeet Range MRS. The RI fieldwork did not include sampling groundwater since SI Report recommended that no further evaluation of groundwater was necessary. The field activities conducted during the RI are summarized below.

March 2018

- Marked out 80 sample locations.
- Collected surface and subsurface soil samples for lead analysis at 56 locations.
- Collected surface and subsurface soil samples for PAH analysis at 22 locations.
- Surface and subsurface soils were sieved using a #10 sieve (2-millimeter [mm] mesh size) at 33 locations.
- Surface and subsurface soils were sieved using a #35 sieve (0.5-mm mesh size) at two locations.
- Lead shot, non-lead grit sized particles, and clay pigeon fragments from the sieved fractions were counted.
- Collected rinsate blanks off reusable equipment.
- Containerized and characterized the investigation derived waste (IDW) in four 55-gallon drums.

April 2018

- Wetlands delineation in the Northern Range Area.

December 2018

- Marked out 34 sample locations.
- Collected surface soil samples for lead analysis at 9 locations.
- Collected surface soil samples for PAH analysis at 3 locations.
- Surface and subsurface soils were sieved using a #10 sieve at 29 locations.
- Surface and subsurface soils were sieved using a #20 sieve (0.85-mm mesh size) and a #14 sieve (1.4-mm mesh size) at 14 locations.
- Lead shot, non-lead grit sized shot particles, and clay pigeon fragments from the sieved fractions were counted.

- Collected rinsate blanks from reusable equipment.
- Containerized and characterized the IDW in two 55-gallon drums.

March 2019

- Marked out 23 sample locations.
- Surface and subsurface soils were sieved using a #10 sieve at 29 locations.
- Surface and subsurface soils were sieved using a #14 sieve at 7 locations.
- Lead shot, non-lead grit sized particles, and clay pigeon fragments from the sieved fractions were counted.

Containerized and characterized the IDW in two 55-gallon drums.

A photographic log documenting site conditions and the field activities conducted is provided in Appendix B.

3.1 Soil Sampling and Sieving

Surface and subsurface soil sampling was conducted in March and December 2018, and March 2019. Sample locations were marked out with a global position system unit with sub-meter accuracy. Surface soils were obtained with a shovel/spade and subsurface soils were obtained with hand auger (3-inch). Figures 3-1, 3-2, and 3-3 present the sample locations and Table 3-1 provides the soil sample details. Soil sample log sheets are presented in Appendix C.

Reusable equipment (hand auger, sieves, and shovels) were decontaminated with an alconox water scrub and water rinse between sample locations.

3.1.1 Lead Sampling

Soil samples were collected for lead analysis in the Northern Range Area, Southern Range Area, and High Tower Range Area to further delineate the distribution of lead in surface soil and determine if lead has impacted subsurface soil. Figures 3-1, 3-2, and 3-3 present the soil sample locations that received lead analysis and Table 3-1 provides the soil sample details. In March 2018, 128 soil samples from 56 locations were collected for lead analysis. In December 2018, 18 soil samples from 9 locations were collected for lead analysis. These soil samples augment those collected in 2007 and 2009.

The soil samples for lead analysis were dry sieved through a #10 sieve to remove any lead shot before jarring up the sample.

3.1.2 PAH Sampling

Soil samples were collected for PAH analysis in the Skeet Range Shooting Area to further characterize PAHs in surface soil and determine if PAHs have impacted subsurface soil. Figure 3-4 presents the PAH soil sample locations and Table 3-1 provides the soil sample details. In March 2018, 38 samples from 22 locations were collected for PAH analysis. In December 2018,

3 soil samples from 2 locations were collected for PAH analysis. These samples augment those collected in 2007 and 2009.

The presence and quantity of clay pigeon fragments were documented at the sample locations if/when they were observed.

3.1.3 Sieving

Sieving of surface and subsurface soil was performed to further characterize lead shot in the Southern Range Area and determine the presence and extent of lead shot in the High Tower Range Area. Figures 3-5 and 3-6 present the soil sample locations that received sieve analysis and Table 3-1 provides the soil sample details. In March 2018, 101 depth intervals at 33 locations were sieved. In December 2018, 45 depth intervals at 29 locations were sieved. In March 2019, 32 depth intervals at 23 locations were sieved. Lead shot and non-lead grit sized particles retained on the sieves were counted for each interval, and this data augments the data collected in 2007. The SI sample locations which were sampled and sieved were included in the data evaluation as they were originally reported.

Sieving consisted of sieving a volume of surface soil (0 to 6-inch and 6 to 12-inch intervals) and subsurface soil (12 to 24-inch or 12 to 18-inch and 18 to 24-inch intervals). Initially, the volume of surface soil was 0.5 cubic foot (1-foot by 1-foot by 6-inches) and the volume of subsurface soil was 0.05 cubic foot (3-inch diameter by 12-inches). The first few soil volumes were dry sieved through a #10 sieve (2-mm mesh size), followed by a #35 sieve (0.5-mm mesh size). However, the soil consistency did not allow it to easily pass through the mesh, and in many instances required excessive force and time, especially when using the #35 sieve. As a result, wet sieving techniques were implemented, and the volume of surface soil was reduced to 7-inch by 7-inch by 6-inch deep or 0.17 cubic feet, with 7 inches being the width of the spade. These changes were discussed on March 23, 2018 with NASA and the regulators, who agreed with the approach, as long as the surface soil lead shot and non-lead grit sized particle counts were extrapolated back to 1-foot by 1-foot by 6-inches. The field task modification request form documenting this change is provided in Attachment 1 of the SAP Addendum.

Lead shot and non-lead grit sized particles were counted on the soil fraction retained on the #10 sieve using wet sieving techniques. Wet sieving techniques facilitated the breakup of the soil peds and kept the mesh relatively unclogged. The slurry that passed through the #10 sieve was scooped out of the plastic totes and wet sieved through the #35 sieve in March 2018. The #35 fraction from March 2018 was retained in a ziplock and later partitioned with a #20 sieve (0.85-mm mesh size) in December 2018 and even further partitioned with a 14 sieve (1.4-mm mesh size) at a later date.

In March 2018, wet sieving with the #35 sieve was conducted on five depth intervals at two locations (SR-SS-225 and SR-SS-221). The soil fraction retained on the #35 sieve was very high (estimated at >100,000 non-lead grit sized particles) concealing any lead shot or lead shot fragments. The soil fractions retained on the #35 sieve from the five depth intervals were sent out for further testing (sieving with #20 sieve, lead shot count, and lead analysis) by a fixed based laboratory. The laboratory sieved the soil and bagged the soil fractions that were retained on and

passed through the #20 sieve. Each fraction was analyzed for lead, visually examined for lead shot, weighed, and the total amount of non-lead grit sized particles was estimated. Grain size analysis was also performed on eight soil samples.

In December 2018, wet sieving with the #20 sieve was conducted on 19 depth intervals at 14 locations. The fraction retained on the #20 sieve was weighed with a digital scale with 0.001-gram accuracy. To get an approximate value of non-lead grit sized particles, a portion of the fraction retained on the #20 sieve was counted, weighed, and extrapolated. The #20 fraction was further partitioned with a #14 sieve and the approximate number of non-lead grit sized particles was estimated.

In March 2019, wet sieving with the #10 sieve (32 depth intervals at 23 locations) and #14 sieve (11 depth intervals at 7 locations) was conducted. The lead shot and non-lead grit sized particles retained on the #10 and #14 sieve were counted.

3.2 Sample Custody

Soil samples were sent to Katahdin Analytical Services, Inc. in Scarborough, Maine for chemical and physical analysis. Chain of custodies documenting the collection time and date, required analyses, and custody of each sample are provided in Appendix D.

3.3 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) samples collected during the investigation included field duplicate samples and laboratory matrix spike/matrix spike duplicate (MS/MSD) samples. Equipment rinsate blanks were also collected as part of the investigation. QA/QC sample log sheets are provided in Appendix E.

3.4 Investigation Derived Waste

IDW generated during the investigation consisted of lead shot and decontamination/sieve water. Excess soil cuttings were placed back in their respective borehole. The lead shot was containerized in a 250-milliliter (mL) polyethylene sample bottle and placed in a 5-gallon bucket. Decontamination and sieve water were containerized in 55-gallon drums. The IDW drums were labeled, sampled, and analyzed for volatile organic compounds (VOCs); benzene, toluene, ethylbenzene, and xylenes (BTEX); diesel range organics (DRO); total organic halides (TOX); semi-volatile organic compounds (SVOCs); and metals.

3.5 Wetlands Delineation

Wetlands delineation in the Northern Range Area was conducted on April 15, 2018, as a review and modification of wetland mapping completed in 2007. Appendix F provides a technical memorandum detailing the wetlands delineation with figures and photos.

The wetland previously mapped as a palustrine emergent and palustrine scrub-shrub wetland (PEM/PSS) (Cowardin et. al 1979) was reviewed based on the three-parameter approach in

accordance with USACE Wetlands Delineation Manual (USACE, 1987) and Regional Supplement to the USACE Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (USACE 2010). This three-parameter approach uses vegetation, soils, and hydrology to identify the presence of freshwater wetlands. An area is a wetland if, under normal circumstances, it meets all three of the following criteria:

- Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions).
- Hydric soils (soils that were formed under water or in saturated conditions).
- Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

Based on the findings of the site survey, a palustrine forested wetland was present with a diminished southern footprint when compared to the 2007 boundary. Findings were based on the above parameters, mapped at sub-meter accuracy, and documented with photos and a paired data-point set.

4.0 NATURE AND EXTENT OF CONTAMINATION

This section presents the results of the physical and chemical analyses performed for surface and subsurface soil samples collected during the SI (Tetra Tech, 2009a), Skeet Range: Lead Follow-Up Soil Sampling Summary Report (Tetra Tech, 2009b), proposed NOAA antennae tower soil sampling (Meyer, 2011), and this RI. Tables 4-1 through 4-6 summarize the data and Figures 4-1 through 4-6 present the data. Appendix G provides the Data Validation Reports.

Groundwater was not evaluated in the RI since the SI Report recommended that no further evaluation of groundwater was necessary, see Section 2.3 for a complete explanation.

4.1 Historical and RI Data Usability

The SI (Tetra Tech, 2009a), SAP (Tetra Tech, 2018a), and the SAP Addendum (Tetra Tech, 2018b) set out to delineate the extent of contaminated surface soil and investigate potential contamination in subsurface soils. The RI data and the acceptable historical data form the complete data set that will be used to evaluate the nature and extent of contamination and determine risks to human health and the environment.

Analytical data from the investigations was verified as to validation status and the interpretation of qualifiers attached to individual results. Data qualified as rejected (R) or false positives attributable to blank contamination (B) were removed from further consideration. Data qualified as estimated (J) or biased high (K) or low (L) were retained. An assessment of data usability was performed to determine if detection limits were adequate to meet the project objectives defined in the SAP (Tetra Tech, 2018a). A review of the data for the Skeet Range MRS indicates that it is acceptable and the data sets for surface and subsurface soil are as detailed in Section 4.2.

4.2 Nature and Occurrence Of Contamination

The lead, PAH, and lead shot results in surface and subsurface soil at the Northern Range Area, Southern Range Area, High Tower Range Area, and Skeet Range Shooting Area were screened against PRGs. PRGs were developed based on the evaluation of the risk to human health and ecological receptors. Human health PRGs were established to protect hypothetical residents and industrial workers from lead and target PAHs in soil. Ecological PRGs were established to protect plants and birds from concentrations of lead in soil and to protect birds from lead shot in the soil. PRGs for each contaminant are presented below and explained in Appendix A of the SAP. The lead shot PRG was further refined during the RI based on the findings of the probability modeling (see Section 7.3.4). The following table provides the PRGs which will be used to present and evaluate the RI data.

Receptors	Recommended Cleanup Levels	
	Average Values	**Not-to-Exceed Values**
Plants (lead)	240 mg/kg (1)	750 mg/kg
Birds (lead in soil)	299 mg/kg (1)	1,100 mg/kg
Birds (lead shot)	NA	100 lead shot/ft^2 (2)
Sediment Invertebrates (lead)	NA	530 mg/kg (3)
Human Health (lead)	200 mg/kg (1)	NA
Human Health (target PAHs)	NA	1x10^{-4} (4)

Footnotes:
(1) - Compared to the arithmetic average concentration across each decision/soil exposure unit. (Northern Range Area, Southern Range Area, and High Tower Range Area).
(2) - This value is applied to the surface soil 6-inch intervals and was refined from 10 lead shot/ft^2 to 100 lead shot/ft^2 after the collection of additional sieve/lead shot counts and probability modeling (see Section 7.3.4)
(3) - Applies to the Northern Range Area of the Skeet Range MRS in the low-lying area classified as a palustrine forested wetland.
(4) - Total Point Risk "not to exceed" 1x10^{-4} for the seven target PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene

The recommended not-to-exceed ecological PRGs for lead in the Northern Range Area is 530 mg/kg (protective of sediment invertebrates) and 750 mg/kg for the Southern Range Area/Skeet Range Shooting Area and High Tower Range Area. The human health PRG for the average lead concentration for each area was set at 200 mg/kg. The human health PRG for PAHs in the Skeet Range Shooting Area, located within the Southern Range Area, is a total point risk of 1x10^{-4}.

PAH concentrations were greater than plant or invertebrate benchmarks/toxicity levels at only a few locations and the bioavailability of PAHs is expected to be low (PAHs are bound to the clay from the skeet). The ecological effect quotient (EEQs) were less than one for birds and mammals in the Step 3a food chain models so risk to those receptors were also acceptable. Therefore, ecological PRGs for PAHs were not provided since PAHs were eliminated as COPCs in the Step 3a refinement portion of the SLERA.

4.2.1 Surface Soils

Surface soils are defined as being from the ground surface to 1-foot bgs for the evaluation of nature and extent of contamination. In Section 7 – Human Health Risk Evaluation and Section 8 – Ecological Risk Assessment, surface soils are defined as the top 6 inches of soil (0 to 6 inches). The top 6 inches represents the greatest risk to receptors and provides the most conservative scenario.

<u>Lead</u>

Lead analysis was performed on 69 surface soil samples at the Skeet Range MRS during the 2009 SI sampling, 2009 follow-up soil sampling, and the 2011 NOAA sampling. During the RI an additional 130 surface soil samples were collected and analyzed for lead. Tables 4-1 through 4-3 provide a summary of lead analytical results for each lead exposure area while Figures 4-1 through 4-3 present the data spatially.

Lead surface soil samples were collected from the Northern Range Area, Southern Range Area, and High Tower Range Area. Lead concentrations above the human health and/or ecological

PRGs are present in surface soil samples from the Northern Range Area and Southern Range Area.

In the Northern Range Area, lead concentrations above the not-to-exceed ecological PRG of 530 mg/kg are present in the drainage swale, see Table 4-1 and Figure 4-1. There is some uncertainty in whether the low-lying soil/sediment samples at the Northern Range Area provide habitat for sediment invertebrates and therefore they will be evaluated as sediment samples to be conservative. Ten samples from the 0 to 6-inch interval and two samples from the 6 to 12-inch interval exceed the ecological PRG. These samples form two clusters located in the low-lying areas of the drainage swale that conveys runoff from the east-facing skeet range to Little Mosquito Creek. The larger cluster is comprised of SR-SS-037, -100, -102, -103, -105, -106, -201, -202, and -213; while the smaller cluster is located to the north and consists of SR-SS-108. The maximum lead concentration of 22,200 mg/kg was detected at SR-SS-213 from 0 to 6 inches, with the next highest concentration being 2,020 mg/kg at SR-SS-202 from 0 to 6 inches. The arithmetic average for lead in the Northern Range Area is 1,112 mg/kg for the 0 to 6-inch interval and 185 mg/kg for the 6 to 12-inch interval. If you remove the highest detection of 22,200 mg/kg that is orders of magnitude higher than all other samples, the average drops to 510 mg/kg. If the samples with lead concentrations greater than the not-to-exceed ecological PRG of 530 mg/kg are removed the arithmetic site-wide lead average for the 0 to 6-inch interval drops to 284 mg/kg. This average lead concentration remains greater than human health PRG of 200 mg/kg.

In the Southern Range Area, lead concentrations above the not-to-exceed ecological PRG of 750 mg/kg are present in the flat area approximately 400 feet away from the shooting area, see Table 4-2 and Figure 4-2. Six samples from the 0 to 6-inch interval exceed the ecological PRG. These samples form a thin ribbon that extends from SR-SS-230 to SR-SS-235 before getting cut-off by the NOAA fence line. Soil samples collected around the satellite antennae towers showed lead concentrations below the ecological PRG, likely due to this area being reworked. The maximum lead concentration in the Southern Range Area was 1,140 mg/kg at SR-SS-235 from 0 to 6 inches. The arithmetic average for lead in the Southern Range Area is 196 mg/kg for the 0 to 6-inch interval and 86 mg/kg for the 6 to 12-inch interval, both of which are lower than the human health PRG of 200 mg/kg.

In the High Tower Range Area, lead concentrations were below the not-to-exceed ecological PRG of 750 mg/kg, see Table 4-3 and Figure 4-3. The maximum lead concentration was 508 mg/kg at SR-SS-254. The arithmetic average for lead in the High Tower Range Area is 115 mg/kg for the 0 to 6-inch interval and 52 mg/kg for the 6 to 12-inch interval, both of which are lower than the human health PRG of 200 mg/kg.

<u>PAHs</u>

PAH analysis was performed on 54 surface soil samples at the Skeet Range MRS during the 2009 SI sampling and 2009 follow-up soil sampling. An additional 30 surface soil samples were collected in the Skeet Range Shooting Area for PAH analysis during the RI. Table 4-4 summarizes the surface soil PAH analytical results while Figure 4-4 presents the data spatially.

Seven PAHs were identified in the SAP and were screened against the human health PRG (total point risk of $1x10^{-4}$). Figure 4-4 presents the data and the areas with total point risk greater than $1x10^{-4}$ appear to form clusters in the Skeet Range Shooting Area specifically along the firing line (11 sample locations) and south of the firing line (SR-SS-275 and -276). Thirteen samples were from the 0 to 6-inch interval and one sample was from the 6 to 12-inch interval. The highest total point risk was in samples from SR-SS-267 ($7.1x10^{-4}$) and SR-SS-275 ($7.0x10^{-4}$), both in the 0 to 6-inch interval.

Lead Shot

Lead shot counts were made during the 2009 SI sampling (56 surface soil samples) and during the RI (142 surface soil samples). Table 4-5 provides a summary of lead shot and non-lead grit size particle counts. The counts presented in Table 4-5 were extrapolated back to a square foot, as explained in Section 3.1.3. Figures 4-5 and 4-6 present the lead shot and non-lead grit size particle counts from the Southern Range Area and High Tower Range Area. The Northern Range Area was investigated for lead shot during the SI sampling but not during the RI since lead shot was not found in any of the four SI samples.

In the Southern Range Area, the majority of the lead shot was found in the 0 to 6-inch interval on the flat grassy portions (southern half of the Southern Range Area) or along the fence line that divides NASA and NOAA. Figure 4-5 presents the lead shot results, as well as the footprint of samples with lead shot greater than the ecological PRG of 100 lead shot/ft^2, depicted as a blue swath. In the 0 to 6-inch and 6 to 12-inch intervals, lead shot greater than 100 lead shot/ ft^2 was found at 20 locations and two locations, respectively. These samples encompassed the same area as the samples which had lead concentrations greater than the not-to-exceed PRG, however, elevated lead shot has a slightly larger footprint. The greatest lead shot counts were found at SR-SS-235 at 967 lead shot/ft^2 in the 0 to 6-inch interval. The non-lead grit sized particle counts are included for the #10, #14, #20, and #35 sieved fractions, which were used along with the lead shot counts to evaluate the ingestion probability.

In the High Tower Range Area, the majority of the lead shot was found in the 0 to 6-inch interval in the southeastern portion. Figure 4-6 presents the lead shot results, as well as the footprint of samples with lead shot greater than the ecological PRG of 100 lead shot/ft^2, depicted as a blue swath. In the 0 to 6-inch and 6 to 12-inch intervals, lead shot greater than 100 lead shot/ft^2 was found at 13 locations and two locations, respectively. The greatest lead shot counts were found at SR-SS-256 at 359 lead shot/ft^2 in the 0 to 6-inch interval. The non-lead grit sized particle counts are included for the #10, #14, #20, and #35 sieved fractions, which were used along with the lead shot counts to evaluate the ingestion probability.

Delineation of lead shot in the High Tower Range Area encroached into the western portion of the Northern Range Area. This lead shot will be evaluated as part of the High Tower Range Area.

4.2.2 Subsurface Soils

Subsurface soils are defined as being as any soil deeper than 1-foot bgs for the evaluation of nature and extent of contamination. In Section 7 – Human Health Risk Evaluation and

Section 8 – Ecological Risk Assessment subsurface soils are defined as any soil deeper than 6 inches.

Lead

Lead analysis was performed on 19 subsurface soil samples during the RI. Tables 4-1 through 4-3 provide a summary of the subsurface soil lead analytical results for each lead exposure area while Figures 4-1 through 4-3 present the data spatially.

The maximum lead concentration in subsurface soil was 140 mg/kg for the Northern Range Area, 191 mg/kg for the Southern Range Area, and 18.2 mg/kg in the High Tower Range Area. The arithmetic average for lead in subsurface soil was 57 mg/kg for the Northern Range Area, 30 mg/kg for the Southern Range Area, and 10 mg/kg in the High Tower Range Area. The concentrations were less than both the human health and ecological PRGs.

PAHs

PAH analysis was performed on eight subsurface soil samples at the Skeet Range Shooting Area during the RI. Table 4-4 provides a summary of the PAH analytical results while Figure 4-4 presents the data spatially. PAH concentrations in subsurface soil are generally low with a maximum total point risk of 2.6×10^{-6}, which is less than the human health PRG.

Lead Shot

Lead shot counts were performed on 35 subsurface soil samples during the RI. Table 4-5 provides a summary of lead shot and non-lead grit sized particles. Figures 4-5 and 4-6 present the lead shot and non-lead grit size particle counts from the Southern Range Area and High Tower Range Area.

Most of the lead shot in both the Southern Range Area and High Tower Range Area was found in the 0 to 6-inch and 6 to 12-inch intervals. However, some lead shot was found in from 1 to 2-foot interval. The maximum lead shot counts in subsurface soil at the Southern Range Area was 45 lead shot/ft^2 at SR-SS-220 from the 12 to 24-inch interval, which were less than the ecological PRG. Lead shot was not found in subsurface soil at the High Tower Range Area.

4.3 Refined Conceptual Site Model

A Conceptual Site Model (CSM) facilitates consistent and comprehensive evaluations of potential risks to human health and environment by creating a framework for identifying the pathways by which human and ecological receptors may come in contact with environmental media contaminated by site activities. A CSM depicts the relationships among the following elements, which are necessary for defining complete exposure pathways:

- Site sources of contamination.
- Contaminant release mechanisms and transport/migration pathways.
- Exposure routes.
- Potential receptors.

These elements establish the manner and degree to which a potential receptor may be exposed to contaminants present at the site. Based on the historical site information and previous sampling data, the CSM for the Skeet Range MRS can be developed. Components of the CSM are discussed below.

4.3.1 Site Sources of Contamination

Based on the historical skeet shooting activities conducted at the High Tower Range and east-facing skeet range and the analytical data evaluated during the initial SI and RI, the primary sources of contamination at the Skeet Range MRS are lead shot (lead) and clay pigeon fragments (PAHs) in surficial soils.

4.3.2 Transportation and Migration Pathways

Migration pathways potentially affecting current conditions at the Skeet Range MRS include the following:

- Migration of lead and PAHs from surface to subsurface soils.
- Migration of lead and PAHs via surface soil runoff or erosion.
- Migration of lead and PAHs from soil to groundwater.

The initial SI concluded that elevated lead concentrations, lead shot counts, and PAHs are present in surface soils. The RI further characterized these contaminants in surface soil while also characterizing the extent in subsurface soil.

The majority of the Skeet Range MRS can be characterized as dense vegetation and grassy fields, which allow infiltration of precipitation and limits sheet flow of rainwater. The northern drainage channel of the Northern Range Area is the primary pathway for surface water runoff at the east-facing skeet range. Analytical results indicate that elevated lead concentrations are present in surface soil samples from the northern drainage channel. Elevated lead concentrations are also present in samples from the Southern Range that form a thin ribbon in undisturbed portions of the flat grassy area. Migration of lead from surface to subsurface soil does not appear to be a major factor based on the subsurface soil concentrations but will still be identified as a migration pathway.

Elevated PAH concentrations are present in surface soil in two localized areas of the Skeet Range Shooting Area. However, these elevated concentrations are limited to surface soil and are not present in subsurface soil.

Lead shot is present in both surface and subsurface soils in the Southern Range Area and High Tower Range Area, however, the higher counts are limited to surface soil. The lead shot appears to be in good condition with little oxidation and fragmentation. Also, lead shot by nature does not migrate readily and is mostly bound to the first couple inches of soil. In the Southern Range Area and High Tower Range Area, locations with elevated lead shot correspond with samples with higher lead concentrations, however, the elevated lead shot footprints are much larger.

Groundwater samples were collected during the SI and lead was found to have a maximum concentration of 2.2 µg/L while PAHs were not detected. No further evaluation of groundwater

was necessary for the SI. The contaminant migration pathway from soil to groundwater is currently incomplete. However, the soil to groundwater pathway appears not likely considering the low concentrations of lead (PAHs were not detected) in groundwater and subsurface soil.

4.3.3 Exposure Routes and Potential Receptors

The primary media through which human receptors can be exposed to lead and PAHs are surface and subsurface soils. Exposure routes for lead and PAHs in soil include dermal contact, ingestion, and potential inhalation from fugitive dusts. Surface soils are the primary media of concern for ecological receptors. Section 6 details the Human Health Risk Evaluation and Section 7 details the Ecological Risk Assessment (ERA).

4.4 Summary

Contamination is present at the Skeet Range MRS due to historic use of various gauge shotguns firing cartridges containing lead shot and PAH-containing clay pigeon targets. The vertical and horizontal extent of lead and PAHs in surface soils and subsurface soils have been fully delineated at the Skeet Range MRS. The data gap areas have been investigated (including the High Tower Range). The RI achieved the objective of further defining the extent of lead, PAHs, and lead shot in surface and subsurface soil. Lead concentrations greater than the not-to-exceed PRG are present in surface soil samples from the Northern Range Area and Southern Range Area. In addition, the arithmetic mean for lead in surface soil at the Northern Range Area is greater than the PRG of 200 mg/kg. PAH concentrations resulting in a total point risk greater than $1x10^{-4}$ are present in surface soil samples at the Skeet Range Shooting Area. Lead shot greater than 100 lead shot/ft^2 is present in surface soil samples at the Southern Range Area and High Tower Range Area. These elevated concentrations/counts are adequately bounded to properly characterize lead, PAHs, and lead shot at the Skeet Range MRS.

Groundwater samples were collected during the SI and indicated the presence of lead at low concentrations (PAHs were not detected). These low concentrations of lead (less than 2 µg/L) are below screening levels and indicate that groundwater at the Skeet Range MRS has not been adversely impacted from the former range activities. For these reasons, further evaluation of groundwater during this RI was not necessary.

The additional chemical and physical data obtained during the RI were used to revise the CSM as presented in this section, as well as in Sections 6 and 7. The revised CSM for the Skeet Range MRS incorporates the results from the RI sampling and previous data.

5.0 CONTAMINANT FATE AND TRANSPORT ANALYSIS

This section provides an evaluation of contaminant fate and transport at the Skeet Range MRS to support the discussion of potential risks from the contaminants. To support the contaminant fate and transport evaluation, a discussion of the physical and chemical properties of contaminants associated with the Skeet Range MRS sources and their potential persistence, migration, dispersion, and degradation pathways is presented below.

5.1 Physical and Chemical Properties

Persistence of various classes of contaminants and their chemical and physical properties in soil-water environments are discussed in this section. Several chemical transformation mechanisms affect contaminant persistence, including hydrolysis, biodegradation, photolysis, and oxidation/reduction reactions. As discussed in Section 4.0, the following contaminants were identified as exceeding screening levels:

- Lead
- PAHs

5.1.1 Lead

Fate and transport of metals/inorganics (lead) are controlled mainly by the mobility of soil particles and dissolution into water present in the immediate environment. Lead is persistent and does not degrade like most organic chemicals. The major fate mechanisms for metals/inorganics are adsorption to the soil matrix and bioaccumulation. Mobility of lead is influenced primarily by its physical and chemical properties in combination with the physical and chemical characteristics of the soil matrix. Soil/pore water pH, soil/pore water Eh, and cation exchange capacity can help predict mobility of inorganic species. Mobility of lead generally increases with decreasing soil pH, Eh, and cation exchange capacity.

In some cases, lead is found at concentrations or in forms (e.g., oxidation states) in which they may migrate in solution. It is possible that some industrial activities could saturate all available cation exchange sites in soil and result in lead being mobilized. Lead is also more mobile under acidic conditions where it is possible for it to migrate vertically through the soil column to groundwater. Therefore, any lead detected in groundwater may represent the sum of dissolved lead and lead adhering to any suspended soil material that are present in the samples.

5.1.2 PAHs

PAHs are present in both dissolved and particulate phases. The physical and chemical properties of PAHs control their fate and transport in the environment. The fate and transport of PAHs correlate to their molecular weights. The molecular weight of PAHs is categorized into three groups (low, medium, and high) with similar physical and chemical behaviors within each group (Simon & Sobieraj, 2006). Fate and transport of PAHs, like lead, are controlled mainly by the mobility of soil particles and dissolution into water present in the immediate environment. PAHs tend to adhere to soil particles and are not very mobile or soluble. Residence time, transport

distance, and wet and dry deposition largely depend on the distribution of particle sizes to which the PAHs are adsorbed. PAHs adsorbed surface soil particles are subject to significant transport via stormwater runoff and erosion but are relatively immobile in subsurface soils due to their low water solubility and high affinity for organic carbon. Over extended periods of time, PAHs can volatilize, degrade, or biodegrade. Microbes can break down PAHs in soil and sediment and living organisms can metabolize PAHs. PAHs at the Skeet Range MRS appear to be mostly bound to the clay pigeon fragments. Therefore, PAHs are typically detected in surface soils and rarely in subsurface soil or groundwater.

5.2 Conceptual Site Model of Contaminant Migration

Based on the investigations conducted at the Skeet Range MRS, lead and PAHs are the primary contaminants of concern. The lead and PAHs are the result of historic use of various gauge shotguns to fire cartridges containing lead shot at PAH-containing clay pigeon targets. Lead shot and clay pigeon fragments accumulated at the surface in localized areas.

Lead shot and lead have not been very mobile. The majority of the lead shot was found in the 0 to 6-inch interval, however, it was also was found in the 6 to 12-inch interval and to a much lesser degree in the 1 to 2-foot interval. The lead shot was generally in good condition with little fragmentation or oxidation. Lead appears to be limited to the first couple of inches of soil and has not migrated to subsurface soil or groundwater.

PAHs are bound to the clay pigeon fragments and are not readily soluble. The clay pigeon fragments were almost exclusively found at the surface in the 0 to 6-inch interval. The clay pigeon fragments ranged in size but were generally competent. Elevated concentrations of PAHs were mostly found in the 0 to 6-inch interval, however, a select few 6 to 12-inch intervals also had elevated PAH concentrations. The 1 to 2-foot intervals had very low concentrations of PAHs, signifying that PAHs are not migrating into subsurface soils or groundwater.

5.2.1 Potential Contaminant Migration Pathways

Potential contaminant migration pathways at the Skeet Range MRS consist of the following:

- Migration of lead and PAHs from surface to subsurface soils.
- Migration of lead and PAHs via surface soil runoff or erosion.

6.0 HUMAN HEALTH RISK EVALUATION

This human health risk evaluation for the MBFR Complex Skeet Range MRS was to evaluate the potential for adverse impacts of site-related contamination and to determine the need for further investigation and/or remedial action at the site. This section presents an evaluation of the potential for human health risks to occur because of environmental exposure to substances detected in soil at the MBFR Complex Skeet Range MRS. A preliminary screening was performed to compare the sample analytical data to risk-based concentrations. Next, a risk ratio approach was applied to estimate cancer risks and noncancer hazards for hypothetical residents and industrial workers exposed to each medium. In addition, potential child and adult lead risks were evaluated by means of modeling blood lead levels affected by soil exposure. The risk evaluation report is comprised of the following five components:

- Data evaluation and selection of Chemicals of Potential Concern (COPCs)
- Exposure assessment
- Toxicity assessment
- Risk characterization
- Characterization of uncertainty

Three major aspects of chemical contamination must be considered when assessing public health risks: (1) contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist either at the source or via migration pathways if exposure occurs at a remote location other than the source; and (3) human or environmental receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure; without any one of the three factors listed above, there is no risk.

6.1 Selection of Chemicals of Potential Concern

COPCs are target analytes detected in an environmental media that are selected for evaluation in the risk assessment process. In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation when the maximum detection in a sampled medium exceeds the lowest risk-based concentration (RBC). Chemicals eliminated from further evaluation are assumed to present minimal risks to potential human receptors.

6.1.1 Derivation of Screening Criteria

USEPA RSLs (USEPA, 2018a) were used to identify COPCs in soil. The RSLs are RBCs based on exposure pathways (i.e., ingestion, dermal contact, and inhalation) for which generally accepted methods, models, and assumptions have been developed for specific land-use conditions and do not consider impact to groundwater or vapor intrusion. The screening concentrations based on the RSLs correspond to a systemic hazard quotient (HQ) of 0.1 for noncarcinogens or an incremental lifetime cancer risk (ILCR) of $1x10^{-6}$ for carcinogens. The RSLs for noncarcinogens are based on an HQ of 0.1 to account for the potential cumulative effects of

several chemicals affecting the same target organ or producing the same adverse noncarcinogenic effect.

The USEPA RSL for residential exposures to lead is based on the Office of Solid Waste and Emergency Response (OSWER) screening level of 400 mg/kg (USEPA, 1994a). The OSWER screening level is based on an acceptable blood lead level of 10 micrograms per deciliter (µg/dL). Current scientific literature on lead toxicity indicates that adverse health effects are associated with blood-lead (PbB) levels below the long-held target of 10 µg/dL. Specifically, evidence exists of clear cognitive declines in young children with PbB levels between 2 and 8 µg/dL (as referenced in the December 2016 USEPA Office of Land and Emergency Management [OLEM] Memo [USEPA, 2016]). For this reason, USEPA recommends consideration of current scientific conclusions when evaluating lead exposure (actual or potential) at CERCLA sites. Therefore, a screening level of 200 milligrams per kilogram mg/kg, based on an acceptable blood lead level of 5 µg/dL, was used to select COPCs for exposures to lead in soil.

A chemical detected in soil was selected as a COPC for direct contact with soil if any detected chemical concentration exceeded the screening levels for residential exposures to soil.

6.1.2 COPCs Selection

COPCs were selected for surface soil and subsurface soil at the Northern Range Area, Southern Range Area (and overlapping Skeet Range Shooting Area), and High Tower Range Area using the COPC screening levels discussed above. To evaluate risk, surface soil was defined as 0 to 0.5 feet bgs and subsurface soil was defined as 0.5 feet to 2 feet bgs. COPC selection information for each area is presented in Tables 6-1 through 6-6. A discussion of the chemicals identified as COPCs and the rationale for COPC selection is provided in the following subsections.

<u>Northern Range Area</u>

A comparison of maximum detected surface soil concentrations to screening levels based on RSLs for residential exposures to soil is presented in Table 6-1. Surface soil at the Northern Range Area was analyzed for lead and PAHs. The maximum detected concentration of lead in surface soil exceeded the direct contact screening levels, therefore lead was retained as a COPC for surface soil at the Northern Range Area. PAH concentrations in surface soil did not exceed the direct contact screening levels.

A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs for residential exposures to soil is presented in Table 6-2. Subsurface soil at the Northern Range Area was only analyzed for lead. Lead was detected at concentrations exceeding the direct contact screening levels, therefore lead was retained as a COPC for subsurface soil at the Northern Range Area.

<u>Southern Range Area/Skeet Range Shooting Area</u>

A comparison of maximum detected surface soil concentrations to screening levels based on RSLs for residential exposures to soil is presented in Table 6-3. The following chemicals were

detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for surface soil:

- PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, and indeno[1,2,3,-cd]pyrene)
- Lead

A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs for residential exposures to soil is presented in Table 6-4. The following chemicals were detected at maximum concentrations exceeding direct contact COPC screening levels and were retained as COPCs for subsurface soil:

- PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenzo[a,h]anthracene, and indeno[1,2,3,-cd]pyrene)
- Lead

<u>High Tower Range Area</u>

A comparison of maximum detected surface soil concentrations to screening levels based on RSLs for residential exposures to soil is presented in Table 6-5. Surface soil at the High Tower Range Area was analyzed for lead and PAHs. The maximum detected concentration of lead in surface soil exceeded the direct contact screening levels, therefore lead was retained as a COPC for surface soil at the High Tower Range Area. PAH concentrations in surface soil did not exceed the direct contact screening levels.

A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs for residential exposures to soil is presented in Table 6-6. Subsurface soil at the High Tower Range Area was only analyzed for lead. Lead concentrations were below the direct contact screening levels; therefore, no chemicals were retained as a COPC for subsurface soil at the High Tower Range Area.

6.2 Exposure Assessment

This section presents the exposure assessment for surface and subsurface soil at the Northern Range Area, Southern Range Area (and overlapping Skeet Range Shooting Area), and High Tower Range Area. Receptors evaluated in the risk assessment are identified, and the methodology used to determine exposure point concentrations (EPCs) (i.e., concentrations to which a receptor is exposed) is presented.

6.2.1 Site Setting

Section 2 presents a discussion of the site location, history, and background. This section summarizes the information in Section 2 as it applies to this evaluation. As discussed in Section 2, the Northern Range Area, Southern Range Area (and overlapping Skeet Range Shooting Area), and High Tower Range Area are part of the Skeet Range MRS and comprise 29.4 acres. The Skeet Range MRS currently consists of an open grass field on the west and south, a deciduous and coniferous scrub area on the east, and a deciduous scrub and palustrine forested

wetland area to the north. The buildings and shooting stations associated with the Skeet Range MRS no longer exist.

Based on the historical skeet shooting activities conducted at the High Tower Range and east-facing Skeet Range, and the analytical data evaluated during the initial SI, the primary sources of contamination at the Skeet Range MRS are lead shot (lead) and clay pigeon fragments (PAHs) in surficial soils.

Receptors at these sites/study areas may be exposed to COPCs in soil via direct contact (i.e., incidental ingestion, dermal contact, and inhalation of volatiles/fugitive dust). Receptors evaluated include future industrial workers and hypothetical residents. Current land use at the sites/study areas is industrial, and future land use is also likely to be industrial/commercial. There are no plans for future residential development of the sites/study areas. Residential receptors were included primarily to aid in risk-management decisions. All receptors were evaluated for exposures to both surface and subsurface soil. Industrial workers and hypothetical residents would only contact subsurface soil if future excavation activities brought subsurface soil to the surface. However, the evaluation of industrial worker and hypothetical resident contact with subsurface soil is included to aid in risk-management decisions.

6.2.2 Exposure Point Concentrations

The EPC is an estimate of the chemical concentration within an exposure unit (EU). The EPC is assumed to be the concentration to which the receptor is exposed and is used to estimate exposure intakes. An EU is the area over which receptor activity is expected to occur. For this evaluation the Northern Range Area, Southern Range Area, and High Tower Range Area were considered to be separate EUs. EPCs were calculated for surface soil and subsurface soil for the Northern Range Area and Southern Range Area (and overlapping Skeet Range Shooting Area); and for surface soil at the High Tower Range Area. No COPCs were identified for subsurface soil at the High Tower Range Area, consequently no EPCs were calculated for this area.

For all COPCs except lead, the 95-percent upper confidence limit (UCL) on the arithmetic mean, which was based on the distribution of the data set, was selected as the EPC. EPCs were calculated following the USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, 2002) and using the USEPA's ProUCL Software Version 5.1.002 (USEPA, 2015a). ProUCL input data and outputs are included in Appendix H. As stated in the guidance manual for the Integrated Exposure Uptake Biokinetic (IEUBK) model (USEPA, 1994b) and Adult Lead Methodology (USEPA, 2003a), the arithmetic mean concentration was used as the EPC for lead.

6.2.3 Exposure Assumptions for Residential Contact with Soil

Soil exposure to a residential receptor was estimated by incorporating the assumptions inherent to the USEPA RSLs for residential soil exposure. For exposure to carcinogenic chemicals, the RSL equations assume 6 years exposure as a child combined with 20 years exposure as an adult. The derived RSL equations incorporate standard default parameters for the residential child (age 0 to 6) given an average body weight of 15 kilograms (kg), a daily incidental soil ingestion rate of

200 milligrams (mg) per day, an exposed body area of 2,373 square centimeters (cm^2), a soil adherence factor of 0.2 milligrams per square centimeters (mg/cm^2), and a yearly exposure frequency of 350 days per year. RSL equations incorporate the exposure assumptions for an adult receptor with a body weight of 80 kg, a daily incidental soil ingestion rate of 100 mg per day, an exposed body area of 6,032 cm^2, a soil adherence factor of 0.07 mg/cm^2, and a yearly exposure frequency of 350 days per year. Residential soil RSLs for carcinogens incorporate the assumption of lifetime (child plus adult) cumulative exposure, whereas residential soil RSLs for non-carcinogenic substances incorporate the assumptions inherent to only child exposures, which is the more sensitive age group receptor for non-cancer toxicity.

6.2.4 Exposure Assumptions for Industrial Worker Contact with Soil

Soil exposure to an industrial receptor was estimated by incorporating the assumptions inherent to the USEPA RSLs for industrial soil exposure. For exposure to carcinogenic chemicals, the RSL equations assume 25 years exposure as a full-time adult worker. The derived RSL equations incorporate standard default parameters, which include a body weight of 80 kg, a daily incidental soil ingestion rate of 100 mg per day, an exposed body area of 3,527 cm^2, a soil adherence factor of 0.12 mg/cm^2, and a yearly occupational exposure frequency of 250 days per year. Non-cancer hazards are estimated assuming the same ingestion rates and exposure frequency.

6.2.5 Lead in Soil

Exposure to lead was assessed using the following models:

- The latest version of USEPA's IEUBK Model for lead (version 1.1 Build 11). This model is typically used to evaluate lead exposure assuming a residential land use scenario (USEPA, 2010).
- USEPA's Adult Lead Methodology (2003a and 2017a). This methodology is typically used to evaluate lead exposure assuming a non-residential land use scenario.

The IEUBK Model for lead is designed to estimate blood levels of lead in children (under 7 years of age) based on either default or site-specific input values for air, drinking water, diet, dust, and soil exposure. Studies indicate that infants and young children are extremely susceptible to adverse effects from exposure to lead. Considerable behavioral and developmental impairments have been noted in children with elevated blood-lead levels. Historically blood-lead levels greater than 10 µg/dL were considered to be a "concern". Current scientific literature on lead toxicity indicates that adverse health effects are associated with PbB levels below the long-held target of 10 µg/dL. Specifically, evidence exists of clear cognitive declines in young children with PbB levels between 2 and 8 µg/dL (as referenced in the December 2016 USEPA OLEM Memo). For this reason, USEPA recommends consideration of current scientific conclusions when evaluating lead exposure (actual or potential) at CERCLA sites. Although an official policy is not currently in place, USEPA may draft a directive formally lowering of the target PbB level in the future, resulting in a lower risk-based clean-up level for this metal. This, in turn, could trigger the need for re-evaluation of lead at sites that have not achieved the more protective standard. Therefore, a value of 5 ug/dL was used as the acceptable blood lead level in this evaluation.

The IEUBK Model for lead was used to address exposure to lead in children when detected soil concentrations exceeded the soil screening level of 200 mg/kg for residential land use. Average chemical concentrations, as well as default parameters for some input parameters, were used in the evaluation. Estimated blood-lead levels and probability density histograms supporting this analysis are presented in Appendix H.

Non-residential adult exposure to lead in soil was evaluated using USEPA's Adult Lead Methodology (USEPA, 2003a and 2017a). In this model, adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood-lead concentration in the developing fetuses of adult women. The adult lead model generates a spreadsheet for each exposure scenario evaluated (e.g., industrial). The output of the spreadsheet is the probability that the blood-lead concentrations in the fetuses exceed 5 micrograms per liter (µg/L) (USEPA, 2017a).

6.3 Toxicity Assessment

The toxicity assessment for COPCs examines information concerning the potential human health effects of exposure to COPCs. The goal of the toxicity assessment is to provide for each COPC a quantitative estimate of the relationship between the magnitude and type of exposure and the severity or probability of human health effects. In this risk evaluation, toxicity values were already incorporated into the RSLs. The assumption that exposure at the site is equivalent to the exposure used to derive the RSLs precluded the need to outline the toxicological indices for each COPC.

Oral reference doses (RfDs), cancer slope factors (CSFs), inhalation reference concentrations (RfCs), and inhalation unit risks (IURs) used in this human health risk evaluation were obtained from the following primary USEPA recommended literature sources and following hierarchy (USEPA, 2003b):

- Tier 1 - Integrated Risk Information System (IRIS).
- Tier 2 - USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program.
- Tier 3 - Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, Agency for Toxic Substances and Disease Registry (ATSDR) values, and the Health Effects Assessment Summary Tables (HEAST).

Although RfDs and CSFs can be found in several toxicological sources, USEPA's IRIS online database is the preferred source of toxicity values. The values presented in IRIS have been verified by the agency's consensus peer review process.

6.4 Risk Characterization

The risk ratio approach was used to calculate cancer risks and hazard indices to be consistent with the methodology used in the SI Report. Exposure assumptions used in the risk ratio approach are default EPA exposure assumptions and are the same exposures that would be used in a traditional risk assessment; therefore, the risks would be the same. Receptors evaluated in the SI Report included residents and industrial workers. The same receptors were evaluated in this risk assessment to be consistent with the SI report. Construction workers are also potential receptors at the site. Potential risks to construction workers would be comparable or less than those of industrial workers; therefore, construction workers were not evaluated in this risk assessment.

Risks from COPCs were calculated for carcinogenic and non-carcinogenic effects. This was accomplished by performing a ratio comparison to the USEPA RSLs for residential and industrial land use for soils. Lead risks were evaluated independently by estimating potential blood lead levels using the IEUBK model and the adult lead methodology.

Non-carcinogenic risk estimates are presented in the form of HQs. The HQ was derived by dividing the non-carcinogenic RBC for a particular medium (e.g., soil) into the exposure point concentration. The USEPA RSLs were used as the RBCs in this evaluation. Compounds potentially resulting in non-carcinogenic (systemic) effects will be evaluated using the following equations:

$$HQ_i = \frac{C_i}{RBC}$$

$$HI = \sum_{i=1}^{n} HQ_i$$

Where:

HQi	=	Hazard quotient for compound i.
Ci	=	Exposure point concentration (mg/kg) for compound i.
RBC	=	Risk-based concentration (mg/kg) for compound i. The RBC is set equal to a hazard quotient of 1.
HI	=	Hazard index.

The HQs for all COPCs were summed to account for potential non-carcinogenic effects associated with multiple chemical exposures (i.e., the HI was calculated). The total hazard index (HI) was then compared to the USEPA's target level of 1. "Acceptable" exposure levels are generally concentration levels that represent a HI less than or equal to 1. However, because all chemicals do not exhibit the same mechanism of action or impact the same target organ, the exceedance of this value does not necessarily constitute an "unacceptable" non-carcinogenic risk. If the estimated HI was greater than 1, non-carcinogenic effects were segregated according to the affected target organs and target organ HIs were calculated, which represent the sum of those chemicals that impact similar target organs or exhibit similar mechanisms of action. Generally, estimated HIs greater than 1 for the same target organs are considered to be "unacceptable."

Carcinogenic risks are expressed in the form of dimensionless probabilities, referred to as ILCRs. The ILCR was derived by dividing the carcinogenic RBC for a particular medium (e.g., soil) into the exposure point concentration. COPCs potentially resulting in carcinogenic effects were evaluated using the following equation:

$$\mathrm{ILCR} = \sum_{i=1}^{n} \left(\frac{C_i}{RBC_i} \times 10^{-6} \right)$$

Where:

ILCR	=	Incremental lifetime cancer risk.
Ci	=	Exposure point concentration (mg/kg) for compound i.
RBC	=	Risk-based concentration (mg/kg) for compound i. The RBC represents the 10-6 risk level.
10-6	=	Risk assessment point of departure risk level.

Multiplying the C_i/RBC ratio by USEPA's point of departure risk level, $1x10^{-6}$, produces a cancer risk estimate for the detected COPC. The ratios are multiplied by $1x10^{-6}$ because the RBCs correspond to a $1x10^{-6}$ risk level. The ILCR values for all COPCs were summed to account for potential cumulative carcinogenic effects of multiple carcinogens detected in an environmental medium. The total ILCR was then compared to USEPA's target cancer risk range of $1x10^{-4}$ to $1x10^{-6}$, which is used to determine whether a potential for human health risk exists at a site. According to the USEPA, for known or suspected carcinogens, "acceptable" exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk between $1x10^{-4}$ to $1x10^{-6}$ or less than $1x10^{-6}$. A $1x10^{-4}$ ILCR estimate corresponds to the potential for the occurrence of one additional incidence of cancer in an exposed population of 10,000 individuals. Generally, an estimated ILCR greater than $1x10^{-4}$ is regarded as "unacceptable."

Some chemicals exhibit both carcinogenic and noncarcinogenic effects. The more restrictive USEPA RSL was used for selecting COPCs but both carcinogenic and noncarcinogenic risks were estimated. Cancer risks and hazard indices were estimated assuming industrial and hypothetical residential land use.

Risk Characterization for the Skeet Range MRS

Risks for COPCs in surface soil and subsurface soil at the Southern Range Area (and overlapping Skeet Range Shooting Area) were estimated using the above methodology and are presented in Tables 1 to 4 in Appendix H, and are summarized in the following table. Lead was the only COPC identified in surface soil and subsurface soil at the Northern Range Area and High Tower Range Area. As discussed above, risks from exposures to lead in soil are evaluated with the IEUBK model and adult lead methodology. Consequently, cancer risks and HIs were not calculated for the Northern Range Area and High Tower Range Area.

Southern Range Area/Skeet Range Shooting Area

Area	Hazard Index		Cancer Risk	
	Residential	Industrial	Residential	Industrial
Surface Soil	0.5	0.04	2E-04	8E-06
Subsurface Soil	0.5	0.04	1E-04	7E-06

HIs for residents and industrial workers exposed to surface soil and subsurface soil at the Southern Range Area (and overlapping Skeet Range Shooting Area) were less than the target level of 1. Cancer risks for residents exposed to surface soil exceeded USEPA's target risk range of 10^{-4} to 10^{-6}, while cancer risks for residents exposed to subsurface soil were equal to the upper bound of the target risk range. Benzo(a)pyrene was the major contributor to the cancer risk. Cancer risks for industrial workers exposed to surface soil and subsurface soil were within USEPA's target risk range.

Risks from Lead

Lead was identified as a COPC in surface soil and subsurface soil at the Northern Range Area, surface and subsurface soil at the Southern Range Area, and in surface soil at the High Tower Range Area. Concentrations of lead in subsurface soil at the High Tower Range Area were less than the residential screening level. Residential exposures to lead in soil were evaluated using USEPA's IEUBK lead model (2010). Exposures to lead in soil by industrial workers were evaluated using a slope factor approach developed by the USEPA Technical Review Workgroup (TRW) (2003a, 2017a).

Residential exposures to lead in surface soil and subsurface soil were evaluated using the most recent version of the IEUBK lead model (Version 1.1 Build 11). As recommended in the IEUBK Model documentation, the average lead concentration was used as the exposure point concentration for each of the exposure units. Also as recommended by current guidance, the default age range was modified from 0 to 84 months to 12 to 72 months (USEPA, 2017b).

A value of 5 ug/dL was used as the acceptable blood lead level. Current scientific literature on lead toxicity indicates that adverse health effects are associated with PbB levels below the long-held target of 10 µg/dL. Specifically, evidence exists of clear cognitive declines in young children with PbB levels between 2 and 8 µg/dL (as referenced in the December 2016 USEPA OLEM Memo). For this reason, USEPA recommends consideration of current scientific conclusions when evaluating lead exposure (actual or potential) at CERCLA sites. Although an official policy is not currently in place, USEPA may draft a directive formally lowering of the target PbB level in the future, resulting in a lower risk-based clean-up level for this metal. This, in turn, could trigger the need for re-evaluation of lead at sites that have not achieved the more protective standard.

IEUBK Model outputs are included in Appendix H and are summarized on the next page.

Lead Risks

Exposure Unit	Exposure Point Concentration (mg/kg)	Blood-Lead Geometric Mean Concentration (µg/dL)	Percent of Receptors Exceeding 5 µg/dL
Northern Range Area			
Surface Soil	1,107	10.3	93.8
Subsurface Soil	170	2.58	7.95
Southern Range Area			
Surface Soil	190	2.78	10.5
Subsurface Soil	84.2	1.71	1.13
High Tower Range Area			
Surface Soil	117	2.05	2.88

The results for residents exposed to lead in surface soil and subsurface soil at the Northern Range Area and surface soil at the Southern Range Area exceed the USEPA goal of no more than 5 percent of children exceeding a 5 µg/dL blood lead level. The results for residents exposed to lead in subsurface soil at the Southern Range Area and surface soil at the High Tower Range Area do not exceed the USEPA goal of no more than 5 percent of children exceeding a 5 µg/dL blood lead level.

Exposures to lead in surface soil and subsurface soil by industrial workers were evaluated using Adult Lead Methodology (ALM) developed by the USEPA TRW for Lead (2003a, 2017a). As recommended in the ALM documentation, the average lead concentration in surface soil and subsurface soil were used as the EPCs at each of the EUs. ILCRs and HIs are calculated for non-lead chemicals using reasonable maximum exposure (RME) assumptions; however, the ALM guidance recommends the use of central tendency exposure (CTE) assumptions in evaluating adult exposures to lead in soil (USEPA 2003a). Therefore, the incidental soil ingestion rate was assumed to be 50 mg/day and the exposure frequency was assumed to be 219 days per year for the industrial worker. Default parameters were used for the remaining model input parameters. Results of the model runs are included in Appendix H. The fetus of a pregnant worker is the ultimate receptor of concern for the ALM model. The results of the modeling are shown below.

Exposure Unit	Exposure Point Concentration (mg/kg)	Blood-Lead Geometric Mean Concentration (µg/dL)	Percent of Receptors Exceeding 5 µg/dL
Northern Range Area			
Surface Soil	1,107	2.2	5.70
Subsurface Soil	170	0.8	0.07
Southern Range Area			
Surface Soil	190	0.9	0.08
Subsurface Soil	84.2	0.7	0.03
High Tower Range Area			
Surface Soil	117	0.9	0.12

The results for industrial workers exposed to lead in surface soil at the Northern Range Area exceed the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 5 µg/dL blood-lead level. The results for industrial workers exposed to lead in subsurface soil at the Northern Range Area, surface soil and subsurface soil at the Southern Range Area, and surface soil at the High Tower Range Area do not exceed the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 5 µg/dL blood-lead level.

6.5 Uncertainty Analysis

The following sources of uncertainty should be considered when interpreting the results of this human health risk evaluation.

- COPC selection was based on USEPA RSLs for residential land use and correspond to ILCRs of $1x10^{-6}$ and HIs of 0.1. The use of the RSLs ensured that all the significant contributors to risk from a site were evaluated. The elimination of chemicals present at concentrations that correspond to ILCRs less than $1x10^{-6}$ and HIs less than 0.1 should not affect the final conclusions of the risk assessment because those chemicals were not expected to cause a potential health concern to residential receptors at the detected concentrations.
- In this risk ratio evaluation, a primary source of uncertainty regarding potential soil exposure is the assumption that future residents would live at the site. Future residential development at the site is not anticipated based on current land use and NASA plans to maintain the runways adjacent to the site.
- During sample collection activities, lead shot and clay pigeon fragments were observed on the ground surface. While not evaluated in this risk assessment, adverse health effects are possible if an individual would ingest the lead shot or clay pigeon fragments.
- In addition to these significant sources of uncertainty, other limitations and uncertainties arise from the quality of the existing toxicological data to support dose-response relationships and the weight of evidence used for determining the carcinogenicity or adverse effects of substances of concern. Uncertainty associated with the exposure assessment includes the values used as input variables for an exposure pathway and the methods used and assumptions made to determine exposure point (or representative) concentrations. Uncertainty in the risk characterization includes that associations with exposure to multiple hazardous substances and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the exposure assessment. These uncertainties should be acknowledged in the risk ratio evaluation along with other site and data-specific uncertainties identified during the evaluation of the environmental data collected.

6.6 Summary

A human health risk evaluation was conducted for the Northern Range Area, Southern Range Area (and overlapping Skeet Range Shooting Area), and High Tower Range Area at MBFR

Complex Skeet Range MRS. COPCs were identified by comparing chemical concentrations in surface soil and subsurface soil to USEPA RSLs. Cancer and non-cancer risk estimates were developed based on development of ratios of EPCs of COPCs in surface soil and subsurface soil to the RSLs for residential and industrial soil exposures. Risks from exposures to lead in soil were evaluated with the IEUBK and adult lead methodology. The results of the human health risk evaluation are summarized below.

Lead was the only chemical detected at concentrations exceeding screening levels in surface soil and subsurface soil at the Northern Range Area.

At the Southern Range Area/Skeet Range Shooting Area, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3,-cd)pyrene, and lead were detected at concentrations exceeding screening levels in surface and subsurface soil.

At the High Tower Range Area, only concentrations of lead in surface soil exceeded the screening levels. Concentrations of all chemicals in subsurface soil were below screening levels.

Soil Risks

Cancer and non-cancer risk estimates were developed for COPCs based on development of ratios of the detected chemical concentrations for surface soil and subsurface soil at the Southern Range Area (and overlapping Skeet Range Shooting Area) against USEPA RSLs for residential and industrial soils. Cancer and non-cancer risks were not developed for the Northern Range Area and High Tower Range Area because lead was the only COPC retained for these areas.

HIs for hypothetical residents and industrial workers exposed to surface soil and subsurface soil at the Southern Range Area (and overlapping Skeet Range Shooting Area) were less than the acceptable level of 1. Cancer risks for residents exposed to surface soil exceeded USEPA's target risk range of 10^{-4} to 10^{-6}, while cancer risks for residents exposed to subsurface soil were equal to the upper bound of the target risk range. Benzo(a)pyrene was the major contributor to the cancer risk. Cancer risks for industrial workers exposed to surface soil and subsurface soil were within USEPA's target risk range.

Risks for Lead

Hypothetical residential exposures to lead in soil were evaluated using USEPA's IEUBK lead model. The results for residents exposed to lead in surface soil and subsurface soil at the Northern Range Area and surface soil at the Southern Range Area exceed the USEPA goal of no more than 5 percent of children exceeding a 5 µg/dL blood lead level. The results for residents exposed to lead in subsurface soil at the Southern Range Area and surface soil at the High Tower Range Area do not exceed the USEPA goal of no more than 5 percent of children exceeding a 5 µg/dL blood lead level.

Industrial exposure to lead in soil were evaluated using USEPA's adult lead methodology. The results for industrial workers exposed to lead in surface soil at the Northern Range Area exceed the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a

5 µg/dL blood-lead level. The results for industrial workers exposed to lead in subsurface soil at the Northern Range Area, surface soil and subsurface soil at the Southern Range Area, and surface soil at the High Tower Range Area do not exceed the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 5 µg/dL blood-lead level.

7.0 ECOLOGICAL RISK ASSESSMENT

The ERA contains information to enable scientists and managers to conclude whether:

- Further information is necessary to evaluate potential risks at the site.
- Remedial action is necessary at the site to eliminate ecological risk.
- Ecological risks at the site are most likely negligible.

The ERA was conducted in accordance with several guidance documents (Navy, 1997, 1999; USEPA, 1997, 1998, 2015b). This ERA consists of Steps 1, 2, and 3a of the eight step ERA process. The first two screening steps comprise the screening-level ecological risk assessment (SLERA), where conservative exposure estimates are compared to screening-level and threshold toxicity values. Step 3a is the first step of a baseline ecological risk assessment (BERA) and consists of refining the conservative assumptions to further focus the ERA process on the chemicals of greatest concern at a site. Steps 3b through 7 consist of additional site-specific investigations/biological studies that are conducted if additional evaluations or investigations are necessary. Aspects of Step 8, risk management, are addressed throughout the ERA process.

7.1 Screening-Level Problem Formulation

Problem formulation is the first step of an ERA and consists of identifying the following:

- Ecological resources to be protected (known as assessment endpoints).
- Measurements used to evaluate risks to those resources (known as measurement endpoints).
- Chemicals, geographic areas, and environmental media relevant to the risk assessment.

As part of receptor identification, site habitats and potential ecological receptors (as they apply to ecological risk) are described in the following subsections. A summary of the environmental setting and potential sources of contamination and associated exposure pathways is presented below.

7.1.1 Environmental Setting

As discussed in Section 2, the Northern Range Area, Southern Range Area (and overlapping Skeet Range Shooting Area), and High Tower Range Area are part of the Skeet Range MRS and comprise 29.4 acres. The Skeet Range MRS currently consists of an open grass field on the west and south, a deciduous and coniferous scrub area on the east, and a deciduous scrub and palustrine forested wetland area to the north. The habitats at the MBFR Complex consist primarily of overgrown vegetation, including grasses, shrubs, and trees. The only wetland habitat at the site is situated in the Northern Range Area within a drainage swale northeast of the NOAA fenced area.

The southern half of the site is basically flat with little slope, but along the northern, eastern, and northwestern boundaries of the area, steep slopes direct non-infiltrated surface runoff into low-lying marshes that border Little Mosquito Creek. Salinity data available for Little Mosquito Creek

are between 9 and 30 parts per thousand which is indicative of a saline water body. Approximately 300 feet to 500 feet of marshland separates the Little Mosquito Creek from the MBFR Complex along the north and east. There are no surface water bodies within or immediately adjacent to the MBFR Complex.

Potential ecological receptors in the terrestrial portion of the site include plants, soil invertebrates, and small mammals and birds. Although a portion of the Northern Range Area is classified as wetlands, the soil/sediment in this area is often dry. Therefore, terrestrial receptors are more likely to inhabit the area versus aquatic receptors such as benthic invertebrates and fish. However, because the area ultimately drains to Little Mosquito Creek soil/sediment could migrate to the creek. Also, because it is wet certain times of the year, sediment invertebrates may also be present during those times.

7.1.2 Potential Sources of Contamination

Based on the historical skeet shooting activities conducted at the High Tower Range and east-facing skeet range, and the analytical data evaluated during the initial SI, the primary sources of contamination at the Skeet Range MRS are lead shot (lead) and clay pigeon fragments (PAHs) in surficial soils. The lead from the lead shot can dissolve and enter the soil, and the clay pigeons can break down and PAHs can be released to the soil. Note that the clay pigeon fragments are very resilient and generally break down slowly over time.

7.1.3 Potential Exposure Pathways

Several groups of terrestrial ecological receptors can be exposed to contaminants in surface soil. Invertebrates such as earthworms are exposed to contaminants as they move through the soil and ingest soil particles while searching for food. Plants are exposed to contaminants via direct contact as contaminants are absorbed through the roots, and contaminants are then translocated to different parts of the plants (e.g., leaves, seeds). Therefore, soil invertebrates and plants are evaluated in the ERA.

Small mammals and birds may be exposed to contaminants in shallow (0 to 6 inches) and shallow subsurface (6 to 24 inches) soil via several exposure routes. They may be exposed by direct contact as they search for food or burrow into the soil. Small mammals and birds also may be exposed to contaminants in soil via incidental ingestion of soil and ingestion of plants and/or invertebrates that have accumulated contaminants from the soil. Therefore, risks to small mammals and birds from these exposure pathways are evaluated in the ERA. Exposure of terrestrial wildlife to contaminants in the soil via dermal contact is unlikely to represent a major exposure pathway because fur, feathers, and chitinous exoskeletons are expected to minimize transfer of contaminants across dermal tissue. Therefore, the dermal pathway is not evaluated in the ERA. Birds may also be exposed to lead when they inadvertently ingest lead shot by mistaking it for grit so this pathway is evaluated in the ERA.

Benthic invertebrates that may inhabit the marshland reaches of the northern drainage channel may be exposed to chemicals in sediment. Because of limited habitat for sediment invertebrates, it is not likely that sediment invertebrates are present in sufficient numbers to provide a significant food source to birds and mammals. Therefore, piscivorous birds and mammals are not evaluated

as potential receptors in the ERA. However, risks to sediment invertebrates are evaluated in the ERA.

7.1.4 Assessment and Measurement Endpoints

Assessment endpoints are explicit expressions of the environmental value that is to be protected (USEPA, 1997). The selection of these endpoints is based on the habitats present, the migration pathways of chemicals, and the routes that chemicals may take to enter receptors. Measurement endpoints are estimates of biological impacts (e.g., mortality, growth, reproduction) that are used to evaluate the assessment endpoints. The assessment and measurement endpoints used to evaluate site data are presented in Table 7-1. The potential receptors at the site include terrestrial plants, soil invertebrates, sediment invertebrates, insectivorous birds and mammals, and herbivorous birds and mammals.

For vertebrate receptors, selection of a particular species is required so that intake through eating can be estimated. The following surrogate species were used for the food chain modeling that was conducted to evaluate risks to mammals and birds within those feeding guilds:

- Herbivorous mammal: Meadow vole
- Herbivorous bird: Bobwhite quail
- Insectivorous mammal: Short-tailed shrew
- Insectivorous bird: American robin
- Granivorous bird: Mourning dove

Large carnivorous birds (i.e., red-tailed hawk) and mammals (i.e., red fox) were not selected as assessment endpoints because their home ranges (hundreds of acres) are much larger than the entire MBFR Complex (approximately 40 acres), a portion of which is the Skeet Range MRS. Also, they also have lower ingestion rates as compared to their body weights so their dose is much lower than that of smaller mammals and birds who could obtain most if not all of their food from the site. Therefore, risks would be greater to small mammals and birds.

7.1.5 Ecological Conceptual Site Model

A CSM in ERA problem formulation is a written description of predicted relationships between ecological entities and the stressors to which they may be exposed (USEPA, 1998). The CSM consists of two primary components: predicted relationships among stressor, exposure, and assessment endpoint response, and a diagram that illustrates the relationships (USEPA, 1998).

The primary sources of known or potential contamination at the site were identified based on past investigations, site history, and the physical characteristics of the site. The source of contamination at the site is historical skeet shooting activities, which resulted in lead shot and clay pigeon fragments in surficial soils. Deposition was initially on the surface (0 to 6 inches); however, some contamination may have moved into deeper soils (6 to 24 inches) through reworking of soil whether mechanically or naturally (e.g., earthworms). The site contains dense vegetation and grassy fields, which allows infiltration of precipitation and limits sheet flow of rainwater in this area. The northern drainage channel is the primary pathway for surface water runoff at the east-facing

skeet range. Analytical results indicate that elevated lead concentrations are present in samples collected in the northern drainage channel.

Plants and soil invertebrates are directly exposed to chemicals in surface soil, while sediment invertebrates are directly exposed to chemicals in sediment within the drainage channel. Birds and mammals can be indirectly exposed to chemicals in the soil through feeding on plants/organisms that have accumulated chemicals from the media and also directly exposed to the chemicals through incidental ingestion of soil while feeding. Birds may also incidentally ingest lead shot while searching for grit that are approximately the same size as or smaller than lead shot. Figure 7-1 represents the ecological CSM for the site.

7.2 Screening-Level Exposure Estimate and Risk Quotients

7.2.1 Ecological Effects Evaluation

The preliminary ecological effects evaluation is an investigation of the relationship between the exposure to a chemical and the potential for adverse effects resulting from exposure. As the first step in the ecological effects evaluation, toxicity thresholds such as ecological screening levels and toxicity reference values (TRVs) were identified and compiled as discussed below.

Terrestrial Plants and Soil Invertebrates

Risks to terrestrial plants and soil invertebrates resulting from direct exposure to chemicals were evaluated by comparing the chemical concentrations in the surface soil to screening levels. The screening levels, which were considered in the following hierarchy, consisted of the USEPA Ecological Soil Screening Levels (Eco SSLs) (http://www.epa.gov/ecotox/ecossl/), followed by values from Los Alamos National Laboratory (LANL) ECORISK database (version 4.1; LANL, 2017), Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks for plants (Efroymson et al., 1997a) and invertebrates (Efroymson et al., 1997b), USEPA Region 4 soil screening levels (USEPA, 2018b), and USEPA Region 5 ecological screening levels (ESLs) (USEPA, 2003c). The ecological screening levels are presented in Appendix I. These screening levels are expressed in units of concentration because terrestrial plants and soil invertebrates are directly exposed to the soil.

Sediment Invertebrates

Risks to sediment invertebrates resulting from direct exposure to chemicals were evaluated by comparing the chemical concentrations in the sediment to marine sediment screening levels if available. The screening levels were considered in the following hierarchy: USEPA Region 3 marine sediment screening benchmarks (2006), USEPA Region 4 marine sediment screening levels (2018b), and USEPA Region 3 freshwater sediment screening benchmarks (2006). The screening levels are presented in Appendix I. These screening levels are expressed in units of concentration because sediment invertebrates are directly exposed to sediment.

Mammals and Birds

Potential risks to birds and mammals resulting from exposure to chemicals in the surface soil were evaluated by first comparing chemical concentrations to ecological screening levels (Appendix I).

Risks to birds and mammals were evaluated using food chain models for chemicals that exceeded screening levels for birds and mammals or chemicals considered by USEPA to be important bioaccumulative chemicals (USEPA, 2006) but did not have wildlife screening levels. Risk to birds and mammals from exposure to chemicals in surface soil were determined by estimating the Chronic Daily Intake (CDI) using food chain models and comparing the CDI to TRVs representing acceptable daily doses in mg/kg-day. The TRVs were developed from no observed adverse effect levels (NOAELs), and lowest observed adverse effect levels (LOAELs) obtained from wildlife studies presented in ORNL Toxicological Benchmarks for Wildlife: 1996 Revision (Sample et al., 1996) and the USEPA Eco SSLs (http://www.epa.gov/ecotox/ecossl/) and were supplemented with other toxicity information when necessary.

Appendix I presents the TRVs for each chemical and the sources (i.e., NOAELs and LOAELs) of the TRVs used in this ERA. The chemical-specific Eco SSL documents provide both NOAELs and LOAELS for various studies, but TRVs are generally calculated only for NOAELs. The geometric mean of the chemical-specific growth and reproduction LOAELs from the chemical-specific Eco SSL documents were used as the LOAEL TRVs.

Ingestion of lead shot by birds has the potential to impact birds. A PRG for ingestion of lead shot was developed in the SAP (Tetra Tech, 2018a) using a probability model. This is discussed in more detail in Section 7.3.4. In general, the model is used to predict the probability of ingesting lead shot. Because the habitat at the Skeet Range MRS is not a wildlife refuge or other type of potentially sensitive environment, a probability of 20 percent was the basis of the lead shot PRG. Therefore, this same probability level is used to determine unacceptable risks to birds in this risk assessment.

7.2.2 Exposure Characterization

Samples collected at the site and evaluated in this ERA include the following:

- Surface soil data (depth 0 to 0.5 feet) and subsurface soil data (depth 0.5 to 2 feet) separated into four areas (Northern Range Area, Southern Range Area [and overlapping Skeet Range Shooting Area], and High Tower Range Area).
- Surface soil/sediment samples within the northern low-lying areas evaluated as sediment. Deeper soil/sediment samples (6 to 12 inch and 12 to 24 inches) were not evaluated as sediment because the primary exposure point for sediment invertebrates will be further downstream if the surficial soil/sediment migrates to that area. It is not expected that the deeper soil/sediment will migrate downstream.

Although terrestrial receptors can be exposed to soil in the top two feet, which is generally considered surface soil for ERAs, the soil was separated into surface (0 to 6 inches) and subsurface soil (6 to 24 inches) because the source of the lead and PAHs was surface deposition

of lead shot and clay pigeon fragments. Generally, greater concentrations of lead and PAHs were found in the surface soil samples so ecological risks were evaluated separately for the surface and subsurface soil data sets.

The list of samples evaluated in this ERA separated into the different areas and different depths is included in Appendix I.

There is uncertainty in whether the low-lying soil/sediment area provide habitat for sediment invertebrates because the area is not consistently wet throughout the year and is more terrestrial habitat than aquatic habitat. Nevertheless, risks to sediment invertebrates are being evaluated in this area to be conservative. Also, the evaluation will be used to determine whether there are potential risks to invertebrates downstream of this area where there is aquatic habitat in the event that sediment migrates to that area in the future.

Terrestrial plants, soil invertebrates, and sediment invertebrates are exposed to chemicals in the soil and sediment through ingestion and/or direct contact. Maximum chemical concentrations in soil (for each depth interval) and sediment were used in the screening step as the exposure concentration to select COPCs.

Chronic daily intake doses in mg/kg-day were estimated for mammals and birds using exposure equations. The following equation was used to calculate the exposure dose for mammals and birds from exposure to chemicals in soil (and associated food items such as plants and invertebrates):

$$\mathrm{CDI} = \frac{[(\mathrm{Cf} * \mathrm{If}) + (\mathrm{Cs} * \mathrm{Is})] * \mathrm{H}}{\mathrm{BW}}$$

Where:

CDI	=	Chronic daily intake [milligrams per kilogram (mg/kg)-day]
Cf	=	Chemical concentration in food – (see discussion below)
Cs	=	Chemical concentration in surface soil (mg/kg)
If	=	Food ingestion rate [kilograms per day (kg/day)]
Is	=	Incidental surface soil ingestion rate (kg/day)
H	=	Portion of food intake from the contaminated area (unitless)
BW	=	Body weight (kg)

The exposure assumptions (i.e., ingestion rate, body weight) were obtained primarily from the Wildlife Exposure Factors Handbook (USEPA, 1993) with other sources used as necessary. Food ingestion rates were presented on a dry weight basis and chemical concentrations in the food items were estimated in dry weight concentrations. This was done to be consistent with chemical concentrations in soil, which are reported on a dry weight basis. The exposure assumptions and the calculation of exposure assumptions are presented in Appendix I.

Chemical concentrations in food items for terrestrial insectivorous and herbivorous receptors were calculated using soil-to-invertebrate or soil-to-plant bioaccumulation factors (BAFs) and regression equations from the USEPA Eco SSL Guidance Document (2007) as documented in

Appendix I. The following equation was used to calculate chemical concentrations in plants or invertebrates when BAFs were used:

$$Cf = Cs * BAF$$

Where:

Cf	=	Chemical concentration in food (mg/kg)
Cs	=	Chemical concentration in surface soil (mg/kg)
BAF	=	Biota-soil bioaccumulation factor (unitless) (soil to plant or soil to earthworm)

For selection of chemicals as COPCs, the following set of conservative exposure assumptions was used in the food chain models:

- Maximum soil concentrations
- Median BAFs or regression equations
- Conservative receptor body weight and ingestion rates
- Receptors spend 100% of their time at the site

7.2.3 Risk Characterization

An Ecological Effects Quotient (EEQ) approach was used to characterize the risk to ecological receptors. This approach characterizes the potential effects by comparing exposure concentrations with the effects data. The EEQs for plants and soil invertebrates were calculated as follows:

$$EEQ = \frac{C_s}{SL}$$

Where:

EEQ	=	Ecological effects quotient (unitless)
Cs	=	Maximum chemical concentration in surface soil/sediment (e.g., µg/kg or mg/kg)
SL	=	Surface soil/sediment screening level (e.g., µg/kg or mg/kg)

The EEQs for the terrestrial wildlife model were calculated as follows:

$$EEQ = \frac{CDI}{TRV}$$

Where:

EEQ	=	Ecological effects quotient (unitless)
CDI	=	Chronic daily intake dose (mg/kg-day)
TRV	=	Toxicity reference value (NOAEL or LOAEL) (mg/kg-day)

An EEQ of greater than 1.0 was considered to indicate potential risk. Such values do not necessarily indicate that an effect will occur but only that a low (i.e., conservative) threshold has been exceeded.

7.2.4 Selection of Chemicals of Potential Concern

The final part of the screening evaluation is selection of COPCs. Chemicals that are not selected as COPCs are assumed to present negligible risk to ecological receptors and were not considered for further evaluation in the ERA. Chemicals that are retained as COPCs were evaluated further in Step 3a. Ecological COPCs were selected using the following procedures:

- Chemicals with EEQs greater than 1.0 (using screening values) were retained as COPCs for further evaluation because they have a potential to cause risk to ecological receptors.
- Chemicals with EEQs greater than 1.0 based on the conservative food chain model using NOAELs were retained as COPCs, because they have the potential to cause risk to mammals and birds.
- Chemicals without screening values were retained as COPCs but were only evaluated qualitatively.

Tables 7-2 through 7-4 present the selection of COPCs for surface soil for the Northern Range Area, the Southern Range Area (and overlapping Skeet Range Shooting Area), and the High Tower Range Area, respectively. Table 7-5 presents the selection of COPCs for sediment. Table 7-6 presents the results of the conservative food chain model for soil. Table 7-7 presents a summary of the chemicals that were retained as COPCs in each media because their concentrations exceeded screening levels or they do not have screening levels.

7.3 Tier 2, Step 3a: COPC Refinement

Step 3a consists of a refinement of the conservative exposure assumptions and concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, benthic organisms, and wildlife receptors). The objective of the Step 3a evaluation is to further refine the number of chemicals that are retained as COPCs in order to focus additional efforts on chemicals that are of major ecological concern.

For chemicals that are evaluated further in Step 3a, the following factors were evaluated, as appropriate, to determine if the risks are great enough to warrant additional evaluations.

- Magnitude of Criterion Exceedance: Although the magnitude of the risks may not relate directly to the magnitude of a criterion exceedance, the magnitude of the criterion exceedance may be one item used in a lines-of-evidence approach to determine the need for further site evaluation. The greater the criterion exceedance, the greater the probability and concern that an unacceptable risk exists.
- Frequency of Screening Level Exceedance and Spatial Distribution: A chemical detected at a low frequency at concentrations that exceed a screening level are typically of less concern than a chemical with a higher frequency of exceedances assuming spatial areas

represented by the data are similar. All else being equal, chemicals detected more frequently at concentrations greater that their respective screening levels were given greater consideration than those with fewer exceedances.

- Contaminant Bioavailability: Many contaminants (especially inorganics) are present in the environment in forms that are typically not bioavailable, and the limited bioavailability was considered when evaluating the exposures of receptors to site contaminants. Contaminants with generally less bioavailability are considered to be less toxic than the more bioavailable contaminants, all other factors being equal.
- Additional Toxicity Data: Additional toxicity data were used to further evaluate risks to specific groups of ecological receptors (e.g., plants, invertebrates, and benthic organisms) because while conservative screening levels are useful for initial screening, they may not be available or appropriate for all of the assessment endpoints.
- Food Chain Modeling: Exposure via the food chain is a major pathway of concern for chemicals known to significantly bioaccumulate and/or biomagnify. Thus, potential risk to upper level receptors was evaluated using food chain models. The conservative exposure doses calculated for terrestrial wildlife were re-calculated using the following less conservative exposure assumptions and chemical concentrations:
    - Average chemical concentrations in media
    - Average receptor body weights and ingestion rates

7.3.1 Terrestrial Plants and Soil Invertebrates

Risks to plants and soil invertebrates from lead and PAH concentrations in soil are discussed below.

<u>Lead</u>

Table 7-8 presents all lead concentrations detected in surface soil (0-6 inches) and subsurface soil (6-12 inches and 12-24 inches).

Lead concentrations in surface soil exceed the USEPA Eco SSL for plants of 120 mg/kg in several samples. These are bolded in Table 7-8. The following summarizes the number of detections exceeding the screening value and the range of concentrations exceeding the screening value:

- Northern Range Area: 33 of 35 samples (142 to 22,200 mg/kg)
- Southern Range Area: 27 of 76 samples (149 to 1140 mg/kg)
- High Tower Range Area: 4 of 17 samples (129 to 508 mg/kg)

Average lead concentrations in surface soil are greater than the USEPA Eco SSL for plants of 120 mg/kg in the Northern Range Area (1,107 mg/kg) and the Southern Range Area (190 mg/kg) but is less than the plant screening value in the High Tower Range Area (117 mg/kg).

As presented in the SAP (Tetra Tech, 2018a) and in Section 4.2 of this RI, PRGs were developed for plants. The PRGs were 240 mg/kg, applied as an average concentration across each decision unit (Northern Range Area and Southern Range Area) and a “not to exceed” value of 750 mg/kg.

A few surface soil samples from the Northern Range Area and Southern Range Area have lead concentrations that exceed the “not to exceed” PRG for plants of 750 mg/kg. These are shaded grey in Table 7-8. Only surface soil within the Northern Range Area has an average lead concentration (1,107 mg/kg) that exceeds the plant PRG of 240 mg/kg.

Lead concentrations in subsurface soil are less than surface soil concentrations; however, several samples have concentrations exceeding the plant soil screening value of 120 mg/kg. The following summarizes the number of detections exceeding the screening value and the range of concentrations exceeding the screening value:

- Northern Range Area: 10 of 25 samples (140 to 846 mg/kg)
- Southern Range Area: 10 of 44 samples (121 to 728 mg/kg)
- High Tower Range Area: 4 of 21 samples (124 to 176 mg/kg)

Average lead concentrations in subsurface soil are only slightly greater than the screening value (120 mg/kg) for the Northern Range Area (170 mg/kg) and are less than the screening value for the Southern Range Area (84 mg/kg) and High Tower Range Area (40 mg/kg).

Only one subsurface soil sample from the Northern Range Area has a lead concentration that exceeds the “not to exceed” PRG for plants of 750 mg/kg. Average lead concentrations in subsurface soil are less than the plant PRG of 240 mg/kg.

Based on several soil samples exceeding the plant PRG for lead, lead is retained as a COPC for plants in the Northern Range Area and Southern Range Area. Lead was eliminated as a COPC for plants in the High Tower Range Area since the average lead concentration for surface and subsurface soil was less than the plant PRG of 240 mg/kg.

Lead concentrations in surface soil only exceed the USEPA Eco SSL for soil invertebrate of 1,700 mg/kg in two surface soil samples (2,020 mg/kg and 22,200 mg/kg), both of which were from the southeastern portion of the Northern Range Area. These are shaded black in Table 7-8. These samples were bounded by samples within approximately 30 feet with lead concentrations less than the invertebrate screening value. All subsurface soil samples have lead concentrations less than the invertebrate screening value. However, because the area will be addressed for other receptors (sediment invertebrates and birds, lead will also be retained as a COPC for soil invertebrates in this area.

<u>PAHs</u>

Table 7-9 presents all PAH concentrations detected in surface soil (0-6 inches) and subsurface soil (6-12 inches and 12-24 inches). Bold and shading indicates exceedance of screening levels for plant and invertebrates, respectively.

Several PAHs were selected as COPCs because their maximum detected concentrations exceed a LANL plant screening value as presented at the top of Table 7-9. The following three PAHs exceed available plant screening values in surface soil samples:

- Acenaphthene: 3 of 51 samples
- Benzo(a)anthracene: 6 of 76 samples
- Benzo(b)fluoranthene: 10 of 76 samples

Several PAHs were selected as COPCs because a screening value was not available to quantitatively evaluate risk to plants from exposure to these PAHs in soil; however, data presented on Table 3.1 in the Eco SSL document for PAHs shows that PAHs are typically not toxic to plants except at high soil concentrations with the lowest listed effective concentration affecting 50 percent of the test organisms (EC50) of 30,000 micrograms per kilogram (µg/kg) from Mitchell et al. (1988). Maximum concentrations of PAHs exceed 30,000 µg/kg in a few samples noted below:

- SR-SS-008: benzo(b)fluoranthene, fluoranthene
- SR-SS-033: fluoranthene
- SR-SS-258: benzo(b)fluoranthene
- SR-SS-267: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene
- SR-SS-275: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene

Appendix I includes a figure identifying the location of the samples with individual PAH concentrations exceeding 30,000 µg/kg. These samples are bounded within 35 feet of soil samples with lower concentrations of PAHs. Soil samples SR-SS-008, SR-SS-257, and SR-SS-033 are located within approximately 50 feet of each other. The samples were collected from within the Skeet Range Shooting Area, which consists of mowed grass and an area of deciduous and coniferous scrub. Most of the EC50s and lethal concentrations affecting 50 percent of the test organisms (LC50s) provided in the Eco SSL document (USEPA, 2007) were greater than 1,000,000 µg/kg, with others ranging from 30,000 to 720,000 µg/kg. Although a PAH Eco SSL could not be derived for plants, one of the studies provided in the text of the Eco SSL document (USEPA, 2007) for plants utilized mixed PAHs for the toxicity study. This study provided a LOAEL of 100,000 µg/kg. No PAH concentrations exceeded this LOAEL. Also, it is not likely that the PAHs are bioavailable because they are bound up in the clay pigeon fragments. Considering that most samples have PAH concentrations less than the lowest available EC50 and the area is heavily vegetated, it is not likely that plants are significantly impacted by PAHs in soil. Therefore, PAHs are eliminated as COPCs for plants.

Several PAHs were selected as COPCs because their maximum detected concentrations exceed the Eco SSL for soil invertebrates. Except for fluoranthene, all of the PAHs initially selected as COPCs for invertebrates are high molecular weight PAHs. The following PAHs exceed the soil invertebrate screening value at the following frequencies (not counting duplicates):

- Benzo(a)anthracene: 6 of 76 samples
- Benzo(a)pyrene: 5 of 76 samples
- Benzo(b)fluoranthene: 9 of 76 samples
- Benzo(g,h,i)perylene: 1 of 51 samples
- Benzo(k)fluoranthene: 2 of 76 samples

- Chrysene: 5 of 76 samples
- Fluoranthene: 2 of 51 samples
- Indeno(1,2,3-cd)pyrene: 4 of 76 samples
- Pyrene: 3 of 51 samples

A PRG was not developed for PAHs. Overall impacts to invertebrates are not expected to be significant because there are only 9 locations where PAH concentrations are greater than the invertebrate screening value, and it is not likely that the PAHs will be bioavailable because they are bound up in the clay pigeon fragments. Therefore, PAHs are eliminated as COPCs for soil invertebrates.

7.3.2 Sediment Invertebrates

The wetland boundary within the Northern Range Area is marginal and shifts depending on rainfall and water coming through the drainage area; therefore, habitat for sediment invertebrates may not be present at all low-lying areas sampled. Terrestrial receptors are more likely than aquatic receptors to inhabit the wetland portion of the site during much of the year. However, because the sediment may eventually move downstream and impact Little Mosquito Creek, or the tidal marsh adjacent to the creek, surface soil samples in the low-lying area within the Northern Range Area were also evaluated for risks to sediment invertebrates. Table 7-5 provides the rationale for the COPC selection process. All lead concentrations (104 to 22,220 mg/kg) exceed the sediment screening value of 30.2 mg/kg. The screening value of 30.2 mg/kg is a USEPA Region 3 marine sediment screening benchmark (USEPA, 2006) and is based on the threshold effect level (TEL), which is the concentration at which adverse effects are not expected (MacDonald, et al., 1996). The source document for the TEL screening value (MacDonald, et al., 1996) also provides a benchmark for a higher effect level, which is the probable effect level (PEL). The PEL is the concentration at which adverse effects are likely. Lead concentrations in 26 of 28 locations exceed the PEL of 112 mg/kg (MacDonald, et al., 1996). While erosion of sediment/soil from the site into the tidal marsh and Little Mosquito Creek is limited because the area is heavily vegetated, lead is retained as a COPC for sediment invertebrates.

As presented in the SAP (Tetra Tech, 2018a), a PRG of 530 mg/kg lead was recommended for this area, which is the Washington State sediment cleanup level. The basis for this value is that use of a PRG at the site of 530 mg/kg lead will result in much lower lead concentrations for sediment invertebrates at the exposure point for sediment invertebrates (Little Mosquito Creek). The PRG was to be applied as a “not to exceed” concentration for those samples. Thirteen of 28 locations have lead concentrations exceeding the PRG. Lead concentrations are greater than the PRG developed as part of the SAP; therefore, lead is retained as a COPC for sediment invertebrates.

Dibenzo(a,h)anthracene was initially selected as a COPC in sediment because the detected concentration (SR-SS-038-000.5 at 9.4 µg/kg) exceeds it screening value. However, the toxicity of PAHs is typically assumed to be additive, so evaluating PAH toxicity in sediment by examining total PAH concentrations is especially useful when several PAHs are detected. Concentrations of total PAHs in sediment are less than the screening level for total PAHs of 2,900 µg/kg. Therefore, risks to sediment invertebrates from PAHs are not expected.

7.3.3 Mammals and Birds

The EEQs from the terrestrial food chain modeling for soil were greater than 1.0 for several chemicals using maximum chemical concentrations and conservative exposure assumptions. Therefore, as part of the Step 3a refinement, risks for this pathway were recalculated using average chemical concentrations in surface soil and less conservative exposure assumptions (i.e., average ingestion rates, average body weights) (see Appendix I).

Table 7-10 summarizes the results of the less conservative inputs food chain modeling for terrestrial receptors exposed to soil. Appendix I includes the calculation worksheets. A discussion of the risks to mammal and birds exposed to soil is presented below. Only lead concentrations within soil are evaluated as part of the food chain modeling summarized below. Risks to birds from exposure to lead shot are discussed separately.

- Herbivorous receptors: All EEQs for the vole were less than 1.0 using the NOAEL as the TRV. The NOAEL EEQ for lead was greater than 1.0 for the quail for surface soil from the Northern Range Area (3.9). All LOAEL EEQs were less than 1.0 for the quail. Therefore, lead and PAHs in soil are not retained as COPCs for risks to herbivorous birds and mammals.
- Insectivorous receptors: The EEQs for the shrew for surface soil were greater than 1.0 using the NOAEL as the TRV for lead (4.5) from the Northern Range Area; and lead (1.1), benzo(b)fluoranthene (2.1), chrysene (1.5), and indeno(1,2,3-cd)pyrene (1.4) from the Southern Range Area/Skeet Range Shooting Area. The NOAEL EEQs for the robin were greater than 1.0 in surface soil for lead (27) from the Northern Range Area, lead (6.1) and benzo(b)fluoranthene (1.1) from the Southern Range Area/Skeet Range Shooting Area, and lead (4.1) from the High Tower Range Area; and subsurface soil for lead from the Northern Range Area (5.6), the Southern Range Area (3.1), and the High Tower Range Area (1.7). Except for lead from the Northern Range Area, NOAEL EEQs were only slightly greater than 1.0. LOAEL EEQs were less than or equal to 1.0 for the shrew and robin. Therefore, lead and PAHs in soil are not retained as COPCs for risks to insectivorous mammals; however, as discussed below, lead is retained as a COC for insectivorous birds.

The PRGs developed in the SAP (Tetra Tech, 2018a) for insectivorous birds exposed to lead concentrations in soil include a “not to exceed” value of 1,100 mg/kg and an average concentration across the site of 299 mg/kg. Several locations in the Northern Range Area exceed the “not to exceed” value of 1,100 mg/kg (Table 7-8). The average concentration in surface soil (1,107 mg/kg) from the Northern Range Area was greater than the PRG of 299 mg/kg (Table 7-2). Average concentrations were less than the PRG of 299 mg/kg for subsurface soil from the Northern Range Area and surface and subsurface soil from the Southern Range Area and High Tower Range Area (Tables 7-3 and 7-4). Therefore, even though the LOAEL EEQs were less than 1.0 using average soil concentrations, lead concentrations are greater than the PRG developed as part of the SAP in the Northern Range Area. Therefore, lead is retained as a COPC for insectivorous bird in this area.

7.3.4 Risk to Birds from Lead Shot

No Federal or State values have been promulgated for allowable levels of lead shot in soil. Therefore, as presented in the SAP (Tetra Tech, 2018a), a probability model presented in an USEPA document titled, Assessment of Methods for Estimating Risk to Birds from Ingestion of Contaminated Grit Particles (Bennett et al., 2011) was used to evaluate risks to birds from ingesting lead shot. The model uses the number of lead shot and non-lead particles (i.e., sand, gravel, rocks) to calculate the probability for birds to ingest a lead particle from the site using site-specific parameters. The USEPA model includes a spreadsheet that can be used to calculate the probability for birds to ingest a lead particle from the site using site-specific parameters. Appendix I includes the parameters used in the model modified for the mourning dove and using site-specific values for estimating probability of ingesting lead particles. Several of the site-specific values used in the model came from the Ecological Risk Assessment for Range 17 (Trap and Skeet Range), Patuxent Research Refuge (USFWS and USEPA, March 2004). The area use factor (the F parameter) is assumed to be 0.5 percent or 0.005. This was calculated by dividing the approximate size of the area where lead shot was identified at the Skeet Range (approximately 2.5 acres) by the home range of mourning doves (538 acres) from USFWS and USEPA, (March 2004).

Soil was passed through a series of sieves to determine the number of lead shot and non-lead particles within various size ranges. All soil samples that were sieved were passed through a No.10 sieve (2 mm), while select samples were passed through a No. 14 sieve (1.4 mm), No. 20 sieve (0.84 mm), and No. 35 sieve (0.5 mm). Table 4-5 presents the results of the sieving, which was done for different depth intervals (0 to 6 inches, 6 to 12 inches, and 12 to 24 inches). Most of the lead shot were found on the No. 10 sieve, with a few lead shot found on the No. 14 sieve; no lead shot were found on the No. 20 or No. 35 sieves (see Table 4-5).

As presented in (Bennett et al., 2011), the mean particle size found in the gizzard of mourning doves was 2.1 mm. Because some of the non-lead particles retained on the No. 10 sieve were much greater than 2 mm, for this modeling, only the non-lead particles that passed through the No. 10 sieve and were retained on the No. 14 sieve (between 1.41 and 2 mm) and retained on the No. 20 sieve (between 1.41 and 0.84 mm) were used for the modeling. All of the lead shot were included in the modeling. Although the non-lead particles retained on the No. 14 sieve likely represents the lower range of grit consumed by mourning doves, the modeling was conducted for non-lead particles retained on the No. 20 sieve for informational purposes.

Table 7-11 summarizes the ingestion probability for each sample where lead shot was collected within the Southern Range Area and High Tower Range Area. The probability models are included in Appendix I. The probability modeling was conducted for all three depth intervals (0 to 6 inches, 6 to 12 inches, and 12 to 24 inches), although the primary exposure to birds would be to lead shot in the top six inches. Generally higher numbers of lead shot were found in the 0 to 6-inch interval.

As discussed in more detail in the SAP (Tetra Tech, 2018a), because the habitat at the Skeet Range MRS is not a wildlife refuge or other type of potentially sensitive environment, a probability of 20 percent that a bird would ingest one lead shot was the basis of the lead shot PRG.

Therefore, this same probability level is used to determine unacceptable risks to birds in this risk assessment. With one exception of 94 lead shot/ft^2 in sample SR-SS-407-0006, the probability of ingesting lead shot was less than 20 percent when 100 or fewer lead shot were present in a sample (based on non-lead particles retained on the No. 14 sieve). When based on non-lead particles retained on the No. 20 sieve, the probability of ingesting lead shot was less than 3 percent.

Table 4-5 presents the lead shot counts for all of the samples. Although the majority of samples were only sieved through a No. 10 sieve (only about 30 percent of the samples were also sieved through a No. 14 sieve), it is assumed that the proportion of lead shot/non-lead grit-sized particles would be the same in all samples. Approximately 35 percent of the samples have greater than 100 lead shot/ft^2, and with a few exceptions, most of these were from samples collected in the 0 to 6-inch depth interval. This indicates that even though birds feed over a larger area than represented by a single sample point, there are potential impacts to birds from ingestion of lead shot because of the relatively large number of locations where the number of lead shot particles exceed 100 lead shot/ft^2.

7.4 Ecological Risk Uncertainty Analysis

This section presents some of the general uncertainties associated with the ERA.

7.4.1 Uncertainty in Assessment Endpoints and Measures of Effects

Measures of effects were used to evaluate the assessment endpoints that were selected for this ERA, but the measures of effects were not the same as the assessment endpoints. Therefore, the measures were used to predict effects to the assessment endpoints by selecting surrogate species that were evaluated. For example, mortality of a shrew was used to assess mortality of the small mammal population. However, predicting mortality to a shrew may either under or overprotect the small mammal population, resulting from differences in ingestion rates, toxicity, food preferences, etc., between the different species.

Several endpoints were not quantitatively evaluated in the ERA. For example, risks to reptiles were not evaluated because exposure factors are not established for most species, and toxicity data are very limited. Therefore, risks to these receptors could not be determined.

7.4.2 Uncertainty in Exposure Characterization

The contaminant dose to terrestrial wildlife is calculated using an equation that incorporates ingestion rates, body weights, bioaccumulation factors, and other exposure factors. These exposure factors are obtained from literature studies or predicted using various equations. Ingestion rates and body weights vary between species, especially between species inhabiting different areas.

Bioaccumulation of contaminants into various biological media (i.e., plants, invertebrates) depends on the characteristics of the media such as pH, organic carbon, etc. The bioaccumulation factors that were used for the ERA came from a variety of literature sources because no site-specific values are available. There are uncertainties associated with

accumulation factors from the literature because they may either underpredict of overpredict tissue concentrations, depending upon how representative the factors are for site conditions. As indicated above, it is unlikely that the PAHs in the clay pigeons will be very bioavailable as they are likely bound to the clay particles.

A probability model was used to estimate the probability that a bird would be exposed to and ingest one lead shot while consuming grit. There is a lot of uncertainty in the modeling such as the size of the grit that will be consumed by birds at the site, the amount of time that the birds would spend feeding at the site, and other factors as discussed in Section 7.3.4. However, as discussed in USEPA, 2011, the basis probability models are generally designed to be conservative so potential risks are less likely to be underestimated.

There was uncertainty in assuming the soil/sediment from the wetland area in the Northern Range Area would ultimately erode to Little Mosquito Creek at concentrations that could impact sediment invertebrates in the creek. Erosion from the site is limited because the area is heavily vegetated. Also, any erosion from the site would be a relatively slow process occurring over time, as opposed to a large slug of contaminated sediment being released at one time so the average lead concentration in the tidal marsh and Little Mosquito Creek (where sediment invertebrates are present) is expected to be much lower than the concentrations at the site. The reason is that as sediment from the site moves to the marsh, it will be mixed with other sediment before reaching the marsh and once in the marsh, it will be further mixed through bioturbation within the biotic zone (i.e., the top 4 inches). Also, tidal action from the incoming and outgoing tides will further mix the sediment, resulting in even lower lead concentrations.

7.4.3 Uncertainty in Ecological Effects Data

Uncertainty exists in the ecological effects data, including the screening levels and wildlife TRVs. Several of the screening levels are very conservative, and typically are based on studies where the bioavailability of the chemical is much greater than it is in the environment. Also, toxicity data was not available or was limited for some chemicals.

The NOAELs/LOAELs used for the wildlife endpoints species are based on species other than the endpoint species (e.g., rats). Uncertainty exists in the application of toxicity data across species because the contaminant may be more or less toxic to the endpoint species than it was to the test study species.

The lead shot probability model evaluates the probability that a bird will ingest lead shot based on an assumption that ingestion of one lead shot would be fatal. There is contradicting information in the literature, however, regarding the toxicity on a single lead shot.

7.4.4 Uncertainty in Risk Characterization

The potential for adverse risks exists if an EEQ is greater than 1.0 regardless of the magnitude of the EEQ. Although the relationship between the magnitude of an EEQ and toxicity is not necessarily linear, the magnitude of an EEQ can be used as a rough approximation of the extent of potential risks, especially if there is sufficient confidence in the screening level used.

Uncertainty exists in how the predicted risks to a species at the site translate into risk to the population in the area as a whole.

7.5 Ecological Risk Assessment Summary

Historical skeet shooting activities conducted at the Skeet Range MRS resulted in the presence of lead and PAH contamination in surface and subsurface soil from lead shot and clay pigeon fragments. This ERA evaluated surface and subsurface soil data across the Skeet Range MRS. Low-lying soils were also evaluated as sediment samples. Based on the initial screening of the chemical data, lead and several PAHs were initially selected as COPCs because they were detected at concentrations that exceeded conservative screening levels, they had EEQs greater than 1.0 in the conservative food chain model, or because they did not have screening levels.

Lead and PAHs were then further evaluated to refine the list of COPCs, and to better characterize risks to ecological receptors. PAHs were eliminated as COPCs for all ecological receptors in all areas. Lead was retained as a COPC for risks to the following receptors in the following areas:

- Terrestrial plants in the Northern and Southern Range Areas (it was eliminated as a COPC for plants in the High Tower Range Area).
- Soil invertebrates in the southeastern portion of the Northern Range Area.
- Sediment invertebrates in the low-lying portion of the Northern Range Area.
- Insectivorous birds in the Northern Range Area.
- Birds in areas with greater than 100 lead shot/ft^2.

8.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions and recommendations of the RI conducted at the Skeet Range MRS. The objectives of the RI were to further delineate the extent of contaminated surface soils, investigate potential contamination in subsurface soils, collect data to confirm and further develop the PRGs, re-evaluate risk to human health and ecological receptors, and support an FS at the Skeet Range MRS. A Human Health Risk Evaluation was conducted to evaluate potential human health risks and an ERA was conducted to evaluate potential ecological risks.

The following conclusions are based on the results of the RI:

8.1 Conclusions

8.1.1 Nature and Extent Conclusions

- Lead concentrations present in surface soil greater than the not-to-exceed ecological PRGs of 530 mg/kg and 750 mg/kg (respectively) in surface soil samples at the Northern Range Area and Southern Range Area.
- The arithmetic mean for lead in surface soil at the Northern Range Area is greater than the human health PRG of 200 mg/kg.
- PAH concentrations resulting in a total point risk greater than $1x10^{-4}$ (human health PRG) are present in surface soil samples at the Skeet Range Shooting Area.
- Lead shot are greater than the ecological PRG of 100 lead shot/ft^2 is present in surface soil samples at the Southern Range Area and High Tower Range Area.
- Only low concentrations of lead and PAHs were observed in subsurface soils (> 1-foot bgs) across the Skeet Range MRS.

8.1.2 Human Health Risk Evaluation Conclusions

- Lead was the only chemical detected at concentrations exceeding screening levels in surface soil and subsurface soil at the Northern Range Area.
- At the Southern Range Area and Skeet Range Shooting Area, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3,-cd)pyrene, and lead were detected at concentrations exceeding screening levels in surface and subsurface soil.
- At the High Tower Range Area, only concentrations of lead in surface soil exceeded the screening levels. Concentrations of all chemicals in subsurface soil were below screening levels.
- HIs for hypothetical residents and industrial workers exposed to surface soil and subsurface soil at the Southern Range Area were less than the acceptable level of 1.

- Cancer risks for residents exposed to surface soil exceeded USEPA's target risk range of 10^{-4} to 10^{-6}, while cancer risks for residents exposed to subsurface soil were equal to the upper bound of the target risk range.
    - Benzo(a)pyrene was the major contributor to the cancer risk.
- Cancer risks for industrial workers exposed to surface soil and subsurface soil were within USEPA's target risk range.
- The results for residents exposed to lead in surface soil and subsurface soil at the Northern Range Area and surface soil at the Southern Range Area exceed the USEPA goal of no more than 5 percent of children exceeding a 5 µg/dL blood lead level.
- The results for residents exposed to lead in subsurface soil at the Southern Range Area and surface soil at the High Tower Range Area do not exceed the USEPA goal of no more than 5 percent of children exceeding a 5 µg/dL blood lead level.
- The results for industrial workers exposed to lead in surface soil at the Northern Range Area exceed the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 5 µg/dL blood-lead level.
- The results for industrial workers exposed to lead in subsurface soil at the Northern Range Area, surface soil and subsurface soil at the Southern Range Area, and surface soil at the High Tower Range Area do not exceed the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 5 µg/dL blood-lead level.

8.1.3 Ecological Risk Screening Conclusions

- Lead was retained as a COPC for risks to terrestrial plants and sediment invertebrates.
- Lead was retained as a COPC in the Northern Range Area and Southern Range Area.
- Lead shot was retained as a COPC for risks to birds in areas with greater than 100 lead shot/ft^2.

8.2 Recommendations

Based on the results and findings of this RI, lead, lead shot, and PAHs at the Skeet Range MRS have been adequately defined. It is recommended that a Feasibility Study (FS) be conducted to evaluate remedial alternatives to address lead in the Northern Range Area; lead, PAHs, and lead shot at the Southern Range Area (which includes the Skeet Range Shooting Area), and lead shot at High Tower Range Area.

REFERENCES

Bennett, R., D. Hoff and M. Etterson, 2011. Assessment of Methods for Estimating Risk to Birds from Ingestion of Contaminated Grit Particles. U.S. Environmental Protection Agency, Ecological Risk Assessment Support Center, Cincinnati, OH. EPA/600/R-11/023.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Department of Interior, Fish and Wildlife Service, Office of Biological Services, Washington D.C. December.

Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten, 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Oak Ridge National Laboratory. November. ES/ER/TM-85/R3.

Efroymson, R.A., M.E. Will, and G.W. Suter II, 1997b. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. Oak Ridge National Laboratory. November. ES/ER/TM-126/R2.

LANL (Los Alamos National Laboratory), 2017. ECORISK Database (Release 4.1). Environmental Programs Directorate, Los Alamos National Laboratory, Los Alamos, NM. October.

MacDonald, D.D., Carr, R.S., Calder, F.D., Long, E.R., Ingersoll, C.G., 1996. Development and Evaluation for Sediment Quality Guidelines for Florida Coastal Waters. Ecotoxicology 5:253-278.

Meyer, Theodore J. (2011). FW: Scan from Xerox WorkCentre. [email]. June 26.

Meng and Harsh. 1988. Hydrologic Framework of the Virginia Coastal Plain. U.S. Geological Survey (USGS) Professional Paper 1401-C.

Mitchell, R. L., Burchett, M. D., Pulkownik, A., and Mccluskey, L., 1988. Effects of Environmentally Hazardous Chemicals on the Emergence and Early Growth of Selected Australian Plants. Plant Soil. 112[2]: 195-200.

NASA, 2015. Remedial Project Managers Meeting Summary, Wallops Flight Facility, Wallops Island, VA. December 8.

Navy, 1997. Environmental Policy Memorandum 97 04: Use of Ecological Risk Assessments. May 16.

Navy. 1999. Navy Policy for Conducting Ecological Risk Assessments. Memo from Chief of Naval Operations to Commander, Naval Facilities Engineering Command, 05 April. Department of the Navy, Washington, DC.

Occu – Health, 1999. Environmental Resources Document, NASA Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, VA. October.

Richardson, D.L., 1994. Hydrogeology and Analysis of the Ground-Water Flow System of the Eastern Shore, Virginia. U.S. Geological Survey Water-Supply Paper 2401

Simon, J. A., & Sobieraj, J. A., 2006. Contributions of common sources of polycyclic aromatic hydrocarbons to soil contamination. Remediation Journal: The Journal of Environmental Cleanup Costs, Technologies & Techniques, 16(3), 25-35.

Sample, B.E., D.M. Opresko, and G.W. Suter II, 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. Oak Ridge National Laboratory. June. ES/ER/TM-86/R3.

Tetra Tech, 2004. Background Soil and Groundwater Investigation Report for the Main Base, NASA Wallops Flight Facility Wallops Island, Virginia. May.

Tetra Tech, 2009a. Site Investigation Report, Revision 1 for the Main Base Firing Range Complex NASA Wallops Flight Facility Wallops Island, Virginia. February.

Tetra Tech, 2009b. Summary Report, Main Base Firing Range (MBFR) Complex – Skeet Range: Lead Follow-Up Soil Sampling, NASA Wallops Flight Facility Wallops Island, Virginia. August.

Tetra Tech, 2017. Final Construction Completion Report for Non-Time Critical Removal Action for Soil, Main Base Firing Range Complex – Pistol Range and Rifle Range, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia. March.

Tetra Tech, 2018a. Final Sampling and Analysis Plan Remedial Investigation, Formerly Used Defense Sites Project 9 Former Skeet Range, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia. March.

Tetra Tech, 2018b. Final Sampling and Analysis Plan Addendum Remedial Investigation, Formerly Used Defense Sites Project 9 Former Skeet Range, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia. December.

USACE, 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Environmental Laboratory, USACE Waterways Experiment Station, Vicksburg, Mississippi. January.

USACE, 2005. Archive Search Report for NASA – Wallops Flight Facility. October.

USACE, 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0). ERDC/EL TR-10-20. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi. November.

USACE, 2012. Final Site Inspection Report, Wallops Flight Facility Main Base Ranges (Skeet Range), FUDS Project No. C03VA030109 Accomack County, Virginia. July.

USEPA, 1993. Wildlife Exposure Factors Handbook. Office of Research and Development. Washington, D.C. EPA/600/R-93/187a. December.

USEPA, 1994a. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. OSWER Directive 9355.4-12. Office of Emergency and Remedial Response. Washington, DC.

USEPA, 1994b. Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children. USEPA/540/R-93/081. Office of Emergency and Remedial Response. Washington, DC. February.

USEPA, 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final. Environmental Response Team. June 5.

USEPA, 1998. Final Guidelines for Ecological Risk Assessment. Risk Assessment Forum, Washington, DC, EPA/630/R095/002F. April.

USEPA, 2002. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. Office of Emergency and Remedial Response. OSWER Directive 9285.6-10. December.

USEPA, 2003a. Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. EPA-540-R-03-001. December 1996 finalized January.

USEPA, 2003b. Human Health Toxicity Values in Superfund Risk Assessments. Office of Superfund Remediation and Technology Innovation, OSWER 9285.7-53, Washington, DC. December.

USEPA, 2003c. Ecological Screening Levels. USEPA Region 5 http://www.epa.gov/reg5rcra/ca/edql.htm August.

USEPA, 2006. Region 3 Marine Sediment Screening Benchmarks. July. http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/marsed/screenbench.htm

USEPA, 2007. Guidance for Developing Ecological Soil Screening Level, Attachment 4-1, Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. Office of Solid Waste and Emergency and Response. OSWER Directive 9285.7-55. April.

USEPA, 2010. Integrated Exposure Uptake Biokinetic Model for Lead in Children, Windows® version (IEUBKwin v 1.1 Build 11). February.

USEPA, 2015a. ProUCL Version 5.1.002 User Guide. Office of Research and Development. EPA/600/R-07/041. Washington, DC. October.

USEPA, 2015b. USEPA Region 3 BTAG Frequently Asked Questions. https://www.epa.gov/risk/btag-frequently-asked-questions

USEPA, 2016. Updated Scientific Considerations for Lead in Soil Cleanups. Office of Land and Emergency Management. Washington, DC. December.

USEPA, 2017a. Update to the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters. OLEM Directive 9285.6-56. Office of Land Emergency Management. Washington, D.C. May.

USEPA, 2017b. Recommendations for Default Age Range in the IEUBK Model. OLEM Directive 9200.2-177. Office of Land Emergency Management. Washington, D.C. November.

USEPA, 2018a. Regional Screening Levels for Chemical Contaminants at Superfund Sites. https://www.epa.gov/risk/regional-screening-levels-rsls. November.

USEPA, 2018b. Region 4 Ecological Risk Assessment Supplemental Guidance. Scientific Support Section, Superfund Division. March. https://www.epa.gov/sites/production/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf

USFWS (United States Fish and Wildlife Service) and USEPA. 2004 Ecological Risk Assessment for Range 17 (Trap and Skeet Range), Patuxent Research Refuge, Laurel, MD. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD and Division of Environmental Quality, Edison, NJ; U.S. Environmental Protection Agency, Environmental Response Team, Edison, NJ. March.

TABLES

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TABLE 3-1
SOIL SAMPLE SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				LABORATORY ANALYSIS			SIEVE ANALYSIS			
Sample Location	**Sample ID**	**Sample Date**	**Depth (Feet BGS)**	**Lead**	**PAHs**	**Grain Size**	**#10**	**#14**	**#20**	**#35**
NORTHERN RANGE AREA										
SR-SS-201	SR-SS-201-0006	3/22/2018	0 - 0.5	X						
	SR-SS-201-0612	3/22/2018	0.5 - 1	X						
	SR-SB-201-1224	3/22/2018	1 - 2	X						
SR-SS-202	SR-SS-202-0006	3/22/2018	0 - 0.5	X						
	SR-SS-202-0612	3/22/2018	0.5 - 1	X						
	SR-SB-202-1224	3/22/2018	1 - 2	X						
SR-SS-203	SR-SS-203-0006	3/22/2018	0 - 0.5	X						
	SR-SS-203-0006-D	3/22/2018	0 - 0.5	X						
	SR-SS-203-0612	3/22/2018	0.5 - 1	X						
	SR-SB-203-1224	3/22/2018	1 - 2	X						
SR-SS-204	SR-SS-204-0006	3/22/2018	0 - 0.5	X						
	SR-SS-204-0612	3/22/2018	0.5 - 1	X						
SR-SS-205	SR-SS-205-0006	3/22/2018	0 - 0.5	X						
	SR-SS-205-0612	3/22/2018	0.5 - 1	X						
SR-SS-206	SR-SS-206-0006	3/22/2018	0 - 0.5	X						
	SR-SS-206-0612	3/22/2018	0.5 - 1	X						
SR-SS-207	SR-SS-207-0006	3/22/2018	0 - 0.5	X						
	SR-SS-207-0612	3/22/2018	0.5 - 1	X						
SR-SS-208	SR-SS-208-0006	3/22/2018	0 - 0.5	X						
	SR-SS-208-0612	3/22/2018	0.5 - 1	X						
SR-SS-209	SR-SS-209-0006	3/22/2018	0 - 0.5	X						
	SR-SS-209-0612	3/22/2018	0.5 - 1	X						
SR-SS-210	SR-SS-210-0006	3/22/2018	0 - 0.5	X						
	SR-SS-210-0612	3/22/2018	0.5 - 1	X						
SR-SS-211	SR-SS-211-0006	3/22/2018	0 - 0.5	X						
	SR-SS-211-0612	3/22/2018	0.5 - 1	X						
SR-SS-212	SR-SS-212-0006	3/22/2018	0 - 0.5	X						
	SR-SS-212-0612	3/22/2018	0.5 - 1	X						
SR-SS-213	SR-SS-213-0006	3/22/2018	0 - 0.5	X						
	SR-SS-213-0612	3/22/2018	0.5 - 1	X						
SR-SS-214	SR-SS-214-0006	3/22/2018	0 - 0.5	X						
	SR-SS-214-0612	3/22/2018	0.5 - 1	X						
SR-SS-215	SR-SS-215-0006	3/22/2018	0 - 0.5	X						
	SR-SS-215-0612	3/22/2018	0.5 - 1	X						
SR-SS-301	SR-SS-301-0006	12/19/2018	0 - 0.5	X						
	SR-SS-301-0612	12/19/2018	0.5 - 1	X						
SR-SS-302	SR-SS-302-0006	12/19/2018	0 - 0.5	X						
	SR-SS-302-0612	12/19/2018	0.5 - 1	X						
	SR-SS-302-0612-D	12/19/2018	0.5 - 1	X						
SR-SS-303	SR-SS-303-0006	12/19/2018	0 - 0.5	X						
	SR-SS-303-0612	12/19/2018	0.5 - 1	X						
SR-SS-304	SR-SS-304-0006	12/19/2018	0 - 0.5	X						
	SR-SS-304-0612	12/19/2018	0.5 - 1	X						
SR-SS-305	SR-SS-305-0006	12/19/2018	0 - 0.5	X						
	SR-SS-305-0612	12/19/2018	0.5 - 1	X						
SR-SS-306	SR-SS-306-0006	12/19/2018	0 - 0.5	X						
	SR-SS-306-0612	12/19/2018	0.5 - 1	X						
SR-SS-307	SR-SS-307-0006	12/19/2018	0 - 0.5	X						
	SR-SS-307-0612	12/19/2018	0.5 - 1	X						
SOUTHERN RANGE AREA										
SR-SS-216	SR-SS-216-0006	3/21/2018	0 - 0.5	X			X			
	SR-SS-216-0612	3/21/2018	0.5 - 1	X			X			
	SR-SB-216-1224	3/22/2018	1 - 2	X			X			
SR-SS-217	SR-SS-217-0006	3/21/2018	0 - 0.5	X			X			
	SR-SS-217-0006-D	3/21/2018	0 - 0.5	X						
	SR-SS-217-0612	3/21/2018	0.5 - 1	X			X			
	SR-SB-217-1224	3/22/2018	1 - 2	X			X			
SR-SS-218	SR-SS-218-0006	3/20/2018	0 - 0.5	X			X			
	SR-SS-218-0612	3/20/2018	0.5 - 1	X			X			
	SR-SB-218-1224	3/21/2018	1 - 2	X			X			
SR-SS-219	SR-SS-219-0006	3/20/2018	0 - 0.5	X			X			
	SR-SS-219-0612	3/20/2018	0.5 - 1	X			X			
	SR-SB-219-1224	3/21/2018	1 - 2	X			X			
SR-SS-220	SR-SS-220-0006	3/21/2018	0 - 0.5	X			X			
	SR-SS-220-0612	3/21/2018	0.5 - 1	X			X			
	SR-SB-220-1224	3/22/2018	1 - 2	X			X			
SR-SS-221	SR-SS-221-0006	3/21/2018	0 - 0.5	X			X	X	X	X
	SR-SS-221-0612	3/21/2018	0.5 - 1	X			X	X	X	X
	SR-SB-221-1224	3/22/2018	1 - 2	X			X	X	X	X
SR-SS-222	SR-SS-222-0006	3/20/2018	0 - 0.5	X			X			
	SR-SS-222-0612	3/20/2018	0.5 - 1	X			X			
	SR-SB-222-1224	3/21/2018	1 - 2	X			X			
	SR-SB-222-1224-D	3/21/2018	1 - 2	X						
SR-SS-223	SR-SS-223-0006	3/20/2018	0 - 0.5	X			X			
	SR-SS-223-0612	3/20/2018	0.5 - 1	X			X			
	SR-SB-223-1224	3/21/2018	1 - 2	X			X			
	SR-SB-223-1224-D	3/21/2018	1 - 2	X						
SR-SS-224	SR-SS-224-0006	3/20/2018	0 - 0.5	X			X			
	SR-SS-224-0612	3/20/2018	0.5 - 1	X			X			
	SR-SS-224-0612-D	3/20/2018	0.5 - 1	X						
	SR-SB-224-1224	3/21/2018	1 - 2	X			X			
SR-SS-225	SR-SS-225-0006	3/20/2018	0 - 0.5	X		X	X	X	X	X
	SR-SS-225-0612	3/20/2018	0.5 - 1	X		X	X	X	X	X
	SR-SB-225-1224	3/21/2018	1 - 2	X		X	X			
SR-SS-226	SR-SS-226-0006	3/19/2018	0 - 0.5	X			X			
	SR-SS-226-0006-D	3/19/2018	0 - 0.5	X						
	SR-SS-226-0612	3/19/2018	0.5 - 1	X			X			
	SR-SB-226-1224	3/20/2018	1 - 2	X			X			

TABLE 3-1
SOIL SAMPLE SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				LABORATORY ANALYSIS			SIEVE ANALYSIS			
Sample Location	**Sample ID**	**Sample Date**	**Depth (Feet BGS)**	**Lead**	**PAHs**	**Grain Size**	**#10**	**#14**	**#20**	**#35**
SOUTHERN RANGE AREA (continued)										
SR-SS-227	SR-SS-227-0006	3/26/2018	0 - 0.5	X		X	X			
	SR-SS-227-0612	3/26/2018	0.5 - 1	X		X	X			
	SR-SS-227-0612-D	3/26/2018	0.5 - 1	X						
	SR-SB-227-1218	3/26/2018	1 - 1.5				X			
	SR-SB-227-1824	3/26/2018	1.5 - 2				X			
SR-SS-228	SR-SS-228-0006	3/26/2018	0 - 0.5	X			X			
	SR-SS-228-0612	3/26/2018	0.5 - 1	X			X			
SR-SS-229	SR-SS-229-0006	3/26/2018	0 - 0.5	X			X			
	SR-SS-229-0612	3/26/2018	0.5 - 1	X			X			
SR-SS-230	SR-SS-230-0006	3/26/2018	0 - 0.5	X			X			
	SR-SS-230-0612	3/26/2018	0.5 - 1	X			X			
	SR-SB-230-1218	3/26/2018	1 - 1.5				X			
	SR-SB-230-1824	3/26/2018	1.5 - 2				X			
SR-SS-231	SR-SS-231-0006	3/27/2018	0 - 0.5	X			X			
	SR-SS-231-0612	3/27/2018	0.5 - 1	X			X			
	SR-SB-231-1218	3/28/2018	1 - 1.5				X			
	SR-SB-231-1824	3/28/2018	1.5 - 2				X			
SR-SS-232	SR-SS-232-0006	3/26/2018	0 - 0.5	X			X			
	SR-SS-232-0612	3/26/2018	0.5 - 1	X			X			
	SR-SB-232-1218	3/26/2018	1 - 1.5				X			
	SR-SB-232-1824	3/26/2018	1.5 - 2				X			
SR-SS-233	SR-SS-233-0006	3/27/2018	0 - 0.5	X			X			
	SR-SS-233-0612	3/27/2018	0.5 - 1	X			X			
	SR-SS-233-0612-D	3/27/2018	0.5 - 1	X						
	SR-SB-233-1218	3/28/2018	1 - 1.5				X			
	SR-SB-233-1824	3/28/2018	1.5 - 2				X			
SR-SS-234	SR-SS-234-0006	3/27/2018	0 - 0.5	X			X			
	SR-SS-234-0612	3/27/2018	0.5 - 1	X			X			
	SR-SB-234-1218	3/28/2018	1 - 1.5				X			
	SR-SB-234-1824	3/28/2018	1.5 - 2				X			
SR-SS-235	SR-SS-235-0006	3/27/2018	0 - 0.5	X			X			
	SR-SS-235-0612	3/27/2018	0.5 - 1	X			X			
	SR-SB-235-1218	3/28/2018	1 - 1.5				X			
	SR-SB-235-1824	3/28/2018	1.5 - 2				X			
SR-SS-236	SR-SS-236-0006	3/27/2018	0 - 0.5	X			X			
	SR-SS-236-0612	3/27/2018	0.5 - 1	X			X			
	SR-SB-236-1218	3/28/2018	1 - 1.5				X			
	SR-SB-236-1824	3/28/2018	1.5 - 2				X			
SR-SS-237	SR-SS-237-0006	3/27/2018	0 - 0.5	X			X			
	SR-SS-237-0612	3/27/2018	0.5 - 1	X			X			
	SR-SB-237-1218	3/28/2018	1 - 1.5				X			
	SR-SB-237-1824	3/28/2018	1.5 - 2				X			
SR-SS-238	SR-SS-238-0006	3/26/2018	0 - 0.5	X			X			
	SR-SS-238-0006	12/17/2018	0 - 0.5				X	X	X	
	SR-SS-238-0612	3/26/2018	0.5 - 1	X			X			
SR-SS-239	SR-SS-239-0006	3/26/2018	0 - 0.5	X			X			
	SR-SS-239-0612	3/26/2018	0.5 - 1	X			X			
SR-SS-240	SR-SS-240-0006	3/26/2018	0 - 0.5	X			X			
	SR-SS-240-0006	12/17/2018	0 - 0.5				X	X	X	
	SR-SS-240-0612	3/26/2018	0.5 - 1	X			X			
SR-SS-257	SR-SS-257-0006	3/22/2018	0 - 0.5		X					
	SR-SS-257-0612	3/22/2018	0.5 - 1		X					
	SR-SB-257-1224	3/22/2018	1 - 2		X					
SR-SS-258	SR-SS-258-0006	3/22/2018	0 - 0.5		X					
	SR-SS-258-0612	3/22/2018	0.5 - 1		X					
	SR-SB-258-1224	3/22/2018	1 - 2		X					
SR-SS-259	SR-SS-259-0006	3/22/2018	0 - 0.5		X					
	SR-SS-259-0612	3/22/2018	0.5 - 1		X					
	SR-SS-259-0612-D	3/22/2018	0.5 - 1		X					
	SR-SS-259-1224	3/22/2018	1 - 2		X					
SR-SS-260	SR-SS-260-0006	3/22/2018	0 - 0.5		X					
	SR-SS-260-0612	3/22/2018	0.5 - 1		X					
	SR-SS-260-0612-D	3/22/2018	0.5 - 1		X					
	SR-SS-260-1224	3/22/2018	1 - 2		X					
SR-SS-261	SR-SS-261-0006	3/22/2018	0 - 0.5		X					
	SR-SS-261-0612	3/22/2018	0.5 - 1		X					
	SR-SS-261-1224	3/22/2018	1 - 2		X					
SR-SS-262	SR-SS-262-0006	3/22/2018	0 - 0.5		X					
	SR-SS-262-0612	3/22/2018	0.5 - 1		X					
	SR-SS-262-1224	3/22/2018	1 - 2		X					
SR-SS-263	SR-SS-263-0006	3/22/2018	0 - 0.5		X					
	SR-SS-263-0612	3/22/2018	0.5 - 1		X					
	SR-SS-263-1224	3/22/2018	1 - 2		X					
SR-SS-264	SR-SS-264-0006	3/22/2018	0 - 0.5		X					
SR-SS-265	SR-SS-265-0006	3/22/2018	0 - 0.5		X					
SR-SS-266	SR-SS-266-0006	3/22/2018	0 - 0.5		X					
SR-SS-267	SR-SS-267-0006	3/22/2018	0 - 0.5		X					
	SR-SS-267-0006-D	3/22/2018	0 - 0.5		X					
SR-SS-268	SR-SS-268-0006	3/22/2018	0 - 0.5		X					
SR-SS-269	SR-SS-269-0006	3/22/2018	0 - 0.5		X					
SR-SS-270	SR-SS-270-0006	3/22/2018	0 - 0.5		X					
SR-SS-271	SR-SS-271-0006	3/22/2018	0 - 0.5		X					
SR-SS-272	SR-SS-272-0006	3/22/2018	0 - 0.5		X					
SR-SS-273	SR-SS-273-0006	3/22/2018	0 - 0.5		X					
SR-SS-274	SR-SS-274-0006	3/22/2018	0 - 0.5		X					
SR-SS-275	SR-SS-275-0006	3/22/2018	0 - 0.5		X					
	SR-SS-275-0612	3/22/2018	0.5 - 1		X					
	SR-SS-275-1224	3/22/2018	1 - 2		X					
SR-SS-276	SR-SS-276-0006	3/22/2018	0 - 0.5		X					
	SR-SS-276-0006-D	3/22/2018	0 - 0.5		X					

TABLE 3-1
SOIL SAMPLE SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				LABORATORY ANALYSIS			SIEVE ANALYSIS			
Sample Location	**Sample ID**	**Sample Date**	**Depth (Feet BGS)**	**Lead**	**PAHs**	**Grain Size**	**#10**	**#14**	**#20**	**#35**
SOUTHERN RANGE AREA (continued)										
SR-SS-277	SR-SS-277-0006	3/22/2018	0 - 0.5		X					
SR-SS-278	SR-SS-278-0006	3/22/2018	0 - 0.5		X					
SR-SS-308	SR-SS-308-0006	12/18/2018	0 - 0.5				X			
	SR-SS-308-0612	12/18/2018	0.5 - 1				X			
SR-SS-309	SR-SS-309-0006	12/17/2018	0 - 0.5				X	X	X	
	SR-SS-309-0612	12/17/2018	0.5 - 1				X	X	X	
SR-SS-310	SR-SS-310-0006	12/18/2018	0 - 0.5				X			
	SR-SS-310-0612	12/18/2018	0.5 - 1				X			
SR-SS-311	SR-SB-311-0006	12/18/2018	0 - 0.5	X			X			
	SR-SB-311-0612	12/18/2018	0.5 - 1	X			X			
SR-SS-312	SR-SS-312-0006	12/17/2018	0 - 0.5	X			X	X	X	
	SR-SS-312-0612	12/17/2018	0.5 - 1	X			X	X	X	
	SR-SS-312-0612-D	12/17/2018	0.5 - 1	X						
SR-SS-313	SR-SS-313-0006	12/18/2018	0 - 0.5				X			
	SR-SS-313-0612	12/18/2018	0.5 - 1				X			
SR-SS-314	SR-SS-314-0006	12/18/2018	0 - 0.5				X			
	SR-SS-314-0612	12/18/2018	0.5 - 1				X			
SR-SS-315	SR-SB-315-0006	12/18/2018	0 - 0.5				X			
	SR-SB-315-0612	12/18/2018	0.5 - 1				X			
SR-SS-316	SR-SS-316-0006	12/17/2018	0 - 0.5				X	X	X	
	SR-SS-316-0612	12/17/2018	0.5 - 1				X	X	X	
SR-SS-317	SR-SS-317-0006	12/18/2018	0 - 0.5				X			
	SR-SS-317-0612	12/18/2018	0.5 - 1				X			
SR-SS-325	SR-SS-325-0006	12/20/2018	0 - 0.5		X					
	SR-SS-325-0006-D	12/20/2018	0 - 0.5		X					
SR-SS-326	SR-SS-326-0006	12/20/2018	0 - 0.5		X					
SR-SS-327	SR-SS-327-0006	12/20/2018	0 - 0.5		X					
SR-SS-328	SR-SS-328-0006	12/19/2018	0 - 0.5				X	X	X	
	SR-SS-328-0612	12/19/2018	0.5 - 1				X	X	X	
SR-SS-329	SR-SS-329-0006	12/19/2018	0 - 0.5				X			
	SR-SS-329-0612	12/19/2018	0.5 - 1				X			
SR-SS-330	SR-SS-330-0006	12/19/2018	0 - 0.5				X			
	SR-SS-330-0612	12/19/2018	0.5 - 1				X			
SR-SS-331	SR-SS-331-0006	12/19/2018	0 - 0.5				X	X	X	
	SR-SS-331-0612	12/19/2018	0.5 - 1				X			
SR-SS-401	SR-SS-401-0006	3/26/2019	0 - 0.5				X			
SR-SS-402	SR-SS-402-0006	3/26/2019	0 - 0.5				X	X		
	SR-SS-402-0612	3/26/2019	0.5 - 1				X			
SR-SS-403	SR-SS-403-0006	3/26/2019	0 - 0.5				X	X		
	SR-SS-403-0612	3/26/2019	0.5 - 1				X	X		
SR-SS-404	SR-SS-404-0006	3/26/2019	0 - 0.5				X			
SR-SS-405	SR-SS-405-0006	3/26/2019	0 - 0.5				X			
SR-SS-406	SR-SS-406-0006	3/26/2019	0 - 0.5				X			
SR-SS-422	SR-SS-422-0006	3/27/2019	0 - 0.5				X			
	SR-SS-422-0612	3/27/2019	0.5 - 1				X			
SR-SS-423	SR-SS-423-0006	3/27/2019	0 - 0.5				X			
HIGH TOWER RANGE AREA										
SR-SS-241	SR-SS-241-0006	3/28/2018	0 - 0.5	X			X			
	SR-SS-241-0006	12/18/2018	0 - 0.5				X	X	X	
	SR-SS-241-0612	3/28/2018	0.5 - 1	X			X			
SR-SS-242	SR-SS-242-0006	3/23/2018	0 - 0.5	X						
	SR-SS-242-0006-D	3/23/2018	0 - 0.5	X						
	SR-SS-242-0612	3/23/2018	0.5 - 1	X						
SR-SS-243	SR-SS-243-0006	3/24/2018	0 - 0.5	X						
	SR-SS-243-0612	3/24/2018	0.5 - 1	X						
	SR-SS-243-1224	3/24/2018	1 - 2	X						
SR-SS-244	SR-SS-244-0006	3/24/2018	0 - 0.5	X						
	SR-SS-244-0612	3/24/2018	0.5 - 1	X						
SR-SS-245	SR-SS-245-0006	3/23/2018	0 - 0.5	X						
	SR-SS-245-0612	3/23/2018	0.5 - 1	X						
SR-SS-246	SR-SS-246-0006	3/23/2018	0 - 0.5	X		X	X			
	SR-SS-246-0612	3/23/2018	0.5 - 1	X		X	X			
	SR-SB-246-1218	3/28/2018	1 - 1.5				X			
	SR-SB-246-1824	3/28/2018	1.5 - 2				X			
	SR-SB-246-1224	3/23/2018	1 - 2	X		X				
	SR-SB-246-1224-D	3/23/2018	1 - 2	X						
SR-SS-247	SR-SS-247-0006	3/23/2018	0 - 0.5	X						
	SR-SS-247-0612	3/23/2018	0.5 - 1	X						
SR-SS-248	SR-SS-248-0006	3/23/2018	0 - 0.5	X						
	SR-SS-248-0612	3/23/2018	0.5 - 1	X						
SR-SS-249	SR-SS-249-0006	3/23/2018	0 - 0.5	X						
	SR-SS-249-0612	3/23/2018	0.5 - 1	X						
SR-SS-250	SR-SS-250-0006	3/23/2018	0 - 0.5	X						
	SR-SS-250-0612	3/23/2018	0.5 - 1	X						
	SR-SS-250-1224	3/23/2018	1 - 2	X						
SR-SS-251	SR-SS-251-0006	3/28/2018	0 - 0.5	X			X			
	SR-SS-251-0612	3/28/2018	0.5 - 1	X			X			
SR-SS-252	SR-SS-252-0006	3/23/2018	0 - 0.5	X						
	SR-SS-252-0006	12/18/2018	0 - 0.5				X			
	SR-SB-252-0612	3/23/2018	0.5 - 1	X						
	SR-SB-252-0612	12/18/2018	0.5 - 1				X			
SR-SS-253	SR-SS-253-0006	3/28/2018	0 - 0.5	X			X			
	SR-SS-253-0006-D	3/28/2018	0 - 0.5	X						
	SR-SS-253-0612	3/28/2018	0.5 - 1	X			X			
	SR-SB-253-1218	3/28/2018	1 - 1.5				X			
	SR-SB-253-1824	3/28/2018	1.5 - 2				X			
	SR-SB-253-1224	3/28/2018	1 - 2	X						

TABLE 3-1
SOIL SAMPLE SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				LABORATORY ANALYSIS			SIEVE ANALYSIS			
Sample Location	**Sample ID**	**Sample Date**	**Depth (Feet BGS)**	**Lead**	**PAHs**	**Grain Size**	**#10**	**#14**	**#20**	**#35**
HIGH TOWER RANGE AREA (continued)										
SR-SS-254	SR-SS-254-0006	3/23/2018	0 - 0.5	X						
	SR-SS-254-0006	12/18/2018	0 - 0.5				X			
	SR-SB-254-0612	3/23/2018	0.5 - 1	X						
	SR-SB-254-0612	12/18/2018	0.5 - 1				X			
SR-SS-255	SR-SS-255-0006	3/23/2018	0 - 0.5	X			X			
	SR-SS-255-0612	3/23/2018	0.5 - 1	X			X			
	SR-SS-255-0612-D	3/23/2018	0.5 - 1	X						
SR-SS-256	SR-SS-256-0006	3/28/2018	0 - 0.5	X			X			
	SR-SS-256-0612	3/28/2018	0.5 - 1	X			X			
	SR-SB-256-1218	3/28/2018	1 - 1.5				X			
	SR-SB-256-1824	3/28/2018	1.5 - 2				X			
	SR-SB-256-1224	3/28/2018	1 - 2	X						
SR-SS-256N	SR-SS-256N-0006	3/28/2018	0 - 0.5				X			
	SR-SS-256N-0612	3/28/2018	0.5 - 1				X			
SR-SS-256E	SR-SS-256E-0006	3/28/2018	0 - 0.5				X			
	SR-SS-256E-0612	3/28/2018	0.5 - 1				X			
SR-SS-318	SR-SS-318-0006	12/18/2018	0 - 0.5				X			
SR-SS-319	SR-SB-319-0006	12/18/2018	0 - 0.5				X			
SR-SS-320	SR-SS-320-0006	12/18/2018	0 - 0.5				X	X	X	
SR-SS-321	SR-SB-321-0006	12/18/2018	0 - 0.5				X			
SR-SS-322	SR-SS-322-0006	12/18/2018	0 - 0.5				X			
SR-SS-323	SR-SB-323-0006	12/18/2018	0 - 0.5				X	X	X	
SR-SS-324	SR-SS-324-0006	12/18/2018	0 - 0.5				X			
SR-SS-332	SR-SS-332-0006	12/19/2018	0 - 0.5				X	X	X	
SR-SS-333	SR-SS-333-0006	12/19/2018	0 - 0.5				X	X	X	
SR-SS-334	SR-SS-334-0006	12/19/2018	0 - 0.5				X	X	X	
SR-SS-407	SR-SS-407-0006	3/26/2019	0 - 0.5				X	X		
	SR-SS-407-0612	3/26/2019	0.5 - 1				X	X		
SR-SS-408	SR-SS-408-0006	3/26/2019	0 - 0.5				X			
	SR-SS-408-0612	3/26/2019	0.5 - 1				X			
SR-SS-409	SR-SS-409-0006	3/26/2019	0 - 0.5				X			
	SR-SS-409-0612	3/27/2019	0.5 - 1				X			
SR-SS-410	SR-SS-410-0006	3/26/2019	0 - 0.5				X	X		
	SR-SS-410-0612	3/27/2019	0.5 - 1				X	X		
SR-SS-411	SR-SS-411-0006	3/26/2019	0 - 0.5				X			
SR-SS-412	SR-SS-412-0006	3/26/2019	0 - 0.5				X			
SR-SS-413	SR-SS-413-0006	3/26/2019	0 - 0.5				X	X		
SR-SS-414	SR-SS-414-0006	3/26/2019	0 - 0.5				X			
SR-SS-415	SR-SS-415-0006	3/27/2019	0 - 0.5				X			
SR-SS-416	SR-SS-416-0006	3/27/2019	0 - 0.5				X			
	SR-SS-416-0612	3/27/2019	0.5 - 1				X			
SR-SS-417	SR-SS-417-0006	3/27/2019	0 - 0.5				X	X		
	SR-SS-417-0612	3/27/2019	0.5 - 1				X	X		
SR-SS-418	SR-SS-418-0006	3/27/2019	0 - 0.5				X	X		
SR-SS-419	SR-SS-419-0006	3/27/2019	0 - 0.5				X			
SR-SS-420	SR-SS-420-0006	3/27/2019	0 - 0.5				X			
SR-SS-421	SR-SS-421-0006	3/27/2019	0 - 0.5				X			

Notes:
D Duplicate Sample
PAHs Polycyclic Aromatic Hydrocarbons

TABLE 4-1
LEAD ANALYTICAL SUMMARY
SKEET RANGE MRS - NORTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-006	SR-SS-012	SR-SS-037	SR-SS-038	SR-SS-039	SR-SS-100	SR-SS-100-D	SR-SS-102	SR-SS-103	SR-SS-104	SR-SS-105	SR-SS-106
SAMPLE		SR-SS-006-000.5	SR-SS-012-000.5	SR-SS-037-000.5	SR-SS-038-000.5	SR-SS-039-000.5	SR-SS-100-000.5	SR-SS-100-000.5	SR-SS-102-000.5	SR-SS-103-000.5	SR-SS-104-000.5	SR-SS-105-000.5	SR-SS-106-000.5
SAMPLE DEPTH (inches)	PRG[1]	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6
SAMPLE DATE		10/19/2007	10/18/2007	10/19/2007	10/19/2007	10/19/2007	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009
LEAD (mg/kg)	530	317	104	**1150**	235	104 J	**1190**	**1400**	**701**	**1330**	354	**564**	**728**

		SR-SS-107	SR-SS-108	SR-SS-201			SR-SS-202			SR-SS-203			
SAMPLE		SR-SS-107-000.5	SR-SS-108-000.5	SR-SS-201-0006	SR-SS-201-0612	SR-SB-201-1224	SR-SS-202-0006	SR-SS-202-0612	SR-SB-202-1224	SR-SS-203-0006	SR-SS-203-0006-D	SR-SS-203-0612	SR-SB-203-1224
SAMPLE DEPTH (inches)	PRG[1]	0 - 6	0 - 6	0 - 6	6 - 12	12 - 24	0 - 6	6 - 12	12 - 24	0 - 6	0 - 6	6 - 12	12 - 24
SAMPLE DATE		7/20/2009	7/20/2009	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018
LEAD (mg/kg)	530	325	**1050**	**602**	**846**	17.6	**2020**	44.6	140	387	411	85.4	13

		SR-SS-204		SR-SS-205		SR-SS-206		SR-SS-207		SR-SS-208		SR-SS-209	
SAMPLE		SR-SS-204-0006	SR-SS-204-0612	SR-SS-205-0006	SR-SS-205-0612	SR-SS-206-0006	SR-SS-206-0612	SR-SS-207-0006	SR-SS-207-0612	SR-SS-208-0006	SR-SS-208-0612	SR-SS-209-0006	SR-SS-209-0612
SAMPLE DEPTH (inches)	PRG[1]	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12
SAMPLE DATE		03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018
LEAD (mg/kg)	530	446	499	350	62	445	209	463	209	286	37.4	206	22.2

		SR-SS-210		SR-SS-211		SR-SS-212		SR-SS-213		SR-SS-214		SR-SS-215	
SAMPLE		SR-SS-210-0006	SR-SS-210-0612	SR-SS-211-0006	SR-SS-211-0612	SR-SS-212-0006	SR-SS-212-0612	SR-SS-213-0006	SR-SS-213-0612	SR-SS-214-0006	SR-SS-214-0612	SR-SS-215-0006	SR-SS-215-0612
SAMPLE DEPTH (inches)	PRG[1]	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12
SAMPLE DATE		03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018	03/22/2018
LEAD (mg/kg)	530	179	35.6	226	82.6	253	223	**22200**	**694**	453	153	327	45.8

		SR-SS-301		SR-SS-302			SR-SS-303		SR-SS-304		SR-SS-305	
SAMPLE		SR-SS-301-0006	SR-SS-301-0612	SR-SS-302-0006	SR-SS-302-0612	SR-SS-302-0612-D	SR-SS-303-0006	SR-SS-303-0612	SR-SS-304-0006	SR-SS-304-0612	SR-SS-305-0006	SR-SS-305-0612
SAMPLE DEPTH (inches)	PRG[1]	0 - 6	6 - 12	0 - 6	6 - 12	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12
SAMPLE DATE		12/19/2018	12/19/2018	12/19/2018	12/19/2018	12/19/2018	12/19/2018	12/19/2018	12/19/2018	12/19/2018	12/19/2018	12/19/2018
LEAD (mg/kg)	530	165 J	14.2 J	174 J	99.5 J	92.2 J	360 J	50.6 J	264 J	70.4 J	350 J	156 J

		SR-SS-306		SR-SS-307	
SAMPLE		SR-SS-306-0006	SR-SS-306-0612	SR-SS-307-0006	SR-SS-307-0612
SAMPLE DEPTH (inches)	PRG[1]	0 - 6	6 - 12	0 - 6	6 - 12
SAMPLE DATE		12/19/2018	12/19/2018	12/19/2018	12/19/2018
LEAD (mg/kg)	530	162 J	48.1 J	142 J	384 J

Notes:

-D Duplicate sample
mg/kg Miligrams per kilogram
PRG Preliminary Remediation Goal
[1] 530 mg/kg represents the not-to-exceed lead PRG for sediment invertebrates. The arithmetic mean PRG for across each exposure area is set at 200 mg/kg for human health and 240 mg/kg for plants.

Bolded and shaded values indicate exceedances of the not-to-exceed lead PRG of 530 mg/kg

Average Lead Concentration		Average Lead Concentration (without not-to-exceed values)	
0 - 6 inches	1112 mg/kg	0 - 6 inches	284 mg/kg
6 - 12 inches	185 mg/kg	6 - 12 inches	127 mg/kg
12 - 24 inches	57 mg/kg	12 - 24 inches	57 mg/kg

TABLE 4-2
LEAD ANALYTICAL SUMMARY
SKEET RANGE MRS - SOUTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-001	SR-SS-002	SR-SS-003	SR-SS-004	SR-SS-007		SR-SS-008	SR-SS-009	SR-SS-010	SR-SS-011	SR-SS-013	SR-SS-014
SAMPLE		SR-SS-001-000.5	SR-SS-002-000.5	SR-SS-003-000.5	SR-SS-004-000.5	SR-SS-007-000.5	SR-SS-007-000.5-D	SR-SS-008-000.5	SR-SS-009-000.5	SR-SS-010-000.5	SR-SS-011-000.5	SR-SS-013-000.5	SR-SS-014-000.5
SAMPLE DEPTH	PRG(1)	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6
SAMPLE DATE		10/19/2007	10/19/2007	10/19/2007	10/22/2007	10/22/2007	10/22/2007	10/22/2007	10/22/2007	10/22/2007	10/18/2007	10/22/2007	10/22/2007
LEAD (mg/kg)	750	59.3	9.6	30.1	50.1	93.9	97.5	84.3	64.9	25.9	38.6	42.3	39.7

		SR-SS-015	SR-SS-016	SR-SS-017	SR-SS-019	SR-SS-020		SR-SS-021	SR-SS-022	SR-SS-023	SR-SS-024	SR-SS-025	SR-SS-026
SAMPLE		SR-SS-015-000.5	SR-SS-016-000.5	SR-SS-017-000.5	SR-SS-019-000.5	SR-SS-020-000.5	SR-SS-020-000.5-D	SR-SS-021-000.5	SR-SS-022-000.5	SR-SS-023-000.5	SR-SS-024-000.5	SR-SS-025-000.5	SR-SS-026-000.5
SAMPLE DEPTH	PRG(1)	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6
SAMPLE DATE		10/22/2007	10/22/2007	10/22/2007	10/24/2007	10/24/2007	10/24/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/24/2007	10/24/2007
LEAD (mg/kg)	750	16.8	68.3	171	64.4	16.6	18.6	14.6	26	91.5	511	56.9	27.1

		SR-SS-027	SR-SS-028	SR-SS-029	SR-SS-030	SR-SS-031	SR-SS-032	SR-SS-033	SR-SS-034	SR-SS-035	SR-SS-036	SR-SS-040
SAMPLE		SR-SS-027-000.5	SR-SS-028-000.5	SR-SS-029-000.5	SR-SS-030-000.5	SR-SS-031-000.5	SR-SS-032-000.5	SR-SS-033-000.5	SR-SS-034-000.5	SR-SS-035-000.5	SR-SS-036-000.5	SR-SS-040-000.5
SAMPLE DEPTH	PRG(1)	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6
SAMPLE DATE		10/24/2007	10/24/2007	10/24/2007	10/24/2007	10/24/2007	10/24/2007	10/25/2007	10/24/2007	10/25/2007	10/18/2007	11/6/2007
LEAD (mg/kg)	750	16.6	47.1	328	289	6.9	15.5	26.3	9.8	20	99.6	756

		SR-SS-041		SR-SS-042	SR-SS-043	SR-SS-045	SR-SS-047	SR-SS-049	SR-SS-050	SR-SS-051	SR-SS-053	SR-SS-054	SR-SS-055
SAMPLE		SR-SS-041-000.5	SR-SS-041-000.5-D	SR-SS-042-000.5	SR-SS-043-000.5	SR-SS-045-000.5	SR-SS-047-000.5	SR-SS-049-000.5	SR-SS-050-000.5	SR-SS-051-000.5	SR-SS-053-000.5	SR-SS-054-000.5	SR-SS-055-000.5
SAMPLE DEPTH	PRG(1)	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6
SAMPLE DATE		11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/7/2007	11/7/2007	11/7/2007	11/7/2007	11/7/2007
LEAD (mg/kg)	750	398	407	424	152	405	117	90.1	98.1	589	152	587	115

		SR-SS-056	SR-SS-216			SR-SS-217				SR-SS-218		
SAMPLE		SR-SS-056-000.5	SR-SS-216-0006	SR-SS-216-0612	SR-SB-216-1224	SR-SS-217-0006	SR-SS-217-0006-D	SR-SS-217-0612	SR-SB-217-1224	SR-SS-218-0006	SR-SS-218-0612	SR-SB-218-1224
SAMPLE DEPTH	PRG(1)	0 - 6	0 - 6	6 - 12	12 - 24	0 - 6	0 - 6	6 - 12	12 - 24	0 - 6	6 - 12	12 - 24
SAMPLE DATE		11/7/2007	03/21/2018	03/21/2018	03/22/2018	03/21/2018	03/21/2018	03/21/2018	03/22/2018	03/20/2018	03/20/2018	03/21/2018
LEAD (mg/kg)	750	58.7	823 J-	57.4 J-	11.2	893 J-	954 J-	101 J-	25.4 J-	530	158	27.2 J-

		SR-SS-219			SR-SS-220			SR-SS-221		
SAMPLE		SR-SS-219-0006	SR-SS-219-0612	SR-SB-219-1224	SR-SS-220-0006	SR-SS-220-0612	SR-SB-220-1224	SR-SS-221-0006	SR-SS-221-0612	SR-SB-221-1224
SAMPLE DEPTH	PRG(1)	0 - 6	6 - 12	12 - 24	0 - 6	6 - 12	12 - 24	0 - 6	6 - 12	12 - 24
SAMPLE DATE		03/20/2018	03/20/2018	03/21/2018	03/21/2018	03/21/2018	03/22/2018	03/21/2018	03/21/2018	03/22/2018
LEAD (mg/kg)	750	850	169	22.1 J-	196 J-	566 J-	191 J-	245 J-	63.9 J-	18.8 J-

		SR-SS-222				SR-SS-223				SR-SS-224			
SAMPLE		SR-SS-222-0006	SR-SS-222-0612	SR-SB-222-1224	SR-SB-222-1224-D	SR-SS-223-0006	SR-SS-223-0612	SR-SB-223-1224	SR-SB-223-1224-D	SR-SS-224-0006	SR-SS-224-0612	SR-SS-224-0612-D	SR-SB-224-1224
SAMPLE DEPTH	PRG(1)	0 - 6	6 - 12	12 - 24	12 - 24	0 - 6	6 - 12	12 - 24	12 - 24	0 - 6	6 - 12	6 - 12	12 - 24
SAMPLE DATE		03/20/2018	03/20/2018	03/21/2018	03/21/2018	03/20/2018	03/20/2018	03/21/2018	03/21/2018	03/20/2018	03/20/2018	03/20/2018	03/21/2018
LEAD (mg/kg)	750	31.3	4.95	4.64 J-	5.37 J-	18.5	10.6	10.2	5.79 J-	5.43	2.22	2.3	2.87 J-

		SR-SS-225			SR-SS-226				SR-SS-227			SR-SS-228	
SAMPLE		SR-SS-225-0006	SR-SS-225-0612	SR-SB-225-1224	SR-SS-226-0006	SR-SS-226-0006-D	SR-SS-226-0612	SR-SS-226-1224	SR-SS-227-0006	SR-SS-227-0612	SR-SS-227-0612-D	SR-SS-228-0006	SR-SS-228-0612
SAMPLE DEPTH	PRG(1)	0 - 6	6 - 12	12 - 24	0 - 6	0 - 6	6 - 12	12 - 24	0 - 6	6 - 12	6 - 12	0 - 6	6 - 12
SAMPLE DATE		03/20/2018	03/20/2018	03/21/2018	03/19/2018	03/19/2018	03/19/2018	03/20/2018	03/26/2018	03/26/2018	03/26/2018	03/26/2018	03/26/2018
LEAD (mg/kg)	750	149	153	7.34 J-	7.95	8.09	24.6	12.6	158 J	27.8 J	28 J	89.8 J	20.8 J

		SR-SS-229		SR-SS-230		SR-SS-231		SR-SS-232		SR-SS-233		
SAMPLE		SR-SS-229-0006	SR-SS-229-0612	SR-SS-230-0006	SR-SS-230-0612	SR-SS-231-0006	SR-SS-231-0612	SR-SS-232-0006	SR-SS-232-0612	SR-SS-233-0006	SR-SS-233-0612	SR-SS-233-0612-D
SAMPLE DEPTH	PRG(1)	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	6 - 12
SAMPLE DATE		03/26/2018	03/26/2018	03/26/2018	03/26/2018	03/27/2018	03/27/2018	03/26/2018	03/26/2018	03/27/2018	03/27/2018	03/27/2018
LEAD (mg/kg)	750	14.7 J	13.3 J	752 J	121 J	362 J	93.8 J	40.6 J	69.4 J	213 J	56.2 J	56.1

		SR-SS-234		SR-SS-235		SR-SS-236		SR-SS-237		SR-SS-238		SR-SS-239	
SAMPLE		SR-SS-234-0006	SR-SS-234-0612	SR-SS-235-0006	SR-SS-235-0612	SR-SS-236-0006	SR-SS-236-0612	SR-SS-237-0006	SR-SS-237-0612	SR-SS-238-0006	SR-SS-238-0612	SR-SS-239-0006	SR-SS-239-0612
SAMPLE DEPTH	PRG(1)	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12	0 - 6	6 - 12
SAMPLE DATE		03/27/2018	03/27/2018	03/27/2018	03/27/2018	03/27/2018	03/27/2018	03/27/2018	03/27/2018	03/26/2018	03/26/2018	03/27/2018	03/27/2018
LEAD (mg/kg)	750	208	62.1	1140	194	360	136	185	55.6	50.6 J	23.6 J	68.8	11.2

TABLE 4-2
LEAD ANALYTICAL SUMMARY
SKEET RANGE MRS - SOUTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-240		**SR-SS-311**		**SR-SS-312-0006**	
SAMPLE	**PRG[1]**	**SR-SS-240-0006**	**SR-SS-240-0612**	**SR-SS-311-0006**	**SR-SS-311-0612**	**SR-SS-312-0006**	**SR-SS-312-0612**
SAMPLE DEPTH		**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**
SAMPLE DATE		**03/27/2018**	**03/27/2018**	**12/18/2018**	**12/18/2018**	**12/17/2018**	**12/17/2018**
LEAD (mg/kg)	750	107	17.7	93.8 J	93.5 J	105 J	21.7 J

Notes:
-D Duplicate sample
mg/kg Miligrams per kilogram
PRG Preliminary Remediation Goal
[1] 750 mg/kg represents the not-to-exceed lead PRG for plants. The arithmetic mean PRG for across each exposure area is set at 200 mg/kg for human health and 240 mg/kg for plants.

Bolded and shaded values indicate exceedances of the not-to-exceed lead PRG of 750 mg/kg

Average Lead Concentration	
0 - 6 inches	196 mg/kg
6 - 12 inches	86 mg/kg
12 - 24 inches	30 mg/kg

TABLE 4-3
LEAD ANALYTICAL SUMMARY
SKEET RANGE MRS - HIGH TOWER RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-005	SR-SS-241		SR-SS-242			SR-SS-243			SR-SS-244	
SAMPLE		**SR-SS-005-0006**	**SR-SS-241-0006**	**SR-SS-241-0612**	**SR-SS-242-0006**	**SR-SS-242-0006-D**	**SR-SS-242-0612**	**SR-SS-243-0006**	**SR-SS-243-0612**	**SR-SS-243-1224**	**SR-SS-244-0006**	**SR-SS-244-0612**
SAMPLE DEPTH (inches)	**PRG[1]**	**0 - 6**	**0 - 6**	**6 - 12**	**0 - 6**	**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**	**12 - 24**	**0 - 6**	**6 - 12**
SAMPLE DATE		**10/18/2007**	**03/28/2018**	**03/28/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**
LEAD (mg/kg)	750	28.9	28.9	14.3	94.7 J	81 J	10.9 J	28.9 J	4.68 J	5.28 J	55.2	124

		SR-SS-245		SR-SS-246				SR-SS-247		SR-SS-248		SR-SS-249	
SAMPLE		**SR-SS-245-0006**	**SR-SS-245-0612**	**SR-SS-246-0006**	**SR-SS-246-0612**	**SR-SB-246-1224**	**SR-SB-246-1224-D**	**SR-SS-247-0006**	**SR-SS-247-0612**	**SR-SS-248-0006**	**SR-SS-248-0612**	**SR-SS-249-0006**	**SR-SS-249-0612**
SAMPLE DEPTH (inches)	**PRG[1]**	**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**	**12 - 24**	**12 - 24**	**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**
SAMPLE DATE		**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**
LEAD (mg/kg)	750	82.8	22.9	92.1	8.9	10.4	11.1	76 J	10.2 J	17.2	8.56 J	53.4 J	7.49 J

		SR-SS-250			SR-SS-251		SR-SS-252		SR-SS-253			
SAMPLE		**SR-SS-250-0006**	**SR-SS-250-0612**	**SR-SB-250-1224**	**SR-SS-251-0006**	**SR-SS-251-0612**	**SR-SS-252-0006**	**SR-SS-252-0612**	**SR-SS-253-0006**	**SR-SS-253-0006-D**	**SR-SS-253-0612**	**SR-SB-253-1224**
SAMPLE DEPTH (inches)	**PRG[1]**	**0 - 6**	**6 - 12**	**12 - 24**	**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**	**0 - 6**	**0 - 6**	**6 - 12**	**12 - 24**
SAMPLE DATE		**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/28/2018**	**03/28/2018**	**03/23/2018**	**03/23/2018**	**03/28/2018**	**03/28/2018**	**03/28/2018**	**03/28/2018**
LEAD (mg/kg)	750	94.9 J	12.8 J	18.2 J	7.87	60.5	243	66.6	70.7	61.3	15.9	4.78

		SR-SS-254		SR-SS-255			SR-SS-256		
SAMPLE		**SR-SS-254-0006**	**SR-SS-254-0612**	**SR-SS-255-0006**	**SR-SS-255-0612**	**SR-SS-255-0612-D**	**SR-SS-256-0006**	**SR-SS-256-0612**	**SR-SB-256-1224**
SAMPLE DEPTH (inches)	**PRG[1]**	**0 - 6**	**6 - 12**	**0 - 6**	**6 - 12**	**6 - 12**	**0 - 6**	**6 - 12**	**12 - 24**
SAMPLE DATE		**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/23/2018**	**03/28/2018**	**03/28/2018**	**03/28/2018**
LEAD (mg/kg)	750	508	158	129	176 J	105 J	342	125	11.4

Notes:
-D Duplicate sample
mg/kg Miligrams per kilogram
PRG Preliminary Remediation Goal
[1] 750 mg/kg represents the not-to-exceed lead PRG for plants. The arithmetic mean PRG for across each exposure area is set at 200 mg/kg for human health and 240 mg/kg for plants.
Bolded and shaded values indicate exceedances of the not-to-exceed lead PRG of 750 mg/kg

Average Lead Concentration	
0 - 6 inches	115 mg/kg
6 - 12 inches	52 mg/kg
12 - 24 inches	10 mg/kg

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-257			SR-SS-258			SR-SS-259				SR-SS-260
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-257-0006**	**SR-SS-257-0612**	**SR-SB-257-1224**	**SR-SS-258-0006**	**SR-SS-258-0612**	**SR-SB-258-1224**	**SR-SS-259-0006**	**SR-SS-259-0612**	**SR-SS-259-061-D**	**SR-SB-259-1224**	**SR-SS-260-0006**
Sample Date		**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**
PAH (µg/kg)												
Benzo(A)Anthracene	1,100	890	17 J	30	**22,000**	710	190	**14,000**	**2,000**	**1,300**	33	**3,800**
Benzo(A)Pyrene	110	**1,000**	20 J	35	**22,000**	**770**	**180**	**17,000**	**2,200**	**1,500**	40	**3,900**
Benzo(B)Fluoranthene	1,100	**1,500**	29	52	**31,000**	**1,100**	240	**25,000**	**2,900**	**2,200**	56	**5,200**
Benzo(K)Fluoranthene	11,000	470	5.7 J	14 J	**13,000**	370	92	7,800	1,200	760	14 J	2,200
Chrysene	110,000	1,100	19 J	36	27,000	860	220	18,000	2,400	1,700	38	4,400
Dibenzo(A,H)Anthracene	110	**250**	4.4 J	11 J	**5,100**	**200**	44	**6,000**	**600**	**300**	12 J	**1,000**
Indeno(1,2,3-CD)Pyrene	1,100	840	23	42	**18,000**	830	150	**20,000**	**1,900**	950	46	**3,500**
POINT RISK												
Benzo(A)Anthracene	1,100	8.1E-07	1.5E-08	2.7E-08	2.0E-05	6.5E-07	1.7E-07	1.3E-05	1.8E-06	1.2E-06	3.0E-08	3.5E-06
Benzo(A)Pyrene	110	9.1E-06	1.8E-07	3.2E-07	2.0E-04	7.0E-06	1.6E-06	1.5E-04	2.0E-05	1.4E-05	3.6E-07	3.5E-05
Benzo(B)Fluoranthene	1,100	1.4E-06	2.6E-08	4.7E-08	2.8E-05	1.0E-06	2.2E-07	2.3E-05	2.6E-06	2.0E-06	5.1E-08	4.7E-06
Benzo(K)Fluoranthene	11,000	4.3E-08	5.2E-10	1.3E-09	1.2E-06	3.4E-08	8.4E-09	7.1E-07	1.1E-07	6.9E-08	1.3E-09	2.0E-07
Chrysene	110,000	1.0E-08	1.7E-10	3.3E-10	2.5E-07	7.8E-09	2.0E-09	1.6E-07	2.2E-08	1.5E-08	3.5E-10	4.0E-08
Dibenzo(A,H)Anthracene	110	2.3E-06	4.0E-08	1.0E-07	4.6E-05	1.8E-06	4.0E-07	5.5E-05	5.5E-06	2.7E-06	1.1E-07	9.1E-06
Indeno(1,2,3-CD)Pyrene	1,100	7.6E-07	2.1E-08	3.8E-08	1.6E-05	7.5E-07	1.4E-07	1.8E-05	1.7E-06	8.6E-07	4.2E-08	3.2E-06
TOTAL POINT RISK		**1.4E-05**	**2.9E-07**	**5.3E-07**	**3.1E-04**	**1.1E-05**	**2.6E-06**	**2.6E-04**	**3.2E-05**	**2.0E-05**	**6.0E-07**	**5.6E-05**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-260			SR-SS-261			SR-SS-262			SR-SS-263		
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-260-0612**	**SR-SS-260-0612-D**	**SR-SB-260-1224**	**SR-SS-261-0006**	**SR-SS-261-0612**	**SR-SB-261-1224**	**SR-SS-262-0006**	**SR-SS-262-0612**	**SR-SB-262-1224**	**SR-SS-263-0006**	**SR-SS-263-0612**	**SR-SB-263-1224**
Sample Date		**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**
PAH (µg/kg)													
Benzo(A)Anthracene	1,100	450	350	25	550	16 J	3.9 J	**1,500**	69	24 M	6.2 J	98	56
Benzo(A)Pyrene	110	**550**	**420**	30	**660**	25	4.2 J	**1,700**	77	25 M	6.5 J	83	61
Benzo(B)Fluoranthene	1,100	740	600	43	880	33	6.1 J	**2,400**	110	40 M	11 J	120	85 M
Benzo(K)Fluoranthene	11,000	270	200	10 J	330	7.4 J	10 U	810	37	8.6 JM	11 U	39	29
Chrysene	110,000	550	440	27	660	18 J	10 U	1,900	80	26 M	3 J	110	65
Dibenzo(A,H)Anthracene	110	**160**	**110**	7.2 J	**180**	7.8 J	10 U	**460**	22	6.7 J	11 U	21 J	14 J
Indeno(1,2,3-CD)Pyrene	1,100	520	390	32	560	30	4.2 J	**1,600**	84	22	7 J	71	58 M
POINT RISK													
Benzo(A)Anthracene	1,100	4.1E-07	3.2E-07	2.3E-08	5.0E-07	1.5E-08	3.5E-09	1.4E-06	6.3E-08	2.2E-08	5.6E-09	8.9E-08	5.1E-08
Benzo(A)Pyrene	110	5.0E-06	3.8E-06	2.7E-07	6.0E-06	2.3E-07	3.8E-08	1.5E-05	7.0E-07	2.3E-07	5.9E-08	7.5E-07	5.5E-07
Benzo(B)Fluoranthene	1,100	6.7E-07	5.5E-07	3.9E-08	8.0E-07	3.0E-08	5.5E-09	2.2E-06	1.0E-07	3.6E-08	1.0E-08	1.1E-07	7.7E-08
Benzo(K)Fluoranthene	11,000	2.5E-08	1.8E-08	9.1E-10	3.0E-08	6.7E-10	4.5E-10	7.4E-08	3.4E-09	7.8E-10	5.0E-10	3.5E-09	2.6E-09
Chrysene	110,000	5.0E-09	4.0E-09	2.5E-10	6.0E-09	1.6E-10	4.5E-11	1.7E-08	7.3E-10	2.4E-10	2.7E-11	1.0E-09	5.9E-10
Dibenzo(A,H)Anthracene	110	1.5E-06	1.0E-06	6.5E-08	1.6E-06	7.1E-08	4.5E-08	4.2E-06	2.0E-07	6.1E-08	5.0E-08	1.9E-07	1.3E-07
Indeno(1,2,3-CD)Pyrene	1,100	4.7E-07	3.5E-07	2.9E-08	5.1E-07	2.7E-08	3.8E-09	1.5E-06	7.6E-08	2.0E-08	6.4E-09	6.5E-08	5.3E-08
TOTAL POINT RISK		**8.0E-06**	**6.1E-06**	**4.3E-07**	**9.5E-06**	**3.7E-07**	**9.7E-08**	**2.5E-05**	**1.1E-06**	**3.7E-07**	**1.3E-07**	**1.2E-06**	**8.7E-07**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-264	SR-SS-265	SR-SS-266	SR-SS-267		SR-SS-268	SR-SS-269	SR-SS-270	SR-SS-271	SR-SS-272	SR-SS-273	SR-SS-274
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-264-0006**	**SR-SS-265-0006**	**SR-SS-266-0006**	**SR-SS-267-0006**	**SR-SS-267-0006-D**	**SR-SS-268-0006**	**SR-SS-269-0006**	**SR-SS-270-0006**	**SR-SS-271-0006**	**SR-SS-272-0006**	**SR-SS-273-0006**	**SR-SS-274-0006**
Sample Date		**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**
PAH (µg/kg)													
Benzo(A)Anthracene	1,100	290	**1,400**	**6,000**	**38,000**	**60,000**	**9,600**	42	200	220	240	7 J	360
Benzo(A)Pyrene	110	**300**	**1,600**	**6,100**	**40,000**	**49,000**	**8,300**	67	**240**	**280**	**210**	9.2 J	**360**
Benzo(B)Fluoranthene	1,100	430	**2,300**	**8,600**	**52,000**	**72,000**	**11,000**	91	350	360	290	17 J	540
Benzo(K)Fluoranthene	11,000	140	720	2,800	**23,000**	**20,000**	4,400	28	110	140	86	10 U	170
Chrysene	110,000	370	1,800	7,300	47,000	61,000	11,000	55	250	270	250	3.7 J	440
Dibenzo(A,H)Anthracene	110	70	**410**	**1,500**	**11,000**	**12,000**	**1,900**	19 J	60	71	40	2 J	84
Indeno(1,2,3-CD)Pyrene	1,100	250	**1,400**	**5,400**	**34,000**	**37,000**	**6,800**	64	200	210	160	5.4 J	280
POINT RISK													
Benzo(A)Anthracene	1,100	2.6E-07	1.3E-06	5.5E-06	3.5E-05	5.5E-05	8.7E-06	3.8E-08	1.8E-07	2.0E-07	2.2E-07	6.4E-09	3.3E-07
Benzo(A)Pyrene	110	2.7E-06	1.5E-05	5.5E-05	3.6E-04	4.5E-04	7.5E-05	6.1E-07	2.2E-06	2.5E-06	1.9E-06	8.4E-08	3.3E-06
Benzo(B)Fluoranthene	1,100	3.9E-07	2.1E-06	7.8E-06	4.7E-05	6.5E-05	1.0E-05	8.3E-08	3.2E-07	3.3E-07	2.6E-07	1.5E-08	4.9E-07
Benzo(K)Fluoranthene	11,000	1.3E-08	6.5E-08	2.5E-07	2.1E-06	1.8E-06	4.0E-07	2.5E-09	1.0E-08	1.3E-08	7.8E-09	4.5E-10	1.5E-08
Chrysene	110,000	3.4E-09	1.6E-08	6.6E-08	4.3E-07	5.5E-07	1.0E-07	5.0E-10	2.3E-09	2.5E-09	2.3E-09	3.4E-11	4.0E-09
Dibenzo(A,H)Anthracene	110	6.4E-07	3.7E-06	1.4E-05	1.0E-04	1.1E-04	1.7E-05	1.7E-07	5.5E-07	6.5E-07	3.6E-07	1.8E-08	7.6E-07
Indeno(1,2,3-CD)Pyrene	1,100	2.3E-07	1.3E-06	4.9E-06	3.1E-05	3.4E-05	6.2E-06	5.8E-08	1.8E-07	1.9E-07	1.5E-07	4.9E-09	2.5E-07
TOTAL POINT RISK		**4.3E-06**	**2.3E-05**	**8.8E-05**	**5.8E-04**	**7.1E-04**	**1.2E-04**	**9.6E-07**	**3.4E-06**	**3.9E-06**	**2.9E-06**	**1.3E-07**	**5.1E-06**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-275			SR-SS-276		SR-SS-277	SR-SS-278	SR-SS-325		SR-SS-326	SR-SS-327	SR-SS-001
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-275-0006**	**SR-SS-275-0612**	**SR-SS-275-1224**	**SR-SS-276-0006**	**SR-SS-276-0006-D**	**SR-SS-277-0006**	**SR-SS-278-0006**	**SR-SS-325-0006**	**SR-SS-325-0006-D**	**SR-SS-326-0006**	**SR-SS-327-0006**	**SR-SS-001-000.5**
Sample Date		**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**03/22/2018**	**12/20/2018**	**12/20/2018**	**12/20/2018**	**12/20/2018**	**10/19/2007**
PAH (µg/kg)													
Benzo(A)Anthracene	1,100	**58,000**	**16,000**	58	810	**9,700**	**3,600**	**2,100**	1,100	890	38	53 J	**9,500**
Benzo(A)Pyrene	110	**48,000**	**14,000**	61	**770**	**8,300**	**2,800**	**1,800**	**1,000**	**1,000**	39	63 J	**14,000**
Benzo(B)Fluoranthene	1,100	**70,000**	**20,000**	85	**1,100**	**12,000**	**4,000**	**2,600**	**1,500**	**1,400**	66 J	94 J	**21,000**
Benzo(K)Fluoranthene	11,000	**18,000**	5,500	26	290	3,200	1,500	720	600	520	18 J	27 J	**9,000 J**
Chrysene	110,000	58,000	16,000	63	840	9,800	3,900	2,200	1,200	1,100	45	70 J	10,000
Dibenzo(A,H)Anthracene	110	**12,000**	**3,000**	16 J	**200**	**2,000**	**660**	**440**	**220 J**	**260 J**	21 J	26	**4,700**
Indeno(1,2,3-CD)Pyrene	1,100	**38,000**	**9,300**	60	640	**5,400**	**2,000**	**1,300**	860 J	740 J	56	100 J	**11,000 J**
POINT RISK													
Benzo(A)Anthracene	1,100	5.3E-05	1.5E-05	5.3E-08	7.4E-07	8.8E-06	3.3E-06	1.9E-06	1.0E-06	8.1E-07	3.5E-08	4.8E-08	8.6E-06
Benzo(A)Pyrene	110	4.4E-04	1.3E-04	5.5E-07	7.0E-06	7.5E-05	2.5E-05	1.6E-05	9.1E-06	9.1E-06	3.5E-07	5.7E-07	1.3E-04
Benzo(B)Fluoranthene	1,100	6.4E-05	1.8E-05	7.7E-08	1.0E-06	1.1E-05	3.6E-06	2.4E-06	1.4E-06	1.3E-06	6.0E-08	8.5E-08	1.9E-05
Benzo(K)Fluoranthene	11,000	1.6E-06	5.0E-07	2.4E-09	2.6E-08	2.9E-07	1.4E-07	6.5E-08	5.5E-08	4.7E-08	1.6E-09	2.5E-09	8.2E-07
Chrysene	110,000	5.3E-07	1.5E-07	5.7E-10	7.6E-09	8.9E-08	3.5E-08	2.0E-08	1.1E-08	1.0E-08	4.1E-10	6.4E-10	9.1E-08
Dibenzo(A,H)Anthracene	110	1.1E-04	2.7E-05	1.5E-07	1.8E-06	1.8E-05	6.0E-06	4.0E-06	2.0E-06	2.4E-06	1.9E-07	2.4E-07	4.3E-05
Indeno(1,2,3-CD)Pyrene	1,100	3.5E-05	8.5E-06	5.5E-08	5.8E-07	4.9E-06	1.8E-06	1.2E-06	7.8E-07	6.7E-07	5.1E-08	9.1E-08	1.0E-05
TOTAL POINT RISK		**7.0E-04**	**2.0E-04**	**8.9E-07**	**1.1E-05**	**1.2E-04**	**4.0E-05**	**2.6E-05**	**1.4E-05**	**1.4E-05**	**6.9E-07**	**1.0E-06**	**2.1E-04**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-002	SR-SS-003	SR-SS-004	SR-SS-005	SR-SS-006	SR-SS-007		SR-SS-008	SR-SS-009	SR-SS-010	SR-SS-011	SR-SS-012
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-002-000.5**	**SR-SS-003-000.5**	**SR-SS-004-000.5**	**SR-SS-005-000.5**	**SR-SS-006-000.5**	**SR-SS-007-000.5**	**SR-SS-007-000.5-D**	**SR-SS-008-000.5**	**SR-SS-009-000.5**	**SR-SS-010-000.5**	**SR-SS-011-000.5**	**SR-SS-012-000.5**
Sample Date		**10/19/2007**	**10/19/2007**	**10/22/2007**	**10/18/2007**	**10/22/2007**	**10/22/2007**	**10/22/2007**	**10/22/2007**	**10/22/2007**	**10/22/2007**	**10/18/2007**	**10/18/2007**
PAH (µg/kg)													
Benzo(A)Anthracene	1,100	890	800 J	15 J	22 J	3.7 J	**8,800 J**	**8,900 J**	**24,000**	**19,000 J**	22 J	6.5 J	11 J
Benzo(A)Pyrene	110	**990**	**780**	15 J	20 J	4.4 J	**8,700**	**9,200**	**28,000**	**17,000**	23	7.2 J	12 J
Benzo(B)Fluoranthene	1,100	**1,500**	**1,100**	20 J	20 J	6.5 J	**11,000**	**13,000**	**39,000**	**22,000**	34	8.3 J	13 J
Benzo(K)Fluoranthene	11,000	740 J	560 J	12 J	13 J	3.7 J	5,300 J	6,400 J	**21,000 J**	**12,000 J**	18 J	5 J	8 J
Chrysene	110,000	910	710	15 J	20 J	4.7 J	7,700	7,900	24,000	16,000	22	7.1 J	12 J
Dibenzo(A,H)Anthracene	110	**270**	**250**	12 J	20 U	21 U	**3,800 J**	**3,300 J**	**11,000**	**6,400 J**	14 J	21 U	21 U
Indeno(1,2,3-CD)Pyrene	1,100	830 J	670	14 J	16 J	5 J	**8,500**	**7,500**	**27,000 J**	**14,000**	25	5.8 J	9.7 J
POINT RISK													
Benzo(A)Anthracene	1,100	8.1E-07	7.3E-07	1.4E-08	2.0E-08	3.4E-09	8.0E-06	8.1E-06	2.2E-05	1.7E-05	2.0E-08	5.9E-09	1.0E-08
Benzo(A)Pyrene	110	9.0E-06	7.1E-06	1.4E-07	1.8E-07	4.0E-08	7.9E-05	8.4E-05	2.5E-04	1.5E-04	2.1E-07	6.5E-08	1.1E-07
Benzo(B)Fluoranthene	1,100	1.4E-06	1.0E-06	1.8E-08	1.8E-08	5.9E-09	1.0E-05	1.2E-05	3.5E-05	2.0E-05	3.1E-08	7.5E-09	1.2E-08
Benzo(K)Fluoranthene	11,000	6.7E-08	5.1E-08	1.1E-09	1.2E-09	3.4E-10	4.8E-07	5.8E-07	1.9E-06	1.1E-06	1.6E-09	4.5E-10	7.3E-10
Chrysene	110,000	8.3E-09	6.5E-09	1.4E-10	1.8E-10	4.3E-11	7.0E-08	7.2E-08	2.2E-07	1.5E-07	2.0E-10	6.5E-11	1.1E-10
Dibenzo(A,H)Anthracene	110	2.5E-06	2.3E-06	1.1E-07	1.8E-07	1.9E-07	3.5E-05	3.0E-05	1.0E-04	5.8E-05	1.3E-07	9.5E-08	9.5E-08
Indeno(1,2,3-CD)Pyrene	1,100	7.5E-07	6.1E-07	1.3E-08	1.5E-08	4.5E-09	7.7E-06	6.8E-06	2.5E-05	1.3E-05	2.3E-08	5.3E-09	8.8E-09
TOTAL POINT RISK		**1.4E-05**	**1.2E-05**	**2.9E-07**	**4.2E-07**	**2.5E-07**	**1.4E-04**	**1.4E-04**	**4.4E-04**	**2.6E-04**	**4.1E-07**	**1.8E-07**	**2.4E-07**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-013	SR-SS-014	SR-SS-015	SR-SS-016	SR-SS-017	SR-SS-018	SR-SS-019	SR-SS-020		SR-SS-021	SR-SS-022	SR-SS-023
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-013-000.5**	**SR-SS-014-000.5**	**SR-SS-015-000.5**	**SR-SS-016-000.5**	**SR-SS-017-000.5**	**SR-SS-018-000.5**	**SR-SS-019-000.5**	**SR-SS-020-000.5**	**SR-SS-020-000.5-D**	**SR-SS-021-000.5**	**SR-SS-022-000.5**	**SR-SS-023-000.5**
Sample Date		**10/22/2007**	**10/22/2007**	**10/22/2007**	**10/22/2007**	**10/22/2007**	**10/25/2007**	**10/24/2007**	**10/24/2007**	**10/24/07**	**10/25/2007**	**10/25/2007**	**10/25/2007**
PAH (µg/kg)													
Benzo(A)Anthracene	1,100	**1,200 J**	**1,600**	96	**1,500**	6.3 J	4.3 J	980	**9,800**	**9,600**	**2,600 J**	37	4.9 J
Benzo(A)Pyrene	110	**1,400**	**1,900**	**110**	**1,500**	8 J	5 J	**1,300**	**11,000**	**9,500**	**2,400**	35	4.6 J
Benzo(B)Fluoranthene	1,100	**1,900**	**3,000 J**	160 J	**1,200**	9.9 J	8.1 J	**2,200**	**9,000 J**	**15,000**	**2,600**	59	22 U
Benzo(K)Fluoranthene	11,000	920 J	1,400	74	1,600	5.4 J	23 U	330 J	8,100 J	6,400 J	1,400 J	18 J	22 U
Chrysene	110,000	1,200	1,700	93	1,800	6.6 J	23 U	1,100 J	11,000	11,000 J	2,200	42	22 U
Dibenzo(A,H)Anthracene	110	**570 J**	**740**	46	**350**	8.6 J	23 U	94	**3,500 J**	**1,400 J**	**1,100**	17 J	22 U
Indeno(1,2,3-CD)Pyrene	1,100	**1,300**	**1,400**	95	950 J	9 J	23 U	810 J	**7,300**	**5,400**	**1,900**	67	22 U
POINT RISK													
Benzo(A)Anthracene	1,100	1.1E-06	1.5E-06	8.7E-08	1.4E-06	5.7E-09	3.9E-09	8.9E-07	8.9E-06	8.7E-06	2.4E-06	3.4E-08	4.5E-09
Benzo(A)Pyrene	110	1.3E-05	1.7E-05	1.0E-06	1.4E-05	7.3E-08	4.5E-08	1.2E-05	1.0E-04	8.6E-05	2.2E-05	3.2E-07	4.2E-08
Benzo(B)Fluoranthene	1,100	1.7E-06	2.7E-06	1.5E-07	1.1E-06	9.0E-09	7.4E-09	2.0E-06	8.2E-06	1.4E-05	2.4E-06	5.4E-08	1.0E-08
Benzo(K)Fluoranthene	11,000	8.4E-08	1.3E-07	6.7E-09	1.5E-07	4.9E-10	1.0E-09	3.0E-08	7.4E-07	5.8E-07	1.3E-07	1.6E-09	1.0E-09
Chrysene	110,000	1.1E-08	1.5E-08	8.5E-10	1.6E-08	6.0E-11	1.0E-10	1.0E-08	1.0E-07	1.0E-07	2.0E-08	3.8E-10	1.0E-10
Dibenzo(A,H)Anthracene	110	5.2E-06	6.7E-06	4.2E-07	3.2E-06	7.8E-08	1.0E-07	8.5E-07	3.2E-05	1.3E-05	1.0E-05	1.5E-07	1.0E-07
Indeno(1,2,3-CD)Pyrene	1,100	1.2E-06	1.3E-06	8.6E-08	8.6E-07	8.2E-09	1.0E-08	7.4E-07	6.6E-06	4.9E-06	1.7E-06	6.1E-08	1.0E-08
TOTAL POINT RISK		**2.2E-05**	**3.0E-05**	**1.7E-06**	**2.0E-05**	**1.7E-07**	**1.7E-07**	**1.6E-05**	**1.6E-04**	**1.3E-04**	**3.8E-05**	**6.2E-07**	**1.7E-07**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-024	SR-SS-025	SR-SS-026	SR-SS-027	SR-SS-028	SR-SS-029	SR-SS-030	SR-SS-031	SR-SS-032	SR-SS-033	SR-SS-034	SR-SS-035
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-024-000.5**	**SR-SS-025-000.5**	**SR-SS-026-000.5**	**SR-SS-027-000.5**	**SR-SS-028-000.5**	**SR-SS-029-000.5**	**SR-SS-030-000.5**	**SR-SS-031-000.5**	**SR-SS-032-000.5**	**SR-SS-033-000.5**	**SR-SS-034-000.5**	**SR-SS-035-000.5**
Sample Date		**10/25/2007**	**10/24/2007**	**10/24/2007**	**10/24/2007**	**10/24/2007**	**10/24/2007**	**10/24/2007**	**10/24/2007**	**10/24/2007**	**10/25/2007**	**10/24/2007**	**10/25/2007**
PAH (µg/kg)													
Benzo(A)Anthracene	1,100	4.7 J	**2,400**	**10,000**	950	18 J	**3,600**	5 J	440	360	**24,000 J**	**1,200 J**	60
Benzo(A)Pyrene	110	4.7 J	**3,500**	**12,000**	**810**	18 J	**3,500**	23 U	**290**	**330**	**22,000**	**1,200**	65 J
Benzo(B)Fluoranthene	1,100	23 U	**5,200**	**19,000**	**1,300**	20 J	**3,000 J**	6.8 J	460	330 J	**19,000**	**1,200**	120 J
Benzo(K)Fluoranthene	11,000	23 U	1,700 J	5,700 J	540 J	16 J	2,700 J	4.5 J	280 J	240 J	**14,000 J**	760 J	47 J
Chrysene	110,000	23 U	2,800 J	10,000 J	1,100 J	14 J	3,600 J	23 U	420 J	330 J	20,000 J	1,100 J	83 J
Dibenzo(A,H)Anthracene	110	23 U	**340**	**2,000 J**	**320**	8.5 J	**320 J**	23 U	**150**	**110**	**9,500**	**160 J**	13 J
Indeno(1,2,3-CD)Pyrene	1,100	23 U	**2,300 J**	**7,200 J**	490	16 J	**2,200**	23 U	270	200	**16,000**	800	44 J
POINT RISK													
Benzo(A)Anthracene	1,100	4.3E-09	2.2E-06	9.1E-06	8.6E-07	1.6E-08	3.3E-06	4.5E-09	4.0E-07	3.3E-07	2.2E-05	1.1E-06	5.5E-08
Benzo(A)Pyrene	110	4.3E-08	3.2E-05	1.1E-04	7.4E-06	1.6E-07	3.2E-05	1.0E-07	2.6E-06	3.0E-06	2.0E-04	1.1E-05	5.9E-07
Benzo(B)Fluoranthene	1,100	1.0E-08	4.7E-06	1.7E-05	1.2E-06	1.8E-08	2.7E-06	6.2E-09	4.2E-07	3.0E-07	1.7E-05	1.1E-06	1.1E-07
Benzo(K)Fluoranthene	11,000	1.0E-09	1.5E-07	5.2E-07	4.9E-08	1.5E-09	2.5E-07	4.1E-10	2.5E-08	2.2E-08	1.3E-06	6.9E-08	4.3E-09
Chrysene	110,000	1.0E-10	2.5E-08	9.1E-08	1.0E-08	1.3E-10	3.3E-08	1.0E-10	3.8E-09	3.0E-09	1.8E-07	1.0E-08	7.5E-10
Dibenzo(A,H)Anthracene	110	1.0E-07	3.1E-06	1.8E-05	2.9E-06	7.7E-08	2.9E-06	1.0E-07	1.4E-06	1.0E-06	8.6E-05	1.5E-06	1.2E-07
Indeno(1,2,3-CD)Pyrene	1,100	1.0E-08	2.1E-06	6.5E-06	4.5E-07	1.5E-08	2.0E-06	1.0E-08	2.5E-07	1.8E-07	1.5E-05	7.3E-07	4.0E-08
TOTAL POINT RISK		**1.7E-07**	**4.4E-05**	**1.6E-04**	**1.3E-05**	**2.9E-07**	**4.3E-05**	**2.3E-07**	**5.1E-06**	**4.8E-06**	**3.4E-04**	**1.5E-05**	**9.2E-07**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-036	SR-SS-037	SR-SS-038	SR-SS-039	SR-SS-040	SR-SS-041		SR-SS-042	SR-SS-043	SR-SS-044	SR-SS-045	SR-SS-047
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-036-000.5**	**SR-SS-037-000.5**	**SR-SS-038-000.5**	**SR-SS-039-000.5**	**SR-SS-040-000.5**	**SR-SS-041-000.5**	**SR-SS-041-000.5-D**	**SR-SS-042-000.5**	**SR-SS-043-000.5**	**SR-SS-044-000.5**	**SR-SS-045-000.5**	**SR-SS-047-000.5**
Sample Date		**10/18/2007**	**10/19/2007**	**10/19/2007**	**10/19/2007**	**11/6/2007**	**11/6/2007**	**11/6/2007**	**11/6/2007**	**11/6/2007**	**11/6/2007**	**11/6/2007**	**11/6/2007**
PAH (µg/kg)													
Benzo(A)Anthracene	1,100	9.4 J	10 J	13 J	14 J	4.2 J	8.7 J	14 J	3.5 J	5.2 J	66 J	9.6 J	46 J
Benzo(A)Pyrene	110	8.6 J	13 J	13 J	100 UJ	4.8 J	9.7 J	12 J	4.4 J	6.6 J	97	14 J	40
Benzo(B)Fluoranthene	1,100	9.9 J	17 J	22 J	100 UJ	7.4 J	13 J	19 J	24 U	10 J	130	14 J	49
Benzo(K)Fluoranthene	11,000	6 J	8.3 J	11 J	100 UJ	4.2 J	7.5 J	11 J	24 U	5.4 J	69 J	9.6 J	27 J
Chrysene	110,000	8.8 J	11 J	14 J	18 J	4.5 J	9.3 J	14 J	4.3 J	6 J	70	11 J	39
Dibenzo(A,H)Anthracene	110	21 U	23 U	9.4 J	100 UJ	24 U	24 U	24 U	24 U	23 U	54 J	25 U	19 J
Indeno(1,2,3-CD)Pyrene	1,100	6.9 J	11 J	11 J	100 UJ	24 U	8.6 J	12 J	24 U	6 J	110	12 J	33
POINT RISK													
Benzo(A)Anthracene	1,100	8.5E-09	9.1E-09	1.2E-08	1.3E-08	3.8E-09	7.9E-09	1.3E-08	3.2E-09	4.7E-09	6.0E-08	8.7E-09	4.2E-08
Benzo(A)Pyrene	110	7.8E-08	1.2E-07	1.2E-07	4.5E-07	4.4E-08	8.8E-08	1.1E-07	4.0E-08	6.0E-08	8.8E-07	1.3E-07	3.6E-07
Benzo(B)Fluoranthene	1,100	9.0E-09	1.5E-08	2.0E-08	4.5E-08	6.7E-09	1.2E-08	1.7E-08	1.1E-08	9.1E-09	1.2E-07	1.3E-08	4.5E-08
Benzo(K)Fluoranthene	11,000	5.5E-10	7.5E-10	1.0E-09	4.5E-09	3.8E-10	6.8E-10	1.0E-09	1.1E-09	4.9E-10	6.3E-09	8.7E-10	2.5E-09
Chrysene	110,000	8.0E-11	1.0E-10	1.3E-10	1.6E-10	4.1E-11	8.5E-11	1.3E-10	3.9E-11	5.5E-11	6.4E-10	1.0E-10	3.5E-10
Dibenzo(A,H)Anthracene	110	9.5E-08	1.0E-07	8.5E-08	4.5E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.0E-07	4.9E-07	1.1E-07	1.7E-07
Indeno(1,2,3-CD)Pyrene	1,100	6.3E-09	1.0E-08	1.0E-08	4.5E-08	1.1E-08	7.8E-09	1.1E-08	1.1E-08	5.5E-09	1.0E-07	1.1E-08	3.0E-08
TOTAL POINT RISK		**2.0E-07**	**2.6E-07**	**2.5E-07**	**1.0E-06**	**1.7E-07**	**2.3E-07**	**2.6E-07**	**1.8E-07**	**1.8E-07**	**1.7E-06**	**2.7E-07**	**6.6E-07**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-4
PAH ANALYTICAL SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

		SR-SS-049	SR-SS-050	SR-SS-051	SR-SS-052	SR-SS-053	SR-SS-054	SR-SS-055	SR-SS-056
Sample	**Residential RSL November 2018[(1)]**	**SR-SS-049-000.5**	**SR-SS-050-000.5**	**SR-SS-051-000.5**	**SR-SS-052-000.5**	**SR-SS-053-000.5**	**SR-SS-054-000.5**	**SR-SS-055-000.5**	**SR-SS-056-000.5**
Sample Date		**11/6/2007**	**11/7/2007**	**11/7/2007**	**11/7/2007**	**11/7/2007**	**11/7/2007**	**11/7/2007**	**11/7/2007**
PAH (µg/kg)									
Benzo(A)Anthracene	1,100	13 J	35	310 J	14 J	54	540	4.8 J	3.1 J
Benzo(A)Pyrene	110	13 J	31	**240**	13 J	46	**450**	6.1 J	3.7 J
Benzo(B)Fluoranthene	1,100	14 J	28 J	230 J	15 J	45 J	410 J	5.8 J	4.9 J
Benzo(K)Fluoranthene	11,000	9.3 J	20 J	160 J	9.6 J	33	300 J	5.1 J	3.6 J
Chrysene	110,000	12 J	24 J	240	9.5 J	41	430	23 U	24 U
Dibenzo(A,H)Anthracene	110	25 U	17 J	98	8.4 J	20 J	**180**	23 U	24 U
Indeno(1,2,3-CD)Pyrene	1,100	9.6 J	28	170	15 J	37	310	8.3 J	24 U
POINT RISK									
Benzo(A)Anthracene	1,100	1.2E-08	3.2E-08	2.8E-07	1.3E-08	4.9E-08	4.9E-07	4.4E-09	2.8E-09
Benzo(A)Pyrene	110	1.2E-07	2.8E-07	2.2E-06	1.2E-07	4.2E-07	4.1E-06	5.5E-08	3.4E-08
Benzo(B)Fluoranthene	1,100	1.3E-08	2.5E-08	2.1E-07	1.4E-08	4.1E-08	3.7E-07	5.3E-09	4.5E-09
Benzo(K)Fluoranthene	11,000	8.5E-10	1.8E-09	1.5E-08	8.7E-10	3.0E-09	2.7E-08	4.6E-10	3.3E-10
Chrysene	110,000	1.1E-10	2.2E-10	2.2E-09	8.6E-11	3.7E-10	3.9E-09	1.0E-10	1.1E-10
Dibenzo(A,H)Anthracene	110	1.1E-07	1.5E-07	8.9E-07	7.6E-08	1.8E-07	1.6E-06	1.0E-07	1.1E-07
Indeno(1,2,3-CD)Pyrene	1,100	8.7E-09	2.5E-08	1.5E-07	1.4E-08	3.4E-08	2.8E-07	7.5E-09	1.1E-08
TOTAL POINT RISK		**2.7E-07**	**5.2E-07**	**3.7E-06**	**2.4E-07**	**7.3E-07**	**6.9E-06**	**1.8E-07**	**1.6E-07**

Notes:

PAH Polycyclic aromatic hydrocarbon
µg/kg micrograms per kilogram
-D Duplicate sample
J Estimated value

1) If sample result was non-detect (U qualifier), 1/2 the detection limit was used for point risk calculation.
2) The seven PAHs in this table were determined to be risk drivers based on the risk ratio conducted during the Site Investigation (2008) and subsequent changes to the RSLs (through November 2018) due to updated toxicity values.
3) Total point risks calculated using the Residential Regional Screening Levels (RSLs) from November 2018 for each PAH identified as a risk driver.

Bolded and shaded values indicate exceedances of either the RSL or Total Point Risk of 1.0E-04

TABLE 4-5
LEAD SHOT AND NON-LEAD GRIT SIZED PARTICLE COUNTS
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				#10 SIEVE						#14 SIEVE				#20 SIEVE				#35 SIEVE				
Sample	Method	Area (Feet^2)	Volume (Feet^3)	Lead Shot	Grit Sized Particles	Clay Pigeon Frags	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Adjusted[1] Clay Pigeon Frags	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Notes
SOUTHERN RANGE AREA																						
SR-SS-216-0006	1ft x 1ft	1	0.5	294	153	5	294	153	5	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-216-0612	1ft x 1ft	1	0.5	72	46	3	72	46	3	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-216-1224	3in HA	0.05	0.05	5	23	0	25	115	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-217-0006	1ft x 1ft	1	0.5	419	151	0	419	151	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-217-0612	1ft x 1ft	1	0.5	92	167	0	92	167	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-217-1224	3in HA	0.05	0.05	0	11	0	0	55	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-218-0006	1ft x 1ft	1	0.5	218	178	0	218	178	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-218-0612	1ft x 1ft	1	0.5	138	39	0	138	39	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-218-1224	3in HA	0.05	0.05	6	7	0	30	35	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-219-0006	1ft x 1ft	1	0.5	533	119	0	533	119	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-219-0612	1ft x 1ft	1	0.5	46	155	0	46	155	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-219-1224	3in HA	0.05	0.05	1	35	0	5	175	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-220-0006	1ft x 1ft	1	0.5	66	75	0	66	75	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-220-0612	1ft x 1ft	1	0.5	193	58	0	193	58	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-220-1224	3in HA	0.05	0.05	9	18	0	45	90	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-221-0006	1ft x 1ft	1	0.5	148	144	12	148	144	12	3	1,118	3	1,118	0	33,575	0	33,575	0	>100,000	0	>100,000	Field sieved #35 and laboratory sieved #20
SR-SS-221-0612	1ft x 1ft	1	0.5	53	99	0	53	99	0	1	1,438	1	1,438	0	51,840	0	51,840	0	>100,000	0	>100,000	Field sieved #35 and laboratory sieved #20
SR-SB-221-1224	3in HA	0.05	0.05	5	18	0	25	90	0	0	55	0	275	0	1,825	0	9,125	0	>100,000	0	>100,000	Field sieved #35 and laboratory sieved #20
SR-SS-222-0006	1ft x 1ft	1	0.5	15	~1,000	4	15	~1,000	4	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-222-0612	1ft x 1ft	1	0.5	2	~1,000	0	2	~1,000	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SB-222-1224	3in HA	0.05	0.05	0	~200	0	0	~1,000	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-223-0006	1ft x 1ft	1	0.5	0	~750	50	0	~750	50	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-223-0612	1ft x 1ft	1	0.5	5	~700	40	5	~700	40	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SB-223-1224	3in HA	0.05	0.05	0	50	3	0	250	15	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-224-0006	1ft x 1ft	1	0.5	6	~1000	2	6	~1000	2	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-224-0612	1ft x 1ft	1	0.5	1	~750	0	1	~750	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SB-224-1224	3in HA	0.05	0.05	0	~100	0	0	~500	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-225-0006	1ft x 1ft	1	0.5	0	~300	0	0	~300	0	0	5,657	0	5,657	0	86,900	0	86,900	0	>100,000	0	>100,000	Non-lead particles very high, estimated #10 sieve value. Field sieved #35 and laboratory sieved #20
SR-SS-225-0612	1ft x 1ft	1	0.5	8	~300	3	8	~300	3	0	3,408	0	3,408	0	56,686	0	56,686	0	>100,000	0	>100,000	Non-lead particles very high, estimated #10 sieve value. Field sieved #35 and laboratory sieved #20
SR-SB-225-1224	3in HA	0.05	0.05	0	75	0	0	375	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-226-0006	1ft x 1ft	1	0.5	1	~200	0	1	~200	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-226-0612	1ft x 1ft	1	0.5	7	~300	0	7	~300	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SB-226-1224	3in HA	0.05	0.05	0	~100	0	0	~500	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-227-0006	7in x 7in	0.34	0.17	102	92	6	300	270	18	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-227-0612	7in x 7in	0.34	0.17	8	66	0	24	194	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-227-1218	3in HA	0.05	0.025	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-227-1824	3in HA	0.05	0.025	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-228-0006	7in x 7in	0.34	0.17	20	24	6	59	71	18	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-228-0612	7in x 7in	0.34	0.17	0	18	0	0	53	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-229-0006	7in x 7in	0.34	0.17	7	140	6	21	412	18	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-229-0612	7in x 7in	0.34	0.17	0	35	0	0	103	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-230-0006	7in x 7in	0.34	0.17	72	51	255	212	150	750	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-230-0612	7in x 7in	0.34	0.17	17	30	10	50	88	29	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-230-1218	3in HA	0.05	0.025	0	5	0	0	50	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-230-1824	3in HA	0.05	0.025	0	2	0	0	20	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-231-0006	7in x 7in	0.34	0.17	93	31	0	273	91	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-231-0612	7in x 7in	0.34	0.17	2	7	0	6	21	0	--	--	--	--	--	--	--	--	--	--	--	--	

TABLE 4-5
LEAD SHOT AND NON-LEAD GRIT SIZED PARTICLE COUNTS
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				#10 SIEVE						#14 SIEVE				#20 SIEVE				#35 SIEVE				
Sample	Method	Area (Feet^2)	Volume (Feet^3)	Lead Shot	Grit Sized Particles	Clay Pigeon Frags	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Adjusted[1] Clay Pigeon Frags	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Notes
SOUTHERN RANGE AREA (continued)																						
SR-SB-231-1218	3in HA	0.05	0.025	0	3	0	0	30	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-231-1824	3in HA	0.05	0.025	0	2	0	0	20	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-232-0006	7in x 7in	0.34	0.17	15	400	0	44	1,176	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-232-0612	7in x 7in	0.34	0.17	13	155	10	38	456	29	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-232-1218	3in HA	0.05	0.025	0	10	3	0	100	30	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-232-1824	3in HA	0.05	0.025	0	7	0	0	70	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-233-0006	7in x 7in	0.34	0.17	74	38	0	218	112	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-233-0612	7in x 7in	0.34	0.17	6	19	0	18	56	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-233-1218	3in HA	0.05	0.025	0	5	0	0	50	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-233-1824	3in HA	0.05	0.025	0	3	0	0	30	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-234-0006	7in x 7in	0.34	0.17	154	92	0	453	270	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-234-0612	7in x 7in	0.34	0.17	11	30	0	32	88	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-234-1218	3in HA	0.05	0.025	0	1	0	0	10	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-234-1824	3in HA	0.05	0.025	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-235-0006	7in x 7in	0.34	0.17	329	145	3	967	426	9	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-235-0612	7in x 7in	0.34	0.17	18	88	0	53	259	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-235-1218	3in HA	0.05	0.025	0	6	0	0	60	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-235-1824	3in HA	0.05	0.025	0	6	0	0	60	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-236-0006	7in x 7in	0.34	0.17	115	112	3	338	329	9	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-236-0612	7in x 7in	0.34	0.17	9	50	0	26	147	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-236-1218	3in HA	0.05	0.025	0	19	0	0	190	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-236-1824	3in HA	0.05	0.025	1	6	0	10	60	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-237-0006	7in x 7in	0.34	0.17	82	243	0	241	714	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-237-0612	7in x 7in	0.34	0.17	23	125	0	68	368	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-237-1218	3in HA	0.05	0.025	0	10	0	0	100	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-237-1824	3in HA	0.05	0.025	0	7	0	0	70	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-238-0006	7in x 7in	0.34	0.17	18	250	0	53	735	0	--	--	--	--	--	--	--	--	--	--	--	--	March 2018
SR-SS-238-0006	7in x 7in	0.34	0.17	11	30	2	32	88	6	1	408	3	1,200	0	9,072	0	26,672	--	--	--	--	December 2018
SR-SS-238-0612	7in x 7in	0.34	0.17	0	27	0	0	79	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-239-0006	7in x 7in	0.34	0.17	28	300	0	82	882	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-239-0612	7in x 7in	0.34	0.17	0	32	0	0	94	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-240-0006	7in x 7in	0.34	0.17	34	155	0	100	456	0	--	--	--	--	--	--	--	--	--	--	--	--	March 2018
SR-SS-240-0006	7in x 7in	0.34	0.17	81	49	0	238	144	0	1	678	3	1,993	0	10,136	0	29,800	--	--	--	--	December 2018
SR-SS-240-0612	7in x 7in	0.34	0.17	1	103	0	3	303	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-308-0006	7in x 7in	0.34	0.17	0	>1,000	0	0	>3,000	0	--	--	--	--	--	--	--	--	--	--	--	--	Non-lead particles very high, estimated #10 sieve value
SR-SS-308-0612	7in x 7in	0.34	0.17	4	577	0	12	1,696	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-309-0006	7in x 7in	0.34	0.17	7	17	6	21	50	18	14	660	41	1,940	0	11,294	0	33,204	--	--	--	--	
SR-SS-309-0612	7in x 7in	0.34	0.17	0	21	0	0	62	0	2	474	6	1,394	0	10,725	0	31,532	--	--	--	--	
SR-SS-310-0006	7in x 7in	0.34	0.17	27	20	17	79	59	50	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-310-0612	7in x 7in	0.34	0.17	16	20	17	47	59	50	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-311-0006	7in x 7in	0.34	0.17	10	30	78	29	88	229	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-311-0612	7in x 7in	0.34	0.17	13	20	46	38	59	135	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-312-0006	7in x 7in	0.34	0.17	20	83	29	59	244	85	0	725	0	2,132	0	16,855	0	49,554	--	--	--	--	
SR-SS-312-0612	7in x 7in	0.34	0.17	5	80	13	15	235	38	0	712	0	2,093	0	18,960	0	55,742	--	--	--	--	
SR-SS-313-0006	7in x 7in	0.34	0.17	0	11	0	0	32	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-313-0612	7in x 7in	0.34	0.17	5	43	0	15	126	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-314-0006	7in x 7in	0.34	0.17	0	392	0	0	1,152	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-314-0612	7in x 7in	0.34	0.17	2	114	0	6	335	0	--	--	--	--	--	--	--	--	--	--	--	--	

TABLE 4-5
LEAD SHOT AND NON-LEAD GRIT SIZED PARTICLE COUNTS
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				#10 SIEVE						#14 SIEVE				#20 SIEVE				#35 SIEVE				
Sample	Method	Area (Feet^2)	Volume (Feet^3)	Lead Shot	Grit Sized Particles	Clay Pigeon Frags	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Adjusted[1] Clay Pigeon Frags	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Notes
SOUTHERN RANGE AREA (continued)																						
SR-SB-315-0006	7in x 7in	0.34	0.17	10	22	0	29	65	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-315-0612	7in x 7in	0.34	0.17	10	39	0	29	115	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-316-0006	7in x 7in	0.34	0.17	6	45	0	18	132	0	2	472	6	1,388	0	11,018	0	32,393	--	--	--	--	
SR-SS-316-0612	7in x 7in	0.34	0.17	4	28	0	12	82	0	0	715	0	2,102	0	14,528	0	42,712	--	--	--	--	
SR-SS-317-0006	7in x 7in	0.34	0.17	4	18	0	12	53	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-317-0612	7in x 7in	0.34	0.17	0	21	0	0	62	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-328-0006	7in x 7in	0.34	0.17	1	22	2	3	65	6	0	203	0	597	0	3,626	0	10,660	--	--	--	--	
SR-SS-328-0612	7in x 7in	0.34	0.17	0	32	1	0	94	3	0	209	0	614	0	3,874	0	11,390	--	--	--	--	
SR-SS-329-0006	7in x 7in	0.34	0.17	6	12	9	18	35	26	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-329-0612	7in x 7in	0.34	0.17	1	21	4	3	62	12	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-330-0006	7in x 7in	0.34	0.17	4	29	0	12	85	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-330-0612	7in x 7in	0.34	0.17	0	21	0	0	62	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-331-0006	7in x 7in	0.34	0.17	26	234	0	76	688	0	1	1,382	3	4,063	0	21,928	0	64,468	--	--	--	--	
SR-SS-331-0612	7in x 7in	0.34	0.17	13	205	0	38	603	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-401-0006	7in x 7in	0.34	0.17	16	445	0	47	1,308	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-402-0006	7in x 7in	0.34	0.17	45	609	0	132	1,790	0	0	367	0	1,079	--	--	--	--	--	--	--	--	
SR-SS-402-0612	7in x 7in	0.34	0.17	6	781	0	18	2,296	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-403-0006	7in x 7in	0.34	0.17	47	103	0	138	303	0	0	324	0	953	--	--	--	--	--	--	--	--	
SR-SS-403-0612	7in x 7in	0.34	0.17	16	154	0	47	453	0	0	347	0	1,020	--	--	--	--	--	--	--	--	
SR-SS-404-0006	7in x 7in	0.34	0.17	3	418	0	9	1,229	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-405-0006	7in x 7in	0.34	0.17	1	14	0	3	41	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-406-0006	7in x 7in	0.34	0.17	0	111	0	0	326	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-422-0006	7in x 7in	0.34	0.17	52	529	0	153	1,555	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-422-0612	7in x 7in	0.34	0.17	25	628	0	74	1,846	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-423-0006	7in x 7in	0.34	0.17	15	749	0	44	2,202	0	--	--	--	--	--	--	--	--	--	--	--	--	
HIGH TOWER RANGE AREA																						
SR-SS-241-0006	7in x 7in	0.34	0.17	5	25	0	15	74	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-241-0006	7in x 7in	0.34	0.17	1	15	0	3	44	0	0	296	0	870	0	6,269	0	18,431	--	--	--	--	
SR-SS-241-0612	7in x 7in	0.34	0.17	0	21	0	0	62	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-246-0006	7in x 7in	0.34	0.17	2	88	0	6	259	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-246-0612	7in x 7in	0.34	0.17	0	24	0	0	71	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-246-1218	3in HA	0.05	0.025	0	4	0	0	40	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-246-1824	3in HA	0.05	0.025	0	6	0	0	60	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-251-0006	7in x 7in	0.34	0.17	0	250	0	0	735	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-251-0612	7in x 7in	0.34	0.17	0	50	0	0	147	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-252-0006	7in x 7in	0.34	0.17	27	13	0	79	38	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-252-0612	7in x 7in	0.34	0.17	11	13	0	32	38	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-253-0006	7in x 7in	0.34	0.17	29	106	13	85	312	38	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-253-0612	7in x 7in	0.34	0.17	0	4	0	0	12	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-253-1218	3in HA	0.05	0.025	0	28	0	0	280	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-253-1824	3in HA	0.05	0.025	0	23	0	0	230	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-254-0006	7in x 7in	0.34	0.17	7	4	2	21	12	6	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-254-0612	7in x 7in	0.34	0.17	6	5	3	18	15	9	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-255-0006	7in x 7in	0.34	0.17	64	28	0	188	82	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-255-0612	7in x 7in	0.34	0.17	4	32	0	12	94	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-256-0006	7in x 7in	0.34	0.17	122	109	0	359	320	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-256-0612	7in x 7in	0.34	0.17	0	63	0	0	185	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-256-1218	3in HA	0.05	0.025	0	9	0	0	90	0	--	--	--	--	--	--	--	--	--	--	--	--	

TABLE 4-5
LEAD SHOT AND NON-LEAD GRIT SIZED PARTICLE COUNTS
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

				#10 SIEVE						#14 SIEVE				#20 SIEVE				#35 SIEVE				
Sample	Method	Area (Feet^2)	Volume (Feet^3)	Lead Shot	Grit Sized Particles	Clay Pigeon Frags	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Adjusted[1] Clay Pigeon Frags	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Lead Shot	Grit Sized Particles	Adjusted[1] Lead Shot	Adjusted[1] Grit Sized Particles	Notes
HIGH TOWER RANGE AREA (continued)																						
SR-SB-256-1824	3in HA	0.05	0.025	0	6	0	0	60	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-256N-0006	7in x 7in	0.34	0.17	56	68	0	165	200	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-256N-0612	7in x 7in	0.34	0.17	4	49	0	12	144	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-256E-0006	7in x 7in	0.34	0.17	54	313	0	159	920	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-256E-0612	7in x 7in	0.34	0.17	5	246	0	15	723	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-318-0006	7in x 7in	0.34	0.17	30	272	0	88	800	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-319-0006	7in x 7in	0.34	0.17	4	52	0	12	153	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-320-0006	7in x 7in	0.34	0.17	20	97	0	59	285	0	0	755	0	2,220	0	11,917	0	35,036	--	--	--	--	
SR-SB-321-0006	7in x 7in	0.34	0.17	24	175	0	71	515	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-322-0006	7in x 7in	0.34	0.17	15	90	0	44	265	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SB-323-0006	7in x 7in	0.34	0.17	32	59	0	94	173	0	0	790	0	2,323	0	14,057	0	41,328	--	--	--	--	
SR-SS-324-0006	7in x 7in	0.34	0.17	63	78	0	185	229	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-332-0006	7in x 7in	0.34	0.17	14	233	0	41	685	0	1	1,283	3	3,772	0	20,226	0	59,464	--	--	--	--	
SR-SS-333-0006	7in x 7in	0.34	0.17	3	6	150	9	18	441	0	1,371	0	4,031	0	23,786	0	69,931	--	--	--	--	
SR-SS-334-0006	7in x 7in	0.34	0.17	45	94	0	132	276	0	0	843	0	2,478	0	17,254	0	50,727	--	--	--	--	
SR-SS-407-0006	7in x 7in	0.34	0.17	32	62	12	94	182	35	0	241	0	709	--	--	--	--	--	--	--	--	
SR-SS-407-0612	7in x 7in	0.34	0.17	45	86	11	132	253	32	1	285	3	838	--	--	--	--	--	--	--	--	
SR-SS-408-0006	7in x 7in	0.34	0.17	35	115	0	103	338	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-408-0612	7in x 7in	0.34	0.17	11	26	0	32	76	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-409-0006	7in x 7in	0.34	0.17	73	1633	0	215	4,801	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-409-0612	7in x 7in	0.34	0.17	13	922	0	38	2,711	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-410-0006	7in x 7in	0.34	0.17	61	252	0	179	741	0	0	1,071	0	3,149	--	--	--	--	--	--	--	--	
SR-SS-410-0612	7in x 7in	0.34	0.17	11	618	0	32	1,817	0	0	1,934	0	5,686	--	--	--	--	--	--	--	--	
SR-SS-411-0006	7in x 7in	0.34	0.17	11	35	0	32	103	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-412-0006	7in x 7in	0.34	0.17	6	905	0	18	2,661	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-413-0006	7in x 7in	0.34	0.17	12	66	0	35	194	0	0	262	0	770	--	--	--	--	--	--	--	--	
SR-SS-414-0006	7in x 7in	0.34	0.17	10	65	0	29	191	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-415-0006	7in x 7in	0.34	0.17	5	678	0	15	1,993	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-416-0006	7in x 7in	0.34	0.17	49	260	0	144	764	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-416-0612	7in x 7in	0.34	0.17	14	184	0	41	541	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-417-0006	7in x 7in	0.34	0.17	55	172	0	162	506	0	0	633	0	1,861	--	--	--	--	--	--	--	--	
SR-SS-417-0612	7in x 7in	0.34	0.17	37	522	0	109	1,535	0	0	1,161	0	3,413	--	--	--	--	--	--	--	--	
SR-SS-418-0006	7in x 7in	0.34	0.17	13	162	0	38	476	0	0	313	0	920	--	--	--	--	--	--	--	--	
SR-SS-419-0006	7in x 7in	0.34	0.17	70	28	0	206	82	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-420-0006	7in x 7in	0.34	0.17	3	451	0	9	1,326	0	--	--	--	--	--	--	--	--	--	--	--	--	
SR-SS-421-0006	7in x 7in	0.34	0.17	49	68	0	144	200	0	--	--	--	--	--	--	--	--	--	--	--	--	

Notes:
(1) Adjusted to a 1-foot by 1-foot by 6inch volume (0.5 feet^3)
1ft x 1ft - 1 foot by 1 foot square
3in HA - 3-inch diameter hand auger
7in x 7in - 7-inch by 7 inch square

TABLE 4-6
LABORATORY GRAIN SIZE AND SIEVE SUMMARY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

	SR-SS-221			SR-SS-225			SR-SS-227		SR-SS-246		
SAMPLE	**SR-SS-221-0006**	**SR-SS-221-0612**	**SR-SB-221-1224**	**SR-SS-225-0006**	**SR-SS-225-0612**	**SR-SB-225-1224**	**SR-SS-227-0006**	**SR-SS-227-0612**	**SR-SS-246-0006**	**SR-SS-246-0612**	**SR-SB-246-1224**
SAMPLE DATE	**3/21/2018**	**3/21/2018**	**3/22/2018**	**3/20/2018**	**3/20/2018**	**3/21/2018**	**3/26/2018**	**3/26/2018**	**3/23/2018**	**3/23/2018**	**3/23/2018**
Lead (mg/kg)	245	63.9	18.8	149	153	7.34	158	27.8	92.1 B	8.9 B	10.4 B
Lead Sieve 20 (mg/kg)	153	728	33.9	19.5	139	--	--	--	--	--	--
Lead Sieve Pan (mg/kg)	138	45.8	43.9	12	55.1	--	--	--	--	--	--
Lead Pellet Count	0	0	0	0	0	--	--	--	--	--	--
Pellet Count Percent	0	0	0	0	0	--	--	--	--	--	--
Percent Gravel	--	--	--	0	0	0	0.38	0	0	0.3	0.07
Percent Course Sand	--	--	--	0.82	0.6	0.67	9.05	3.45	2.17	5.01	8.93
Percent Medium Sand	--	--	--	18.83	20.01	21.89	39.65	35.29	26.64	31.67	37.58
Percent Fine Sand	--	--	--	67.94	70.79	65.33	35.16	43.64	38.46	32.33	26.12
Percent Fines	--	--	--	12.42	8.6	12.11	15.77	17.62	32.73	30.69	27.3
Sieve 3" (% passing)	--	--	--	100	100	100	100	100	100	100	100
Sieve 2" (% passing)	--	--	--	100	100	100	100	100	100	100	100
Sieve 1-1/2" (% passing)	--	--	--	100	100	100	100	100	100	100	100
Sieve 1" (% passing)	--	--	--	100	100	100	100	100	100	100	100
Sieve 3/4" (% passing)	--	--	--	100	100	100	100	100	100	100	100
Sieve 1/4" (% passing)	--	--	--	100	100	100	100	100	100	100	100
Sieve No. 004 or 4.74 mm (% passing)	--	--	--	100	100	100	99.62	100	100	99.7	99.93
Sieve No. 010 or 2 mm (% passing)	--	--	--	99.18	99.4	99.33	90.57	96.55	97.83	94.69	91
Sieve No. 020 or 0.85 mm (% passing)	--	--	--	96.18	95.94	95.12	68.44	79.9	86.55	78.22	68.75
Sieve No. 040 or 0.42 mm (% passing)	--	--	--	80.36	79.39	77.44	50.92	61.27	71.19	63.02	53.42
Sieve No. 060 or 0.25 mm (% passing)	--	--	--	51.98	42.83	47.64	35.01	42.89	55.97	50.42	42.93
Sieve No. 080 or 0.177 mm (% passing)	--	--	--	30.15	22.07	26.26	24.56	30.82	46.45	42.39	37.13
Sieve No. 100 or 0.149 mm (% passing)	--	--	--	20.06	12.82	17.33	21.86	24.12	40.95	37.69	33.78
Sieve No. 200 or 0.074 mm (% passing)	--	--	--	12.42	8.6	12.11	15.77	17.62	32.73	30.69	27.3
TOTAL SOLIDS	--	--	--	**85**	**87**	**90**	**85**	**87**	**49**	**82**	**82**

Notes:
mg/kg - miligrams per kilogram

TABLE 6-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SKEET RANGE MRS - NORTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Northern Range Area	**Polycyclic Aromatic Hydrocarbons**														
	56-55-3	Benzo(a)anthracene	3.7 J	14 J	ug/kg	SR-SS-039-000.5-20071019	5/5	-	14	NA	1,100 C	NA	NA	No	BSL
	50-32-8	Benzo(a)pyrene	4.4 J	13 J	ug/kg	SR-SS-037-000.5-20071019, SR-SS-038-000.5-20071019	4/5	100 - 100	13	NA	110 C	NA	NA	No	BSL
	205-99-2	Benzo(b)fluoranthene	6.5 J	22 J	ug/kg	SR-SS-038-000.5-20071019	4/5	100 - 100	22	NA	1,100 C	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	4.5 J	11 J	ug/kg	SR-SS-037-000.5-20071019	4/5	100 - 100	11	NA	180,000 N[8]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	3.7 J	11 J	ug/kg	SR-SS-038-000.5-20071019	4/5	100 - 100	11	NA	11,000 C	NA	NA	No	BSL
	218-01-9	Chrysene	4.7 J	18 J	ug/kg	SR-SS-039-000.5-20071019	5/5	-	18	NA	110,000 C	NA	NA	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	9.4 J	9.4 J	ug/kg	SR-SS-038-000.5-20071019	1/5	21 - 100	9.4	NA	110 C	NA	NA	No	BSL
	206-44-0	Fluoranthene	7.4 J	25 J	ug/kg	SR-SS-039-000.5-20071019	5/5	-	25	NA	240,000 N	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	5 J	11 J	ug/kg	SR-SS-037-000.5-20071019, SR-SS-038-000.5-20071019	4/5	100 - 100	11	NA	1,100 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	5.7 J	5.7 J	ug/kg	SR-SS-037-000.5-20071019	1/5	21 - 100	5.7	NA	180,000 N[8]	NA	NA	No	BSL
	Miscellaneous Parameters														
	7439-92-1	**Lead**	104	22,200	mg/kg	SR-SS-213-0006	35/35	-	22,200	NA	**200** [7]	NA	NA	**Yes**	ASL
	--	pH	5.6	6.2	S.U.	SR-SS-006-000.5-20071019, SR-SS-038-000.5-20071019	5/5	-	6.2	NA	NA	NA	NA	No	NTX
	--	Total Organic Carbon	20,000	360,000 J	mg/kg	SR-SS-039-000.5-20071019	5/5	-	360,000	NA	NA	NA	NA	No	NTX

Notes:
(1) Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.
(3) The maximum detected concentration is used for screening purposes.
(4) No background data is available.
(5) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2018. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
(6) The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
(7) USEPA, 2016. Updated Scientific Considerations for Lead in Soil Cleanups, December.
(8) Value is for pyrene.

The maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:

ARAR/TBC	Applicable or Relevant and Appropriate Requirements To Be Considerec
C	Carcinogen
CAS	Chemical Abstracts Service
COPC	Chemical of Potential Concern
J	Estimated value
mg/kg	milligrams per kilogram
N	Noncarcinogen
NA	Not Applicable/Not Available
ug/kg	micrograms per kilogram

Rationale Codes:
For selection as a COPC:
ASL Above Screening Level

For elimination as a COPC:
BSL Below COPC Screening Level
NTX No toxicity criteria

TABLE 6-2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SKEET RANGE MRS - NORTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Northern	**Miscellaneous Parameters**														
Range Area	7439-92-1	**Lead**	13	846	mg/kg	SR-SS-201-0612	25/25	-	846	NA	**200 [7]**	NA	NA	**Yes**	ASL

Notes:
(1) Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.
(3) The maximum detected concentration is used for screening purposes.
(4) No background data is available.
(5) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2018. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
(6) The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
(7) USEPA, 2016. Updated Scientific Considerations for Lead in Soil Cleanups, December.

The maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:

ARAR/TBC	Applicable or Relevant and Appropriate Requirements To Be Considered
C	Carcinogen
CAS	Chemical Abstracts Service
COPC	Chemical Of Potential Concern
J	Estimated value
mg/kg	milligrams per kilogram
N	Noncarcinogen
NA	Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL Above Screening Level

For elimination as a COPC:
BSL Below COPC Screening Level

TABLE 6-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SKEET RANGE MRS - SOUTHERN RANGE AREA/SKEET RANGE SHOOTING AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Southern Range Area	**Polycyclic Aromatic Hydrocarbons**														
	91-57-6	2-Methylnaphthalene	3.2 J	120 J	ug/kg	SR-SS-033-000.5-20071025	16/45	21 - 26	120	NA	24,000 N	NA	NA	No	BSL
	83-32-9	Acenaphthene	2 J	670	ug/kg	SR-SS-033-000.5-20071025	25/45	21 - 25	670	NA	360,000 N	NA	NA	No	BSL
	120-12-7	Anthracene	2.9 J	2,800	ug/kg	SR-SS-033-000.5-20071025	27/45	21 - 25	2,800	NA	1,800,000 N	NA	NA	No	BSL
	56-55-3	**Benzo(a)anthracene**	3.1 J	60,000	ug/kg	SR-SS-267-0006-D	70/70	-	60,000	NA	**1,100 C**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	3.7 J	49,000	ug/kg	SR-SS-267-0006-D	69/70	23 - 23	49,000	NA	**110 C**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	4.9 J	72,000	ug/kg	SR-SS-267-0006-D	67/70	22 - 24	72,000	NA	**1,100 C**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	4.2 J	24,000	ug/kg	SR-SS-008-000.5-20071022	40/45	22 - 24	24,000	NA	180,000 N[8]	NA	NA	No	BSL
	207-08-9	**Benzo(k)fluoranthene**	3.6 J	23,000	ug/kg	SR-SS-267-0006	65/70	3.1 - 24	23,000	NA	**11,000 C**	NA	NA	**Yes**	ASL
	218-01-9	Chrysene	3 J	61,000	ug/kg	SR-SS-267-0006-D	65/70	1.7 - 24	61,000	NA	110,000 C	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	2 J	12,000	ug/kg	SR-SS-267-0006-D, SR-SS-275-0006	56/70	1.8 - 25	12,000	NA	**110 C**	NA	NA	**Yes**	ASL
	206-44-0	Fluoranthene	5.4 J	36,000	ug/kg	SR-SS-033-000.5-20071025	45/45	-	36,000	NA	240,000 N	NA	NA	No	BSL
	86-73-7	Fluorene	2.9 J	380	ug/kg	SR-SS-033-000.5-20071025	22/45	21 - 25	380	NA	240,000 N	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	5.4 J	38,000	ug/kg	SR-SS-275-0006	64/70	22 - 24	38,000	NA	**1,100 C**	NA	NA	**Yes**	ASL
	91-20-3	Naphthalene	4.1 J	370	ug/kg	SR-SS-033-000.5-20071025	22/45	21 - 25	370	NA	3,800 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	5.8 J	12,000	ug/kg	SR-SS-033-000.5-20071025	34/45	21 - 24	12,000	NA	180,000 N[8]	NA	NA	No	BSL
	129-00-0	Pyrene	9.6 J	30,000 J	ug/kg	SR-SS-008-000.5-20071022	31/45	21 - 25	30,000	NA	180,000 N	NA	NA	No	BSL
	Miscellaneous Parameters														
	7439-92-1	**Lead**	5.43	1,140	mg/kg	SR-SS-235-0006	76/76	-	1,140	NA	**200 [7]**	NA	NA	**Yes**	ASL
	--	pH	4.7	8.7	S.U.	SR-SS-051-000.5-20071107	45/45	-	8.7	NA	NA	NA	NA	No	NTX
	--	Total Organic Carbon	3400	60,000	mg/kg	SR-SS-029-000.5-20071024	45/45	-	60,000	NA	NA	NA	NA	No	NTX

Notes:
(1) Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.
(3) The maximum detected concentration is used for screening purposes.
(4) No background data is available.
(5) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2018. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
(6) The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
(7) USEPA, 2016. Updated Scientific Considerations for Lead in Soil Cleanups, December.
(8) Value is for pyrene.

The maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:

ARAR/TBC	Applicable or Relevant and Appropriate Requirements To Be Considered
C	Carcinogen
CAS	Chemical Abstracts Service
COPC	Chemical Of Potential Concern
J	Estimated value
mg/kg	milligrams per kilogram
N	Noncarcinogen
NA	Not Applicable/Not Available
ug/kg	micrograms per kilogram

Rationale Codes:
For selection as a COPC:
ASL Above Screening Level

For elimination as a COPC:
BSL Below COPC Screening Level
NTX No toxicity criteria

TABLE 6-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SKEET RANGE MRS - SOUTHERN RANGE AREA/SKEET RANGE SHOOTING AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Southern Range Area	**Polycyclic Aromatic Hydrocarbons**														
	56-55-3	**Benzo(a)anthracene**	3.9 J	16,000	ug/kg	SR-SS-275-0612	16/16	-	16,000	NA	**1,100 C**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	4.2 J	14,000	ug/kg	SR-SS-275-0612	16/16	-	14,000	NA	**110 C**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	6.1 J	20,000	ug/kg	SR-SS-275-0612	16/16	-	20,000	NA	**1,100 C**	NA	NA	**Yes**	ASL
	207-08-9	Benzo(k)fluoranthene	5.7 J	5,500	ug/kg	SR-SS-275-0612	15/16	3.1 - 3.4	5,500	NA	11,000 C	NA	NA	No	BSL
	218-01-9	Chrysene	18 J	16,000	ug/kg	SR-SS-275-0612	15/16	-	16,000	NA	110,000 C	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	4.4 J	3,000	ug/kg	SR-SS-275-0612	15/16	1.9 - 1.9	3,000	NA	**110 C**	NA	NA	**Yes**	ASL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	4.2 J	9,300	ug/kg	SR-SS-275-0612	16/16	-	9,300	NA	**1,100 C**	NA	NA	**Yes**	ASL
	Miscellaneous Parameters														
	7439-92-1	**Lead**	2.22	728	mg/kg	SR-SS-221-0612 SIEVE 20	44/44	-	728	NA	**200 [7]**	NA	NA	**Yes**	ASL

Notes:
(1) Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.
(3) The maximum detected concentration is used for screening purposes.
(4) No background data is available.
(5) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2018. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
(6) The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
(7) USEPA, 2016. Updated Scientific Considerations for Lead in Soil Cleanups, December.

The maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:

ARAR/TBC	Applicable or Relevant and Appropriate Requirements To Be Considered
C	Carcinogen
CAS	Chemical Abstracts Service
COPC	Chemical Of Potential Concern
J	Estimated value
mg/kg	milligrams per kilogram
N	Noncarcinogen
NA	Not Applicable/Not Available
ug/kg	micrograms per kilogram

Rationale Codes:
For selection as a COPC:
ASL Above Screening Level

For elimination as a COPC:
BSL Below COPC Screening Level
NTX No toxicity criteria

TABLE 6-5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SKEET RANGE MRS - HIGH TOWER RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
High Tower Range Area	**Polycyclic Aromatic Hydrocarbons**														
	120-12-7	Anthracene	3.6 J	3.6 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	3.6	NA	1,800,000 N	NA	NA	No	BSL
	56-55-3	Benzo(a)anthracene	22 J	22 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	22	NA	1,100 C	NA	NA	No	BSL
	50-32-8	Benzo(a)pyrene	20 J	20 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	20	NA	110 C	NA	NA	No	BSL
	205-99-2	Benzo(b)fluoranthene	20 J	20 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	20	NA	1,100 C	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	14 J	14 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	14	NA	180,000 N[8]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	13 J	13 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	13	NA	11,000 C	NA	NA	No	BSL
	218-01-9	Chrysene	20 J	20 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	20	NA	110,000 C	NA	NA	No	BSL
	206-44-0	Fluoranthene	31	31	ug/kg	SR-SS-005-000.5-20071018	1/1	-	31	NA	240,000 N	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	16 J	16 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	16	NA	1,100 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	13 J	13 J	ug/kg	SR-SS-005-000.5-20071018	1/1	-	13	NA	180,000 N[8]	NA	NA	No	BSL
	129-00-0	Pyrene	21	21	ug/kg	SR-SS-005-000.5-20071018	1/1	-	21	NA	180,000 N	NA	NA	No	BSL
	Miscellaneous Parameters														
	7439-92-1	**Lead**	7.87	508	mg/kg	SR-SS-254-0006	17/17	-	508	NA	**200 [7]**	NA	NA	**Yes**	ASL
	--	pH	6	6	S.U.	SR-SS-005-000.5-20071018	1/1	-	6	NA	NA	NA	NA	No	NTX
	--	Total Organic Carbon	17,000	17,000	mg/kg	SR-SS-005-000.5-20071018	1/1	-	17,000	NA	NA	NA	NA	No	NTX

Notes:
(1) Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.
(3) The maximum detected concentration is used for screening purposes.
(4) No background data is available.
(5) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2018. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
(6) The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
(7) USEPA, 2016. Updated Scientific Considerations for Lead in Soil Cleanups, December.
(8) Value is for pyrene.

The maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:

ARAR/TBC	Applicable or Relevant and Appropriate Requirements To Be Considered
C	Carcinogen
CAS	Chemical Abstracts Service
COPC	Chemical Of Potential Concern
J	Estimated value
mg/kg	milligrams per kilogram
N	Noncarcinogen
NA	Not Applicable/Not Available
ug/kg	micrograms per kilogram

Rationale Codes:
For selection as a COPC:
ASL Above Screening Level

For elimination as a COPC:
BSL Below COPC Screening Level
NTX No toxicity criteria

TABLE 6-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SKEET RANGE MRS - HIGH TOWER RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
High Tower Range Area	**Miscellaneous Parameters**														
	7439-92-1	Lead	4.68 J	176 J	mg/kg	SR-SS-255-0612	21/21	-	176	NA	200 [7]	NA	NA	No	BSL

Notes:
(1) Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.
(3) The maximum detected concentration is used for screening purposes.
(4) No background data is available.
(5) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2018. The noncarcinogenic values (denoted with a "N" flag) correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1E-06 (carcinogens denoted with a "C" flag).
(6) The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
(7) USEPA, 2016. Updated Scientific Considerations for Lead in Soil Cleanups, December.

The maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:

ARAR/TBC	Applicable or Relevant and Appropriate Requirements To Be Considered
C	Carcinogen
CAS	Chemical Abstracts Service
COPC	Chemical Of Potential Concern
J	Estimated value
mg/kg	milligrams per kilogram
N	Noncarcinogen
NA	Not Applicable/Not Available

Rationale Codes:

For selection as a COPC:
ASL Above Screening Level

For elimination as a COPC:
BSL Below COPC Screening Level

TABLE 7-1
ASSESSMENT ENDPOINTS AND MEASUREMENT ENDPOINTS
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Assessment Endpoint	Measurement Endpoint
Adverse effects on the survival, reproduction, and/or growth of soil invertebrates	• Survival, growth, and/or reproduction of soil invertebrates were evaluated by comparing the measured concentrations of chemicals in the surface soil to invertebrate soil screening levels.
Adverse effects on the survival, reproduction, and/or growth of terrestrial plants	• Survival, growth, and/or reproduction of terrestrial plants were evaluated by comparing the measured concentrations of chemicals in the surface soil to plant soil screening levels.
Adverse effects on the survival, reproduction, and/or growth of sediment invertebrates	• Survival, growth, and/or reproduction of sediment invertebrates were evaluated by comparing the measured concentrations of chemicals in the sediment to sediment screening levels.
Adverse effects on the survival, reproduction, and/or increase in development effects of herbivorous birds and mammals	• Survival, reproduction, and/or increase in development effects of birds and mammals were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and vegetation to No Observed Adverse Effects Levels (NOAELs) and Lowest Observed Adverse Effects Levels (LOAELs) for surrogate wildlife species.
Adverse effects on the survival, reproduction, and/or increase in development effects of invertivorous birds and mammals	• Survival, reproduction, and/or increase in development effects of birds and mammals were evaluated by comparing the estimated ingested dose of contaminants in the surface soil and earthworms to NOAELs and LOAELs for surrogate wildlife species.

TABLE 7-2
ECOLOGICAL COPC SELECTION FOR SURFACE AND SUBSURFACE SOIL
SKEET RANGE MRS - NORTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample ID of Maximum Detection	Overall Average[1]	Average of Detections[2]	Soil Screening Levels[3]				Soil EEQs[4]				Deletion or Selection of COPCs for Soil Invertebrates/Plants		Further Evaluated in Terrestrial Food Chain Modeling[5]	
							Plants	Inverte-brates	Birds	Mammals	Plants	Inverte-brates	Birds	Mammals	COPC (yes/no)?	Rationale	Evaluated (yes/no)?	Rationale
Lead (mg/kg)																		
Lead - Surface Soil	35/35	104	22200	SR-SS-213-0006	1107	1107	120	1700	11	56	**185**	**13**	**2018**	**396**	Yes	ASL	Yes	ASL, BIO
Lead - Subsurface Soil	25/25	13	846	SR-SS-201-0612	170	170	120	1700	11	56	**7.1**	0.50	**77**	**15**	Yes	ASL	Yes	ASL, BIO
Polycyclic Aromatic Hydrocarbons (ug/kg) - Surface Soil																		
Benzo(a)anthracene	5/5	3.7 J	14 J	SR-SS-039-000.5-20071019	10.34	10.34	18000	18000	730	1100	0.00078	0.00078	0.019	0.013	No	BSL	No	BSL
Benzo(a)pyrene	4/5	4.4 J	13 J	SR-SS-037-000.5-20071019, SR-SS-038-000.5-20071019	18.48	10.6	NA	18000	NA	1100	NA	0.00072	NA	0.012	Yes	NSL	Yes	BIO
Benzo(b)fluoranthene	4/5	6.5 J	22 J	SR-SS-038-000.5-20071019	21.7	14.625	18000	18000	NA	1100	0.0012	0.0012	NA	0.020	No	BSL	Yes	BIO
Benzo(g,h,i)perylene	4/5	4.5 J	11 J	SR-SS-037-000.5-20071019	16.72	8.4	NA	18000	NA	1100	NA	0.00061	NA	0.010	Yes	NSL	Yes	BIO
Benzo(k)fluoranthene	4/5	3.7 J	11 J	SR-SS-038-000.5-20071019	16.2	7.75	NA	18000	NA	1100	NA	0.00061	NA	0.010	Yes	NSL	Yes	BIO
Chrysene	5/5	4.7 J	18 J	SR-SS-039-000.5-20071019	11.94	11.94	NA	18000	NA	1100	NA	0.0010	NA	0.016	Yes	NSL	Yes	BIO
Dibenzo(a,h)anthracene	1/5	9.4 J	9.4 J	SR-SS-038-000.5-20071019	18.38	9.4	NA	18000	NA	1100	NA	0.00052	NA	0.0085	Yes	NSL	Yes	BIO
Fluoranthene	5/5	7.4 J	25 J	SR-SS-039-000.5-20071019	14.28	14.28	NA	29000	NA	100000	NA	0.00086	NA	0.00025	Yes	NSL	Yes	BIO
Indeno(1,2,3-cd)pyrene	4/5	5 J	11 J	SR-SS-037-000.5-20071019, SR-SS-038-000.5-20071019	17.34	9.175	NA	18000	NA	1100	NA	0.00061	NA	0.010	Yes	NSL	Yes	BIO
Phenanthrene	1/5	5.7 J	5.7 J	SR-SS-037-000.5-20071019	17.64	5.7	NA	29000	NA	100000	NA	0.00020	NA	0.000057	Yes	NSL	No	NONBIO

Notes:

(1) Average of all analytical results including one-half of the detection limit for non-detects.
(2) Average of detected concentrations only.
(3) The sources of the screening levels are presented in Appendix H.
(4) EEQ is calculated by dividing the maximum chemical concentration by its screening level. Value is unitless.
(5) Chemicals with maximum concentrations exceeding screening levels for birds or mammals or bioaccumulative chemicals without bird or mammal screening values were retained for food-chain modeling.

Rationale Codes for COPC Selection:

ASL	Above Screening Level
BIO	Bioaccumulative
BSL	Below Screening Level
NONBIO	Not bioaccumulative
NSL	No Screening Level Available

The chemical was selected as a COPC or retained for food-chain modeling. Shaded value indicates that the EEQ exceeds 1.

Abbreviations:

COPC	Chemical of Potential Concern
EEQ	Ecological Effects Quotient
NA	Not available, Not applicable

Laboratory Data Qualifiers:

J	Estimated concentration

TABLE 7-3
ECOLOGICAL COPC SELECTION FOR SURFACE AND SUBSURFACE SOIL
SKEET RANGE MRS - SOUTHERN RANGE AREA/SKEET RANGE SHOOTING AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample ID of Maximum Detection	Overall Average[1]	Average of Detections[2]	Soil Screening Levels[3]				Soil EEQs[4]				Deletion or Selection of COPCs for Soil Invertebrates/Plants		Further Evaluated in Terrestrial Food Chain Modeling[5]	
							Plants	Inverte-brates	Birds	Mammals	Plants	Inverte-brates	Birds	Mammals	COPC (yes/no)?	Rationale	Evaluated (yes/no)?	Rationale
Lead (mg/kg)																		
Lead - Surface Soil	76/76	5.43	1140	SR-SS-235-0006	190	190	120	1700	11	56	**9.5**	0.67	**104**	**20**	Yes	ASL	Yes	ASL, BIO
Lead - Subsurface Soil	44/44	2.22	728	SR-SS-221-0612 SIEVE 20	84.2	84.2	120	1700	11	56	**6.1**	0.43	**66**	**13**	Yes	ASL	Yes	ASL, BIO
Polycyclic Aromatic Hydrocarbons (ug/kg) - Surface Soil																		
2-Methylnaphthalene	16/45	3.2 J	120 J	SR-SS-033-000.5-20071025	19	32	NA	29000	NA	100000	NA	0.0041	NA	0.0012	Yes	NSL	No	NONBIO
Acenaphthene	25/45	2 J	670	SR-SS-033-000.5-20071025	70.7	118.1	250	29000	NA	100000	**2.7**	0.023	NA	0.0067	Yes	ASL	Yes	BIO
Anthracene	27/45	2.9 J	2800	SR-SS-033-000.5-20071025	334	550	6800	29000	NA	100000	0.41	0.097	NA	0.028	No	BSL	Yes	BIO
Benzo(a)anthracene	70/70	3.1 J	60000	SR-SS-267-0006-D	4267	4267	18000	18000	730	1100	**3.3**	**3.3**	**82.2**	**55**	Yes	ASL	Yes	ASL, BIO
Benzo(a)pyrene	69/70	3.7 J	49000	SR-SS-267-0006-D	4171	4232	NA	18000	NA	1100	NA	**2.7**	NA	**45**	Yes	ASL, NSL	Yes	ASL, BIO
Benzo(b)fluoranthene	67/70	4.9 J	72000	SR-SS-267-0006-D	5652	5904	18000	18000	NA	1100	**4.0**	**4.0**	NA	**65**	Yes	ASL	Yes	ASL, BIO
Benzo(g,h,i)perylene	40/45	4.2 J	24000	SR-SS-008-000.5-20071022	2089	2349	NA	18000	NA	1100	NA	**1.3**	NA	**22**	Yes	ASL, NSL	Yes	ASL, BIO
Benzo(k)fluoranthene	65/70	3.6 J	23000	SR-SS-267-0006	2322	2500	NA	18000	NA	1100	NA	**1.3**	NA	**21**	Yes	ASL, NSL	Yes	ASL, BIO
Chrysene	65/70	3 J	61000	SR-SS-267-0006-D	4433	4773	NA	18000	NA	1100	NA	**3.4**	NA	**55**	Yes	ASL, NSL	Yes	ASL, BIO
Dibenzo(a,h)anthracene	56/70	2 J	12000	SR-SS-267-0006-D, SR-SS-275-0006	1218	1520	NA	18000	NA	1100	NA	0.67	NA	**11**	Yes	NSL	Yes	ASL, BIO
Fluoranthene	45/45	5.4 J	36000	SR-SS-033-000.5-20071025	3819	3819	NA	29000	NA	100000	NA	**1.2**	NA	0.36	Yes	ASL, NSL	Yes	BIO
Fluorene	22/45	2.9 J	380	SR-SS-033-000.5-20071025	40	70	NA	29000	NA	100000	NA	0.013	NA	0.0038	Yes	NSL	Yes	BIO
Indeno(1,2,3-cd)pyrene	64/70	5.4 J	38000	SR-SS-275-0006	3360	3674	NA	18000	NA	1100	NA	**2.1**	NA	**35**	Yes	ASL, NSL	Yes	ASL, BIO
Naphthalene	22/45	4.1 J	370	SR-SS-033-000.5-20071025	40	70	1000	29000	3400	100000	0.37	0.013	0.11	0.0037	No	BSL	No	BSL
Phenanthrene	34/45	5.8 J	12000	SR-SS-033-000.5-20071025	1328	1754	NA	29000	NA	100000	NA	0.414	NA	0.12	Yes	NSL	No	NONBIO
Pyrene	31/45	9.6 J	30000 J	SR-SS-008-000.5-20071022	2926	4242	NA	18000	33000	1100	NA	**1.7**	0.91	**27**	Yes	ASL, NSL	Yes	ASL, BIO
Polycyclic Aromatic Hydrocarbons (ug/kg) - Subsurface Soil																		
Benzo(a)anthracene	16/16	3.9 J	16000	SR-SS-275-0612	1233	1233	18000	18000	730	1100	0.89	0.89	**22**	**15**	No	BSL	Yes	BIO
Benzo(a)pyrene	16/16	4.2 J	14000	SR-SS-275-0612	1131	1131	NA	18000	NA	1100	NA	0.78	NA	**13**	Yes	NSL	Yes	BIO
Benzo(b)fluoranthene	16/16	6.1 J	20000	SR-SS-275-0612	1598	1598	18000	18000	NA	1100	**1.1**	**1.1**	NA	**18**	Yes	ASL	Yes	BIO
Benzo(k)fluoranthene	15/16	5.7 J	5500	SR-SS-275-0612	474	506	NA	18000	NA	1100	NA	0.31	NA	**5**	Yes	NSL	Yes	BIO
Chrysene	15/16	18 J	16000	SR-SS-275-0612	1279	1364	NA	18000	NA	1100	NA	0.89	NA	**15**	Yes	NSL	Yes	BIO
Dibenzo(a,h)anthracene	15/16	4.4 J	3000	SR-SS-275-0612	256	273	NA	18000	NA	1100	NA	0.17	NA	**3**	Yes	NSL	Yes	BIO
Indeno(1,2,3-cd)pyrene	16/16	4.2 J	9300	SR-SS-275-0612	819	819	NA	18000	NA	1100	NA	0.52	NA	**8**	Yes	NSL	Yes	BIO

Notes:

(1) Average of all analytical results including one-half of the detection limit for non-detects.
(2) Average of detected concentrations only.
(3) The sources of the screening levels are presented in Appendix H.
(4) EEQ is calculated by dividing the maximum chemical concentration by its screening level. Value is unitless.
(5) Chemicals with maximum concentrations exceeding screening levels for birds or mammals or
(6) Aluminum is considered a COPC only when the soil pH is less than 5.5; however, pH data was not available.
(7) Iron is not expected to be toxic to plants with a soil pH between 5 and 8; however, pH data was not available.

Rationale Codes for COPC Selection:

ASL	Above Screening Level
BIO	Bioaccumulative
BSL	Below Screening Level
NONBIO	Not bioaccumulative
NSL	No Screening Level Available

The chemical was selected as a COPC or retained for food-chain modeling. Shaded value indicates that the EEQ exceeds 1.

Abbreviations:

COPC	Chemical of Potential Concern
EEQ	Ecological Effects Quotient
NA	Not available, Not applicable

Laboratory Data Qualifiers:

J	Estimated concentration

TABLE 7-4
ECOLOGICAL COPC SELECTION FOR SURFACE AND SUBSURFACE SOIL
SKEET RANGE MRS - HIGH TOWER RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample ID of Maximum Detection	Overall Average[1]	Average of Detections[2]	Soil Screening Levels[3]				Soil EEQs[4]				Deletion or Selection of COPCs for Soil Invertebrates/Plants		Further Evaluated in Terrestrial Food Chain Modeling[5]	
							Plants	Inverte-brates	Birds	Mammals	Plants	Inverte-brates	Birds	Mammals	COPC (yes/no)?	Rationale	Evaluated (yes/no)?	Rationale
Lead (mg/kg)																		
Lead - Surface Soil	17/17	7.87	508	SR-SS-254-0006	117	117	120	1700	11	56	**4.2**	0.30	**46**	**9.1**	Yes	ASL	Yes	ASL, BIO
Lead - Subsurface Soil	21/21	4.68 J	176 J	SR-SS-255-0612	40.1	40.1	120	1700	11	56	**1.5**	0.10	**16**	**3.1**	Yes	ASL	Yes	ASL, BIO
Polycyclic Aromatic Hydrocarbons (ug/kg) - Surface Soil																		
Anthracene	1/1	3.6 J	3.6 J	SR-SS-005-000.5-20071018	NA	NA	6800	29000	NA	100000	0.00053	0.00012	NA	0.000036	No	BSL	Yes	BIO
Benzo(a)anthracene	1/1	22 J	22 J	SR-SS-005-000.5-20071018	NA	NA	18000	18000	730	1100	0.0012	0.0012	0.0301	0.020	No	BSL	No	BSL
Benzo(a)pyrene	1/1	20 J	20 J	SR-SS-005-000.5-20071018	NA	NA	NA	18000	NA	1100	NA	0.0011	NA	0.018	Yes	NSL	Yes	BIO
Benzo(b)fluoranthene	1/1	20 J	20 J	SR-SS-005-000.5-20071018	NA	NA	18000	18000	NA	1100	0.0011	0.0011	NA	0.018	No	BSL	Yes	BIO
Benzo(g,h,i)perylene	1/1	14 J	14 J	SR-SS-005-000.5-20071018	NA	NA	NA	18000	NA	1100	NA	0.00078	NA	0.013	Yes	NSL	Yes	BIO
Benzo(k)fluoranthene	1/1	13 J	13 J	SR-SS-005-000.5-20071018	NA	NA	NA	18000	NA	1100	NA	0.00072	NA	0.012	Yes	NSL	Yes	BIO
Chrysene	1/1	20 J	20 J	SR-SS-005-000.5-20071018	NA	NA	NA	18000	NA	1100	NA	0.0011	NA	0.018	Yes	NSL	Yes	BIO
Fluoranthene	1/1	31	31	SR-SS-005-000.5-20071018	NA	NA	NA	29000	NA	100000	NA	0.0011	NA	0.00031	Yes	NSL	Yes	BIO
Indeno(1,2,3-cd)pyrene	1/1	16 J	16 J	SR-SS-005-000.5-20071018	NA	NA	NA	18000	NA	1100	NA	0.00089	NA	0.015	Yes	NSL	Yes	BIO
Phenanthrene	1/1	13 J	13 J	SR-SS-005-000.5-20071018	NA	NA	NA	29000	NA	100000	NA	0.00045	NA	0.00013	Yes	NSL	No	NONBIO
Pyrene	1/1	21	21	SR-SS-005-000.5-20071018	NA	NA	NA	18000	33000	1100	NA	0.0012	0.00064	0.019	Yes	NSL	No	BSL

Notes:

(1) Average of all analytical results including one-half of the detection limit for non-detects.
(2) Average of detected concentrations only.
(3) The sources of the screening levels are presented in Appendix H.
(4) EEQ is calculated by dividing the maximum chemical concentration by its screening level. Value is unitless.
(5) Chemicals with maximum concentrations exceeding screening levels for birds or mammals or bioaccumulative chemicals without bird or mammal screening values were retained for food-chain modeling.

Rationale Codes for COPC Selection:

ASL	Above Screening Level
BIO	Bioaccumulative
BSL	Below Screening Level
NONBIO	Not bioaccumulative
NSL	No Screening Level Available

The chemical was selected as a COPC or retained for food-chain modeling. Shaded value indicates that the EEQ exceeds 1.

Abbreviations:

COPC	Chemical of Potential Concern
EEQ	Ecological Effects Quotient
NA	Not available, Not applicable

Laboratory Data Qualifiers:

J	Estimated concentration

TABLE 7-5
ECOLOGICAL COPC SELECTION FOR SEDIMENT
SKEET RANGE MRS - NORTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Parameter	Frequency of Detection	Mininum Detection	Maximum Detection	Sample of Maximum Detection	Overall Average (1)	Average of Detections (2)	Sediment Screening Levels (3)	Sediment EEQs (4)	Deletion or Selection of COPCs for Sediment Invertebrates	
									COPC (yes/no)?	Rationale
Lead (mg/kg)										
Lead - Northern Area	28/28	104	22200	SR-SS-213-0006	1325	1325	30.2	**735**	Yes	ASL
Polycyclic Aromatic Hydrocarbons (ug/kg)										
Benzo(a)anthracene	5/5	3.7 J	14 J	SR-SS-039-000.5-20071019	10.3	10.3	74.8	0.19	No	BSL
Benzo(a)pyrene	4/5	4.4 J	13 J	SR-SS-037-000.5-20071019, SR-SS-038-000.5-20071019	18.5	10.6	88.8	0.15	No	BSL
Benzo(b)fluoranthene	4/5	6.5 J	22 J	SR-SS-038-000.5-20071019	21.7	14.6	27	0.81	No	BSL
Benzo(g,h,i)perylene	4/5	4.5 J	11 J	SR-SS-037-000.5-20071019	16.7	8.40	310	0.035	No	BSL
Benzo(k)fluoranthene	4/5	3.7 J	11 J	SR-SS-038-000.5-20071019	16.2	7.75	240	0.046	No	BSL
Chrysene	5/5	4.7 J	18 J	SR-SS-039-000.5-20071019	11.9	11.9	108	0.17	No	BSL
Dibenzo(a,h)anthracene	1/5	9.4 J	9.4 J	SR-SS-038-000.5-20071019	18.4	9.40	6.22	**1.5**	Yes	ASL
Fluoranthene	5/5	7.4 J	25 J	SR-SS-039-000.5-20071019	14.3	14.3	113	0.22	No	BSL
Indeno(1,2,3-cd)pyrene	4/5	5 J	11 J	SR-SS-037-000.5-20071019, SR-SS-038-000.5-20071019	17.3	9.18	340	0.032	No	BSL
Phenanthrene	1/5	5.7 J	5.7 J	SR-SS-037-000.5-20071019	17.6	5.70	86.7	0.066	No	BSL
Total PAHs(5)	5/5	39.9 J	115 J	SR-SS-038-000.5-20071019	80.0	80.00	2900	0.040	No	BSL

Notes:

(1) Average of all analytical results including one-half of the detection limit for non-detects.
(2) Average of detected concentrations only.
(3) The sources of the screening levels are presented in Appendix H.
(4) EEQ is calculated by dividing the maximum chemical concentration by its screening level. Value is unitless.
(5) Sum of detected polycyclic aromatic hydrocarbons.

Rationale Codes for COPC Selection:

ASL Above Screening Level
BSL Below Screening Level

The chemical was selected as a COPC or retained for food-chain modeling. Shaded value indicates that the EEQ exceeds 1.

Abbreviations:

EEQ Ecological Effects Quotient
COPC Chemical of Potential Concern

Laboratory Data Qualifiers:

J Estimated Concentration

TABLE 7-6
TERRESTRIAL FOOD CHAIN MODEL - CONSERVATIVE SCENARIO
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

CHEMICAL	HERBIVOROUS RECEPTORS EEQS				INSECTIVOROUS RECEPTORS EEQS			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
NORTHERN RANGE AREA								
Lead								
Lead - Surface Soil	2.0E+02	7.5E+00	1.8E+01	4.6E-01	6.2E+02	2.3E+01	7.4E+01	1.9E+00
Lead - Subsurface Soil	8.4E+00	3.1E-01	9.1E-01	2.3E-02	3.2E+01	1.2E+00	4.8E+00	1.2E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil								
Benzo(a)pyrene	1.9E-04	1.9E-05	5.3E-05	1.3E-06	1.9E-03	7.0E-05	3.1E-03	4.9E-05
Benzo(b)fluoranthene	5.2E-04	5.2E-05	1.8E-04	4.5E-06	4.9E-03	4.9E-04	1.0E-02	1.6E-04
Benzo(g,h,i)perylene	1.8E-04	1.8E-05	4.0E-04	6.5E-06	2.8E-03	2.8E-04	5.7E-03	9.1E-05
Benzo(k)fluoranthene	2.1E-04	2.1E-05	4.9E-04	7.9E-06	2.5E-03	2.5E-04	5.0E-03	8.0E-05
Chrysene	4.6E-04	4.6E-05	1.2E-03	1.9E-05	3.6E-03	3.6E-04	7.2E-03	1.2E-04
Dibenzo(a,h)anthracene	1.3E-04	1.3E-05	2.7E-04	4.4E-06	1.9E-03	1.9E-04	3.8E-03	6.1E-05
Fluoranthene	8.4E-04	8.4E-05	2.2E-05	4.1E-06	6.5E-03	6.5E-04	1.2E-04	2.3E-05
Indeno(1,2,3-cd)pyrene	1.4E-04	1.4E-05	2.8E-04	4.5E-06	2.7E-03	2.7E-04	5.5E-03	8.8E-05
SOUTHERN RANGE AREA								
Lead								
Lead - Surface Soil	1.1E+01	4.1E-01	1.2E+00	3.0E-02	4.2E+01	1.5E+00	6.1E+00	1.5E-01
Lead - Subsurface Soil	7.3E+00	2.7E-01	8.0E-01	2.0E-02	2.8E+01	1.0E+00	4.2E+00	1.1E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil								
Acenaphthene	5.2E-03	5.2E-04	6.3E-04	1.6E-05	8.8E-02	8.8E-03	1.6E-03	3.0E-04
Anthracene	6.4E-02	6.4E-03	1.5E-03	2.9E-04	5.8E-01	5.8E-02	1.1E-02	2.1E-03
Benzo(a)anthracene	4.8E-01	4.8E-02	4.8E-01	7.7E-03	8.5E+00	8.5E-01	1.7E+01	2.7E-01
Benzo(a)pyrene	6.6E-01	6.6E-02	1.3E+00	2.1E-02	5.9E+00	5.9E-01	1.2E+01	1.9E-01
Benzo(b)fluoranthene	1.7E+00	1.7E-01	4.4E+00	7.1E-02	1.6E+01	1.6E+00	3.3E+01	5.3E-01
Benzo(g,h,i)perylene	1.1E+00	1.1E-01	3.2E+00	5.1E-02	6.0E+00	6.0E-01	1.2E+01	2.0E-01
Benzo(k)fluoranthene	2.6E-01	2.6E-02	4.4E-01	7.0E-03	5.1E+00	5.1E-01	1.0E+01	1.7E-01
Chrysene	4.9E-01	4.9E-02	4.9E-01	7.8E-03	1.2E+01	1.2E+00	2.5E+01	3.9E-01
Dibenzo(a,h)anthracene	1.7E-01	1.7E-02	3.5E-01	5.6E-03	2.4E+00	2.4E-01	4.9E+00	7.8E-02
Fluoranthene	1.2E+00	1.2E-01	3.2E-02	5.9E-03	9.3E+00	9.3E-01	1.8E-01	3.3E-02
Fluorene	3.3E-03	3.3E-04	3.5E-05	6.5E-06	3.0E-01	3.0E-02	5.9E-03	1.1E-03
Indeno(1,2,3-cd)pyrene	5.0E-01	5.0E-02	9.7E-01	1.6E-02	9.3E+00	9.3E-01	1.9E+01	3.1E-01
Pyrene	1.4E+00	1.4E-01	4.1E+00	6.5E-02	4.6E+00	4.6E-01	9.3E+00	1.5E-01
Polycyclic Aromatic Hydrocarbons - Subsurface Soil								
Benzo(a)anthracene	1.4E-01	1.4E-02	1.5E-01	2.5E-03	2.3E+00	2.3E-01	4.5E+00	7.2E-02
Benzo(a)pyrene	1.9E-01	1.9E-02	3.8E-01	6.1E-03	1.7E+00	1.7E-01	3.3E+00	5.3E-02
Benzo(b)fluoranthene	4.7E-01	4.7E-02	1.2E+00	2.0E-02	4.5E+00	4.5E-01	9.1E+00	1.5E-01
Benzo(k)fluoranthene	6.7E-02	6.7E-03	1.2E-01	1.9E-03	1.2E+00	1.2E-01	2.5E+00	4.0E-02
Chrysene	1.4E-01	1.4E-02	1.5E-01	2.5E-03	3.2E+00	3.2E-01	6.4E+00	1.0E-01
Dibenzo(a,h)anthracene	4.3E-02	4.3E-03	8.7E-02	1.4E-03	6.0E-01	6.0E-02	1.2E+00	2.0E-02
Indeno(1,2,3-cd)pyrene	1.2E-01	1.2E-02	2.4E-01	3.8E-03	2.3E+00	2.3E-01	4.7E+00	7.5E-02
HIGH TOWER RANGE AREA								
Lead								
Lead - Surface Soil	5.1E+00	1.9E-01	5.9E-01	1.5E-02	2.0E+01	7.5E-01	3.1E+00	7.9E-02
Lead - Subsurface Soil	1.9E+00	6.9E-02	2.5E-01	6.2E-03	8.0E+00	2.9E-01	1.3E+00	3.3E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil								
Anthracene	2.7E-04	2.7E-05	8.0E-06	1.5E-06	7.5E-04	7.5E-05	1.4E-05	2.6E-06
Benzo(a)pyrene	3.0E-04	3.0E-05	6.2E-04	9.9E-06	2.4E-03	2.4E-04	4.7E-03	7.6E-05
Benzo(b)fluoranthene	4.7E-04	4.7E-05	1.2E-03	2.0E-05	4.5E-03	4.5E-04	9.1E-03	1.5E-04
Benzo(g,h,i)perylene	2.4E-04	2.4E-05	5.3E-04	8.6E-06	3.5E-03	3.5E-04	7.2E-03	1.2E-04
Benzo(k)fluoranthene	2.4E-04	2.4E-05	5.7E-04	9.2E-06	2.9E-03	2.9E-04	5.9E-03	9.5E-05
Chrysene	4.9E-04	4.9E-05	1.3E-03	2.1E-05	4.0E-03	4.0E-04	8.0E-03	1.3E-04
Fluoranthene	1.0E-03	1.0E-04	2.8E-05	5.1E-06	8.0E-03	8.0E-04	1.5E-04	2.9E-05
Indeno(1,2,3-cd)pyrene	2.1E-04	2.1E-05	4.1E-04	6.5E-06	3.9E-03	3.9E-04	8.0E-03	1.3E-04

Notes:

EEQ Ecological Effects Quotient
LOAEL Lowest Observed Adverse Effects Level
NOAEL No Observed Adverse Effects Level
NV Value Not Available
Exceedance of screening criteria

TABLE 7-7
CHEMICALS SELECTED AS ECOLOGICAL COPCS
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Chemicals	Northern Range Area				Southern Range Area				High Tower Range Area				Northern Range Area Low Lying
	Plants	Invertebrates	Birds	Mammals	Plants	Invertebrates	Birds	Mammals	Plants	Invertebrates	Birds	Mammals	Sediment Invertebrates
Surface Soil													
Metals													
Lead	X	X	X	X	X		X	X	X		X	X	Not applicable
Polycyclic Aromatic Hydrocarbons													
2-Methylnaphthalene					O								Not applicable
Acenaphthene					X								
Benzo(a)anthracene					X	X	X	X					
Benzo(a)pyrene	O				O	X	X	X	O				
Benzo(b)fluoranthene					X	X	X	X					
Benzo(g,h,i)perylene	O				O	X	X	X	O				
Benzo(k)fluoranthene	O				O	X	X	X	O				
Chrysene	O				O	X	X	X	O				
Dibenzo(a,h)anthracene	O				O		X	X					
Fluoranthene	O				O	X	X		O				
Fluorene					O								
Indeno(1,2,3-cd)pyrene	O				O	X	X	X	O				
Phenanthrene	O				O				O				
Pyrene					O	X	X	X	O				
Subsurface Soil													
Metals													
Lead	X		X	X	X		X	X	X		X	X	Not applicable
Polycyclic Aromatic Hydrocarbons													
2-Methylnaphthalene	No subsurface soil samples analyzed for PAHs.								No subsurface soil samples analyzed for PAHs.				Not applicable
Acenaphthene													
Anthracene													
Benzo(a)anthracene							X	X					
Benzo(a)pyrene					O		X	X					
Benzo(b)fluoranthene					X	X	X	X					
Benzo(g,h,i)perylene													
Benzo(k)fluoranthene					O		X	X					
Chrysene					O		X	X					
Dibenzo(a,h)anthracene					O			X					
Fluoranthene													
Fluorene													
Indeno(1,2,3-cd)pyrene					O		X	X					
Naphthalene													
Phenanthrene													
Pyrene													
Sediment													
Metals													
Lead	Not applicable				Not applicable				Not applicable				X
Polycyclic Aromatic Hydrocarbons													
Dibenzo(a,h)anthracene	Not applicable				Not applicable				Not applicable				X

Notes:

O Screening level/toxicity reference value not available

X Exceeds screening level/toxicity reference value

TABLE 7-8
LEAD CONCENTRATIONS IN SOIL COMPARED TO PLANT AND SOIL INVERTEBRATE SCREENING VALUES
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Sample Location	Depth			
	Date	0-6"	6-12"	12-24"
NORTHERN RANGE AREA				
SR-SS-006	10/19/2007	**317**		
SR-SS-012	10/18/2007	104		
SR-SS-037	10/19/2007	**1150**		
SR-SS-038	10/19/2007	**235**		
SR-SS-039	10/19/2007	104 J		
SR-SS-100	7/20/2009	**1190**		
SR-SS-101[(1)]	7/20/2009	**1400**		
SR-SS-102	7/20/2009	**701** *E		
SR-SS-103	7/20/2009	**1330** *E		
SR-SS-104	7/20/2009	**354** *E		
SR-SS-105	7/20/2009	**564** *E		
SR-SS-106	7/20/2009	**728** *E		
SR-SS-107	7/20/2009	**325** *E		
SR-SS-108	7/20/2009	**1050** *E		
SR-SS-201	3/22/2018	**602**	**846**	17.6
SR-SS-202	3/22/2018	**2020**	44.6	**140**
SR-SS-203	3/22/2018	**387**	85.4	13
SR-SS-203-D	3/22/2018	**411**		
SR-SS-204	3/22/2018	**446**	**499**	
SR-SS-205	3/22/2018	**350**	62	
SR-SS-206	3/22/2018	**445**	**209**	
SR-SS-207	3/22/2018	**463**	**209**	
SR-SS-208	3/22/2018	**286**	37.4	
SR-SS-209	3/22/2018	**206**	22.2	
SR-SS-210	3/22/2018	**179**	35.6	
SR-SS-211	3/22/2018	**226**	82.6	
SR-SS-212	3/22/2018	**253**	**223**	
SR-SS-213	3/22/2018	**22200**	**694**	
SR-SS-214	3/22/2018	**453**	**153**	
SR-SS-215	3/22/2018	**327**	45.8	
SR-SS-301	12/19/2018	**165** J	14.2 J	
SR-SS-302	12/19/2018	**174** J	99.5 J	
SR-SS-302-D	12/19/2018		92.2 J	
SR-SS-303	12/19/2018	**360** J	50.6 J	
SR-SS-304	12/19/2018	**264** J	70.4 J	
SR-SS-305	12/19/2018	**350** J	**156** J	
SR-SS-306	12/19/2018	**162** J	48.1 J	
SR-SS-307	12/19/2018	**142** J	**384** J	
SOUTHERN RANGE AREA				
SR-SS-001	10/19/2007	59.3		
SR-SS-002	10/19/2007	9.6		
SR-SS-003	10/19/2007	30.1		
SR-SS-004	10/22/2007	50.1		
SR-SS-007	10/22/2007	93.9		
SR-SS-007-D	10/22/2007	97.5		
SR-SS-008	10/22/2007	84.3		
SR-SS-009	10/22/2007	64.9		
SR-SS-010	10/22/2007	25.9		
SR-SS-011	10/18/2007	38.6		
SR-SS-013	10/22/2007	42.3		
SR-SS-014	10/22/2007	39.7		
SR-SS-015	10/22/2007	16.8		

TABLE 7-8
LEAD CONCENTRATIONS IN SOIL COMPARED TO PLANT AND SOIL INVERTEBRATE SCREENING VALUES
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Sample Location	Depth			
	Date	0-6"	6-12"	12-24"
SR-SS-016	10/22/2007	68.3		
SR-SS-017	10/22/2007	**171**		
SR-SS-019	10/24/2007	64.4		
SR-SS-020	10/24/2007	16.6		
SR-SS-020-D	10/24/2007	18.6		
SR-SS-021	10/25/2007	14.6		
SR-SS-022	10/25/2007	26		
SR-SS-023	10/25/2007	91.5		
SR-SS-024	10/25/2007	**511**		
SR-SS-025	10/24/2007	56.9		
SR-SS-026	10/24/2007	27.1		
SR-SS-027	10/24/2007	16.6		
SR-SS-028	10/24/2007	47.1		
SR-SS-029	10/24/2007	**328**		
SR-SS-030	10/24/2007	**289**		
SR-SS-031	10/24/2007	6.9		
SR-SS-032	10/24/2007	15.5		
SR-SS-033	10/25/2007	26.3		
SR-SS-034	10/24/2007	9.8		
SR-SS-035	10/25/2007	20		
SR-SS-036	10/18/2007	99.6		
SR-SS-040	11/6/2007	**756**		
SR-SS-041	11/6/2007	**398**		
SR-SS-041-D	11/6/2007	**407**		
SR-SS-042	11/6/2007	**424**		
SR-SS-043	11/6/2007	**152**		
SR-SS-045	11/6/2007	**405**		
SR-SS-047	11/6/2007	117		
SR-SS-049	11/6/2007	90.1		
SR-SS-050	11/7/2007	98.1		
SR-SS-051	11/7/2007	**589**		
SR-SS-053	11/7/2007	**152**		
SR-SS-054	11/7/2007	**587**		
SR-SS-055	11/7/2007	115		
SR-SS-056	11/7/2007	58.7		
SR-SS-216	3/21/2018	**823** J-	57.4 J-	11.2
SR-SS-217	3/21/2018	**893** J-	101 J-	25.4 J-
SR-SS-217-D	3/21/2018	**954** J-		
SR-SS-218	3/20/2018	**530**	**158**	27.2 J-
SR-SS-219	3/20/2018	**850**	**169**	22.1 J-
SR-SS-220	3/21/2018	**196** J-	**566** J-	**191** J-
SR-SS-221	3/21/2018	**245** J-	63.9 J-	18.8 J-
SR-SS-222	3/20/2018	31.3	4.95	4.64 J-
SR-SS-222-D	3/20/2018			5.37 J-
SR-SS-223	3/20/2018	18.5	10.6	10.2 J
SR-SS-223-D	3/20/2018			5.79 J-
SR-SS-224	3/20/2018	5.43	2.22	2.87 J-
SR-SS-224-D	3/20/2018		2.3	
SR-SS-225	3/21/2018	19.5	**139**	7.34 J-
SR-SS-226	3/19/2018	7.95	24.6	12.6
SR-SS-226-D	3/19/2018	8.09		
SR-SS-227	3/26/2018	**158** J	27.8 J	
SR-SS-227-D	3/26/2018		28 J	

TABLE 7-8
LEAD CONCENTRATIONS IN SOIL COMPARED TO PLANT AND SOIL INVERTEBRATE SCREENING VALUES
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Sample Location	Depth			
	Date	0-6"	6-12"	12-24"
SR-SS-228	3/26/2018	89.8 J	20.8 J	
SR-SS-229	3/26/2018	14.7 J	13.3 J	
SR-SS-230	3/26/2018	**752** J	**121** J	
SR-SS-231	3/27/2018	**362** J	93.8	
SR-SS-232	3/26/2018	40.6 J	69.4 J	
SR-SS-233	3/27/2018	**213** J	56.2 J	
SR-SS-233-D	3/27/2018		56.1	
SR-SS-234	3/27/2018	**208**	62.1	
SR-SS-235	3/27/2018	**1140**	**194**	
SR-SS-236	3/27/2018	**360**	**136**	
SR-SS-237	3/27/2018	**185**	55.6	
SR-SS-238	3/26/2018	50.6 J	23.6 J	
SR-SS-239	3/27/2018	68.8	11.2	
SR-SS-240	3/27/2018	107	17.7	
SR-SS-311	12/18/2018	93.8 J	93.5 J	
SR-SS-312	12/17/2018	105 J	21.7 J	
HIGH TOWER RANGE AREA				
SR-SS-005	10/18/2007	71.6		
SR-SS-241	3/28/2018	28.9	14.3	
SR-SS-242	3/23/2018	94.7 J	10.9 J	
SR-SS-242-D	3/23/2018	81 J		
SR-SS-243	3/23/2018	28.9 J	4.68 J	5.28 J
SR-SS-244	3/23/2018	55.2	**124**	
SR-SS-245	3/23/2018	82.8	22.9	
SR-SS-246	3/23/2018	92.1	8.9	10.4
SR-SS-246-D	3/23/2018			11.1
SR-SS-247	3/23/2018	76 J	10.2 J	
SR-SS-248	3/23/2018	17.2	8.56 J	
SR-SS-249	3/23/2018	53.4 J	7.49 J	
SR-SS-250	3/23/2018	94.9 J	12.8 J	18.2 J
SR-SS-251	3/28/2018	7.87	60.5	
SR-SS-252	3/23/2018	**243**	66.6	
SR-SS-253	3/28/2018	70.7	15.9	4.78
SR-SS-253-D	3/28/2018	61.3		
SR-SS-254	3/23/2018	**508**	**158**	
SR-SS-255	3/23/2018	**129**	**176** J	
SR-SS-255-D	3/23/2018		105 J	
SR-SS-256	3/28/2018	**342**	**125**	11.4

Notes:

(1) Duplicate of SR-SS-100
Bold Exceedance of plant screening value (120 mg/kg)
J Estimated concentration
J- Biased low concentration

Blank cells indicate sample not collected from that depth
Exceedance of plant preliminary remediation goal (750 mg/kg)
Exceedance of soil invertebrate screening value (1700 mg/kg)

TABLE 7-9
PAH CONCENTRATIONS IN SOIL COMPARED TO PLANT AND SOIL INVERTEBRATE SCREENING VALUES
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Sample Location	2-Methyl naphthalene	Acenaph thene	Acenaph thylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenan threne	Pyrene
Plant Screening Value		250		6800	18000		18000								1000		
Invertebrate Screening Value	29000	29000		29000	18000	18000	18000	18000	18000	18000	18000	29000	29000	18000	29000	29000	18000
NORTHERN RANGE AREA - SURFACE SOIL																	
SR-SS-006	21 U	21 U	21 U	21 U	3.7 J	4.4 J	6.5 J	4.5 J	3.7 J	4.7 J	21 U	7.4 J	21 U	5 J	21 U	21 U	21 U
SR-SS-012	21 U	21 U	21 U	21 U	11 J	12 J	13 J	9.7 J	8 J	12 J	21 U	12 J	21 U	9.7 J	21 U	21 U	21 U
SR-SS-037	23 U	23 U	23 U	23 U	10 J	13 J	17 J	11 J	8.3 J	11 J	23 U	14 J	23 U	11 J	23 U	5.7 J	23 U
SR-SS-038	23 U	23 U	23 U	23 U	13 J	13 J	22 J	8.4 J	11 J	14 J	9.4 J	13 J	23 U	11 J	23 U	23 U	23 U
SR-SS-039	100 UJ	100 UJ	100 UJ	100 UJ	14 J	100 UJ	100 UJ	100 UJ	100 UJ	18 J	100 UJ	25 J	100 UJ	100 UJ	100 UJ	100 UJ	100 UJ
SOUTHERN RANGE AREA - SURFACE SOIL																	
SR-SS-001	36	200	21 U	690 J	9500	14000	**21000**	10000	9000 J	10000	4700	10000	86	11000 J	120	2900	8000 J
SR-SS-002	3.2 J	18 J	20 U	88	890	990	1500	760	740 J	910	270	1400	12 J	830 J	8.5 J	550	1300 J
SR-SS-003	21 U	12 J	21 U	71	800 J	780	1100	530	560 J	710	250	1100 J	7.9 J	670	6 J	420	1100 J
SR-SS-004	22 U	22 U	22 U	22 U	15 J	15 J	20 J	12 J	12 J	15 J	12 J	15 J	22 U	14 J	22 U	5.8 J	9.6 J
SR-SS-007	29	160	22 U	1000 J	8800 J	8700	11000	6600	5300 J	7700	3800 J	9800 J	80	8500	83	4000	12000 J
SR-SS-007-D	27	160	22 U	**1000 J** J	8900 J	9200	13000	5800	6400 J	7900	3300 J	11000 J	85	7500	81	4000	11000 J
SR-SS-008	100	**630** J	22 U	2700 J	**24000**	28000	**39000**	24000	21000 J	24000	11000	32000	310	27000 J	340	11000	30000 J
SR-SS-009	67	**360**	22 U	2500	**19000** J	17000	**22000**	11000	12000 J	16000	6400 J	26000 J	210	14000	180	10000	27000 J
SR-SS-010	21 U	21 U	21 U	21 U	22 J	23	34	20 J	18 J	22	14 J	29 J	21 U	25	21 U	11 J	21 J
SR-SS-011	21 U	21 U	21 U	21 U	6.5 J	7.2 J	8.3 J	6 J	5 J	7.1 J	21 U	8.2 J	21 U	5.8 J	21 U	21 U	21 U
SR-SS-013	23 U	16 J	23 U	52	1200 J	1400	1900	1100	920 J	1200	570 J	1100 J	6 J	1300	8.1 J	250	1200 J
SR-SS-014	12 J	69	22 U	310	1600	1900	3000 J	1300	1400	1700	740	2500	41	1400	33	790	1600
SR-SS-015	21 U	2.1 J	21 U	10 J	96	110	160 J	79	74	93	46	120	21 U	95	21 U	43	110
SR-SS-016	7.7 J	34	23 U	250	1500	1500	1200	1000 J	1600	1800	350	3700	34	950 J	20 J	1500	2500
SR-SS-017	21 U	21 U	21 U	21 U	6.3 J	8 J	9.9 J	8 J	5.4 J	6.6 J	8.6 J	9.9 J	21 U	9 J	21 U	21 U	21 U
SR-SS-019	6.3 J	18 J	23 U	54	980	1300	2200	890	330 J	1100 J	94	1000	8.2 J	810 J	10 J	210	1200 J
SR-SS-020	43	230	21 U	2300	9800	11000	9000 J	7200	8100 J	11000	3500 J	18000	130	7300	120	6200	12000 J
SR-SS-020-D	42	210	21 U	1500 J	9600	9500	15000	6400	6400 J	11000 J	1400 J	15000	130	5400	110	5700	13000 J
SR-SS-021	12 J	52	24 U	190	2600 J	2400	2600	1700	1400 J	2200	1100	3900	29	1900	27	1200	2200
SR-SS-022	24 U	24 U	24 U	24 U	37	35	59	89	18 J	42	17 J	51	24 U	67	24 U	24 J	84
SR-SS-023	22 U	22 U	22 U	22 U	4.9 J	4.6 J	22 U	22 U	22 U	22 U	22 U	8.4 J	22 U	22 U	22 U	22 U	22 U
SR-SS-024	23 U	23 U	23 U	23 U	4.7 J	4.7 J	23 U	23 U	23 U	23 U	23 U	7.8 J	23 U	23 U	23 U	23 U	23 U
SR-SS-025	8.4 J	53	23 U	100	2400	3500	5200	2600	1700 J	2800 J	340	2000	19 J	2300 J	30	600 J	240 J
SR-SS-026	39	240	22 U	1300 J	10000	12000	**19000**	8300	5700 J	10000 J	2000 J	11000	91 J	7200 J	100	3900	22 U
SR-SS-027	3.8 J	21 J	23 U	110	950	810	1300	650	540 J	1100 J	320	1500	12 J	490	10 J	560	1300 J
SR-SS-028	24 U	24 U	24 U	24 U	18 J	18 J	20 J	14 J	16 J	14 J	8.5 J	29	24 U	16 J	24 U	8.6 J	19 J
SR-SS-029	15 J	110	24 U	310	3600	3500	3000 J	2200	2700 J	3600 J	320 J	6500	46	2200	41	1800	4200 J
SR-SS-030	23 U	23 U	23 U	23 U	5 J	23 U	6.8 J	23 U	4.5 J	23 U	23 U	9.4 J	23 U	23 U	23 U	23 U	23 U
SR-SS-031	21 U	11 J	21 U	83	440	290	460	250	280 J	420 J	150	590	11 J	270	7.1 J	310	530 J
SR-SS-032	21 U	8.3 J	21 U	36	360	330	330 J	170	240 J	330 J	110	430	2.9 J	200	4.2 J	170	340 J
SR-SS-033	120 J	**670**	220 U	2800	**24000** J	22000	**19000**	13000	14000 J	20000 J	9500	36000	380	16000	370	12000	22000 J
SR-SS-034	6.2 J	24	21 U	110	1200 J	1200	1200	740	760 J	1100 J	160 J	2100	13 J	800	8.8 J	660	1300 J
SR-SS-035	22 U	22 U	22 U	2.9 J	60	65 J	120 J	61 J	47 J	83 J	13 J	88	22 U	44 J	22 U	32	120 J
SR-SS-036	21 U	21 U	21 U	21 U	9.4 J	8.6 J	9.9 J	6.7 J	6 J	8.8 J	21 U	11 J	21 U	6.9 J	21 U	21 U	21 U
SR-SS-040	24 U	24 U	24 U	24 U	4.2 J	4.8 J	7.4 J	4.2 J	4.2 J	4.5 J	24 U	6.6 J	24 U	24 U	24 U	24 U	24 U
SR-SS-041	24 U	24 U	24 U	24 U	8.7 J	9.7 J	13 J	7.3 J	7.5 J	9.3 J	24 U	13 J	24 U	8.6 J	24 U	6.1 J	24 U
SR-SS-041-D	24 U	24 U	24 U	24 U	14 J	12 J	19 J	10 J	11 J	14 J	24 U	22 J	24 U	12 J	24 U	7.6 J	10 J
SR-SS-042	24 U	24 U	24 U	24 U	3.5 J	4.4 J	24 U	24 U	24 U	4.3 J	24 U	5.4 J	24 U	24 U	24 U	24 U	24 U
SR-SS-043	23 U	23 U	23 U	23 U	5.2 J	6.6 J	10 J	6.4 J	5.4 J	6 J	23 U	7.9 J	23 U	6 J	23 U	23 U	23 U
SR-SS-045	25 U	25 U	25 U	25 U	9.6 J	14 J	14 J	9 J	9.6 J	11 J	25 U	16 J	25 U	12 J	25 U	7.7 J	25 U
SR-SS-047	23 U	2.6 J	23 U	10 J	46 J	40	49	24 J	27 J	39	19 J	76	23 U	33	23 U	37	43 J
SR-SS-049	25 U	25 U	25 U	25 U	13 J	13 J	14 J	7.3 J	9.3 J	12 J	25 U	19 J	25 U	9.6 J	25 U	9.7 J	25 U
SR-SS-050	24 U	2 J	24 U	8.2 J	35	31	28 J	20 J	20 J	24 J	17 J	59	24 U	28	24 U	23 J	29
SR-SS-051	24 U	7.3 J	24 U	65	310 J	240	230 J	130	160 J	240	98	560	7.1 J	170	4.1 J	270	310
SR-SS-053	24 U	24 U	24 U	9.5 J	54	46	45 J	28	33	41	20 J	93	24 U	37	24 U	36	51
SR-SS-054	26 U	13 J	26 U	78	540	450	410 J	240	300 J	430	180	890	9.5 J	310	6.7 J	360	680
SR-SS-055	23 U	23 U	23 U	23 U	4.8 J	6.1 J	5.8 J	6.1 J	5.1 J	23 U	23 U	7.9 J	23 U	8.3 J	23 U	23 U	23 U
SR-SS-056	24 U	24 U	24 U	24 U	3.1 J	3.7 J	4.9 J	24 U	3.6 J	24 U	24 U	6 J	24 U	24 U	24 U	24 U	24 U
SR-SS-257					890 J-	1000 J-	1500 J-		470 J-	1100 J-	250 J-			840 J-			
SR-SS-258					**22000**	22000	**31000**		13000	27000	5100			18000			
SR-SS-259					14000 J	17000 J	**25000** J		7800 J	18000 J	6000 J			20000 J			
SR-SS-259-D					1300 J	1500 J	2200 J		760 J	1700 J	300 J			950 J			

TABLE 7-9
PAH CONCENTRATIONS IN SOIL COMPARED TO PLANT AND SOIL INVERTEBRATE SCREENING VALUES
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Sample Location	2-Methyl naphthalene	Acenaph thene	Acenaph thylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenan threne	Pyrene
Plant Screening Value		250		6800	18000		18000								1000		
Invertebrate Screening Value	29000	29000		29000	18000	18000	18000	18000	18000	18000	18000	29000	29000	18000	29000	29000	18000
SR-SS-260					3800	3900	5200		2200	4400	1000			3500			
SR-SS-261					550	660	880		330	660	180			560			
SR-SS-262					1500	1700	2400		810	1900	460			1600			
SR-SS-263					6.2 J	6.5 J	11 J		3.4 U	3 J	1.9 U			7 J			
SR-SS-264					290	300	430		140	370	70			250 J			
SR-SS-265					1400	1600	2300		720	1800	410			1400 J			
SR-SS-266					6000	6100	8600		2800	7300	1500			5400 J			
SR-SS-267					**38000**	40000	**52000**		23000	47000	11000			34000 J			
SR-SS-267-D					**60000**	49000	**72000**		20000	61000	12000			37000			
SR-SS-268					9600	8300	11000		4400	11000	1900			6800 J			
SR-SS-269					42	67	91		28	55	19 J			64			
SR-SS-270					200	240	350		110	250	60			200			
SR-SS-271					220	280	360		140	270	71			210			
SR-SS-272					240	210	290		86	250	40			160			
SR-SS-273					7 J	9.2 J	17 J		3.1 U	3.7 J	2 J			5.4 J			
SR-SS-274					360	360	540		170	440	84			280 J			
SR-SS-275					**58000**	48000	**70000**		18000	58000	12000			38000			
SR-SS-276					810 J	770 J	1100 J		290 J	840 J	200 J			640 J			
SR-SS-276-D					9700 J	8300 J	12000 J		3200 J	9800 J	2000 J			5400 J			
SR-SS-277					3600	2800	4000		1500	3900	660			2000			
SR-SS-278					2100	1800	2600		720	2200	440			1300			
SR-SS-325					1100	1000	1500		600	1200	220 J			860 J			
SR-SS-325-D					890	1000	1400		520	1100	260 J			740 J			
SR-SS-326					38	39	66 J		18 J	45	21 J			56			
SR-SS-327					53 J	63 J	94 J		27 J	70 J	26			100 J			
SOUTHERN RANGE AREA - SUBSURFACE SOIL (6-12 INCHES)																	
SR-SS-257					30	35	52		5.7 J	36	4.4 J			42			
SR-SS-258					710	770	240		92	860	44			830 J			
SR-SS-259					33	40	56		14 J	38	600			46			
SR-SS-260					450	550	740		270	550	160			520			
SR-SS-260-D					350	420	600		200	440	110			390			
SR-SS-261					3.9 J	4.2 J	6.1 J		7.4 J	18 J	7.8 J			4.2 J			
SR-SS-262					69	77	40 J		8.6 J	80	6.7 J			84			
SR-SS-263					98	83	85 J		39	65	21 J			71			
SR-SS-275					58	61	85		5500	63	3000			9300			
SOUTHERN RANGE AREA - SUBSURFACE SOIL (12-24 INCHES)																	
SR-SB-257					30	35	52		14 J	36	11 J			42			
SR-SB-258					190	180	240		92	220	44			150			
SR-SB-259					33	40	56		14 J	38	12 J			46			
SR-SB-260					25	30	43		10 J	27	7.2 J			32			
SR-SB-261					3.9 J	4.2 J	6.1 J		3.1 U	1.7 U	1.8 U			4.2 J			
SR-SB-262					24 J	25 J	40 J		8.6 J	26 J	6.7 J			22 J			
SR-SB-263					56	61	85 J		29	65	14 J			58 J			
HIGH TOWER AREA - SURFACE SOIL																	
SR-SS-005	20 U	20 U	20 U	3.6 J	22 J	20 J	20 J	14 J	13 J	20 J	20 U	31	20 U	16 J	20 U	13 J	21

Notes:
Units micrograms per kilogram (ug/kg)
Bold Exceedance of plant screening value.
J Estimated concentration
U Not detected

Blank - not analyzed
Exceedance of soil invertebrate screening value.

TABLE 7-10
TERRESTRIAL FOOD CHAIN MODEL - AVERAGE SCENARIO
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Chemical	Herbivorous Receptors EEQs				Insectivorous Receptors EEQs			
	Bobwhite Quail		Meadow Vole		Robin		Short-Tailed Shrew	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
NORTHERN RANGE AREA								
Lead								
Lead - Surface Soil	3.9E+00	1.4E-01	2.8E-01	7.0E-03	2.7E+01	1.0E+00	4.5E+00	1.1E-01
Lead - Subsurface Soil	7.2E-01	2.6E-02	7.0E-02	1.8E-03	5.6E+00	2.0E-01	9.9E-01	2.5E-02
SOUTHERN RANGE AREA								
Lead								
Lead - Surface Soil	7.9E-01	2.9E-02	7.6E-02	1.9E-03	6.1E+00	2.2E-01	1.1E+00	2.7E-02
Lead - Subsurface Soil	4.0E-01	1.5E-02	4.4E-02	1.1E-03	3.1E+00	1.1E-01	5.6E-01	1.4E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil								
Benzo(a)anthracene	1.6E-02	1.6E-03	1.7E-02	2.7E-04	5.2E-01	5.2E-02	9.9E-01	1.6E-02
Benzo(a)pyrene	3.0E-02	3.0E-03	4.5E-02	7.1E-04	4.3E-01	4.3E-02	8.1E-01	1.3E-02
Benzo(b)fluoranthene	8.2E-02	8.2E-03	1.4E-01	2.3E-03	1.1E+00	1.1E-01	2.1E+00	3.4E-02
Benzo(g,h,i)perylene	4.2E-02	4.2E-03	7.7E-02	1.2E-03	4.6E-01	4.6E-02	8.9E-01	1.4E-02
Benzo(k)fluoranthene	1.5E-02	1.5E-03	2.1E-02	3.4E-04	4.6E-01	4.6E-02	8.8E-01	1.4E-02
Chrysene	1.7E-02	1.7E-03	1.7E-02	2.7E-04	7.7E-01	7.7E-02	1.5E+00	2.4E-02
Dibenzo(a,h)anthracene	9.0E-03	9.0E-04	1.4E-02	2.2E-04	2.1E-01	2.1E-02	4.1E-01	6.5E-03
Fluoranthene	8.3E-02	8.3E-03	1.5E-03	2.7E-04	8.8E-01	8.8E-02	1.6E-02	2.9E-03
Indeno(1,2,3-cd)pyrene	2.2E-02	2.2E-03	3.2E-02	5.2E-04	7.3E-01	7.3E-02	1.4E+00	2.2E-02
Pyrene	8.9E-02	8.9E-03	1.7E-01	2.7E-03	3.9E-01	3.9E-02	7.4E-01	1.2E-02
Polycyclic Aromatic Hydrocarbons - Subsurface Soil								
Benzo(a)anthracene	5.9E-03	5.9E-04	7.2E-03	1.1E-04	1.5E-01	1.5E-02	2.9E-01	4.6E-03
Benzo(a)pyrene	8.3E-03	8.3E-04	1.2E-02	2.0E-04	1.2E-01	1.2E-02	2.2E-01	3.5E-03
Benzo(b)fluoranthene	2.3E-02	2.3E-03	4.1E-02	6.5E-04	3.1E-01	3.1E-02	6.0E-01	9.7E-03
Benzo(k)fluoranthene	3.5E-03	3.5E-04	5.3E-03	8.4E-05	9.3E-02	9.3E-03	1.8E-01	2.9E-03
Chrysene	6.0E-03	6.0E-04	7.3E-03	1.2E-04	2.2E-01	2.2E-02	4.3E-01	6.8E-03
Dibenzo(a,h)anthracene	1.9E-03	1.9E-04	2.9E-03	4.6E-05	4.5E-02	4.5E-03	8.6E-02	1.4E-03
Indeno(1,2,3-cd)pyrene	5.4E-03	5.4E-04	7.9E-03	1.3E-04	1.8E-01	1.8E-02	3.4E-01	5.4E-03
HIGH TOWER RANGE AREA								
Lead								
Lead - Surface Soil	5.2E-01	1.9E-02	5.4E-02	1.4E-03	4.1E+00	1.5E-01	7.3E-01	1.8E-02
Lead - Subsurface Soil	2.2E-01	7.9E-03	2.7E-02	6.7E-04	1.7E+00	6.1E-02	3.1E-01	7.7E-03

Notes:

EEQ Ecological Effects Quotient
LOAEL Lowest Observed Adverse Effects Level
NOAEL No Observed Adverse Effects Level
NV Value Not Available

Value is Greater than 1.0

TABLE 7-11
INGESTION PROBABILITY
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Sample	Adjusted[1] Total Lead Shot	#14 SIEVE		#20 SIEVE	
		Adjusted[1] Total Grit Sized Particles	Ingestion Probability[2]	Adjusted[1] Total Grit Sized Particles	Ingestion Probability[2]
SOUTHERN RANGE AREA					
SR-SS-221-0006	151	1,118	0.24	33,575	0.01
SR-SS-221-0612	54	1,438	0.07	51,840	0.00
SR-SB-221-1224	25	275	0.17	9,125	0.01
SR-SS-225-0006	0	5,657	0.00	86,900	0.00
SR-SS-225-0612	8	3,408	0.00	56,686	0.00
SR-SS-238-0006	35	1,200	0.06	26,672	0.00
SR-SS-240-0006	241	1,993	0.22	29,800	0.02
SR-SS-309-0006	62	1,940	0.06	33,204	0.00
SR-SS-309-0612	6	1,394	0.01	31,532	0.00
SR-SS-312-0006	59	2,132	0.06	49,554	0.00
SR-SS-312-0612	15	2,093	0.01	55,742	0.00
SR-SS-316-0006	24	1,388	0.03	32,393	0.00
SR-SS-316-0612	12	2,102	0.01	42,712	0.00
SR-SS-328-0006	3	597	0.01	10,660	0.00
SR-SS-328-0612	0	614	0.00	11,390	0.00
SR-SS-331-0006	79	4,063	0.04	64,468	0.00
SR-SS-402-0006	132	1,079	0.22	--	--
SR-SS-403-0006	138	953	0.26	--	--
SR-SS-403-0612	47	1,020	0.09	--	--
HIGH TOWER RANGE AREA					
SR-SS-241-0006	3	870	0.01	18,431	0.00
SR-SS-320-0006	59	2,220	0.05	35,036	0.00
SR-SB-323-0006	94	2,323	0.08	41,328	0.00
SR-SS-332-0006	44	3,772	0.02	59,464	0.00
SR-SS-333-0006	9	4,031	0.00	69,931	0.00
SR-SS-334-0006	132	2,478	0.10	50,727	0.01
SR-SS-407-0006	94	709	0.24	--	--
SR-SS-407-0612	135	838	0.28	--	--
SR-SS-410-0006	179	3,149	0.11	--	--
SR-SS-410-0612	32	5,686	0.01	--	--
SR-SS-413-0006	35	770	0.09	--	--
SR-SS-417-0006	162	1,861	0.16	--	--
SR-SS-417-0612	109	3,413	0.06	--	--
SR-SS-418-0006	38	920	0.08	--	--

Notes:

[1] Adjusted to a 1-foot by 1-foot by 6-inch volume (0.5 $feet^3$)

[2] Model for estimating probability of ingesting N lead particles by the mourning dove. Calculations provided in Appendix H.

FIGURES

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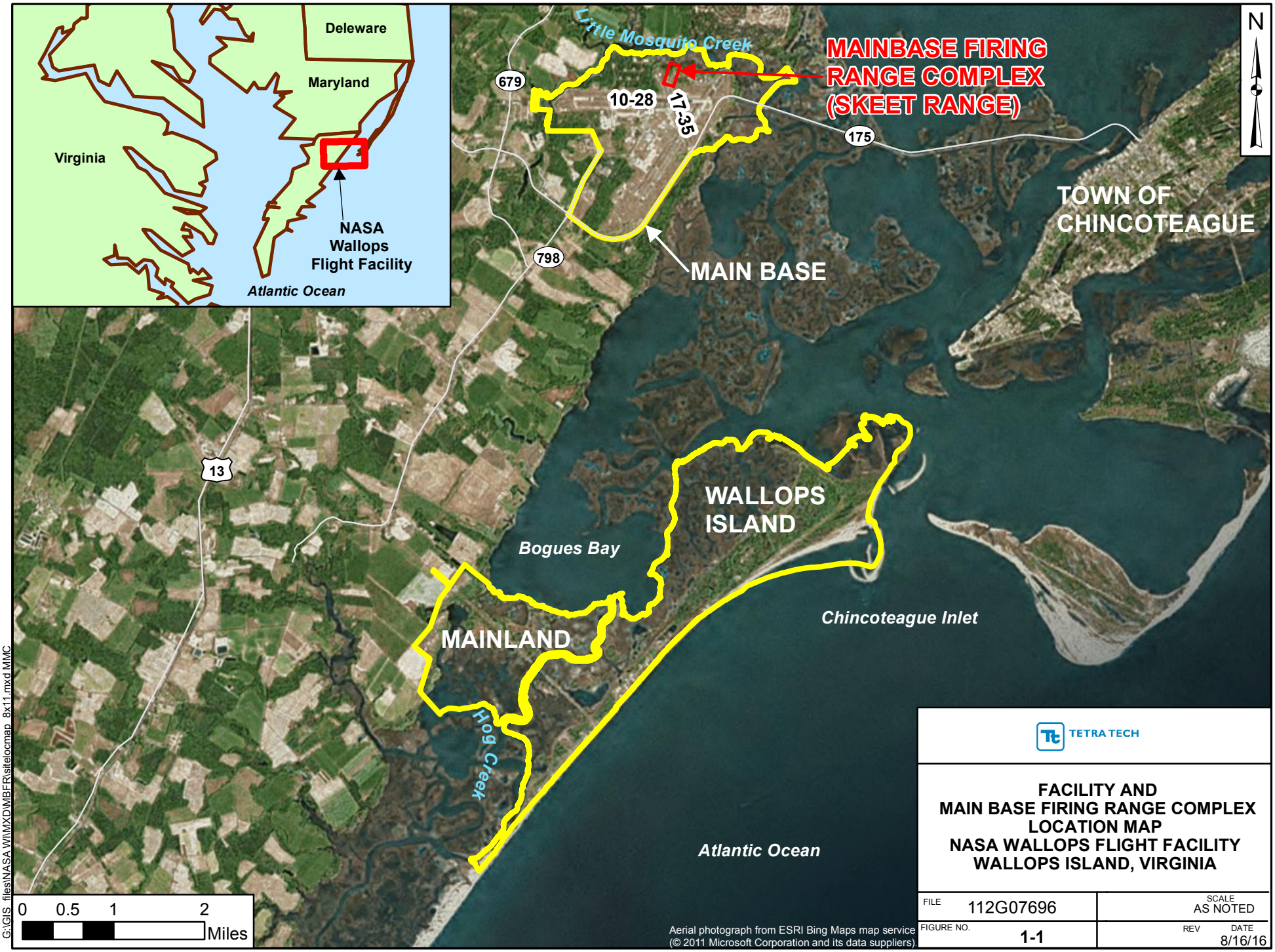

TETRA TECH

FACILITY AND
MAIN BASE FIRING RANGE COMPLEX
LOCATION MAP
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

FILE	112G07696	SCALE	AS NOTED
FIGURE NO.	1-1	REV / DATE	8/16/16

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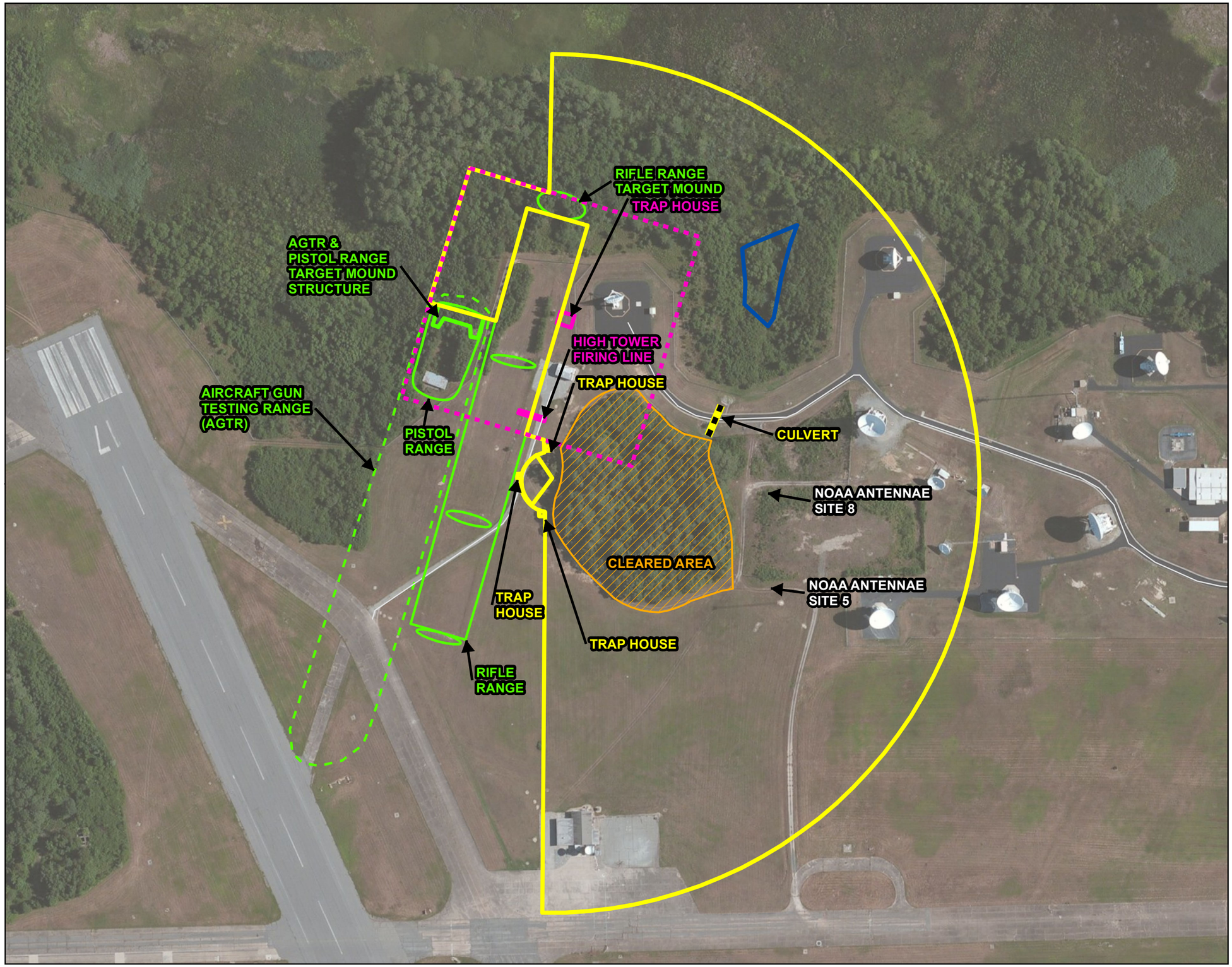
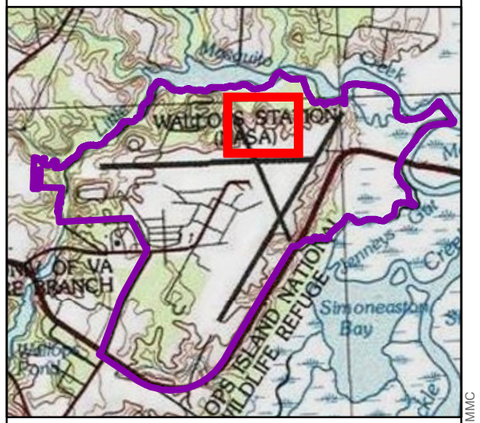


Legend

- High Tower Range
- Approximate AGTR Boundary
- Other MBFR Features
- Cleared Area by NOAA
- Skeet Range MRS
- InstallationBoundary
- Palustrine Forested Wetland
- Culvert



N

0 100 200 400 Feet

FIGURE 2-1
SITE LAYOUT
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH | 1/13/2020

Aerial Imagery 2013 ESRI map service
USA Topo Map 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

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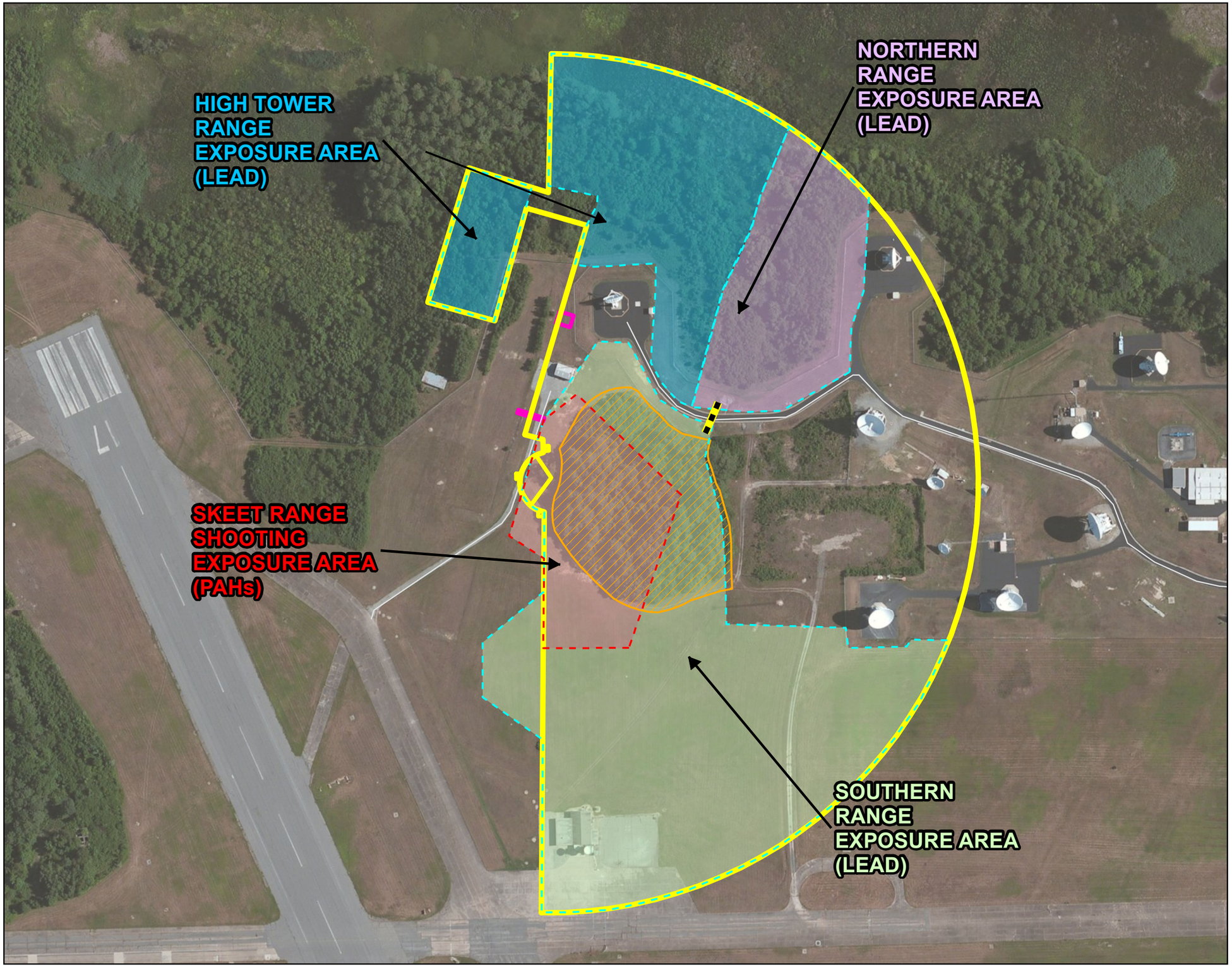
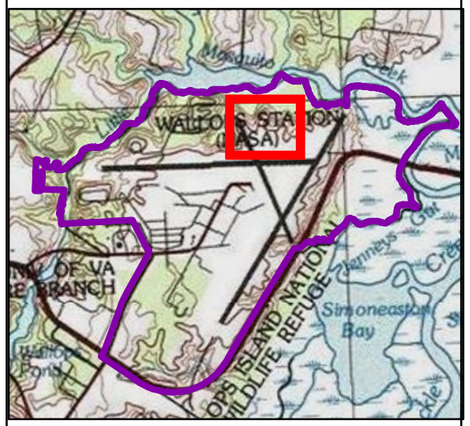


Legend

- Lead Exposure Area
- PAH Exposure Area
- High Tower Range Exposure Area
- Northern Range Exposure Area
- Skeet Range Shooting Exposure Area (PAHs)
- Southern Range Exposure Area
- Cleared Area by NOAA
- Skeet Range MRS
- Installation Boundary
- Culvert



N

0 100 200 400 Feet

FIGURE 2-2
EXPOSURE AREAS
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH | 7/17/2019

Aerial Imagery 2013 ESRI map service
USA Topo Map 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

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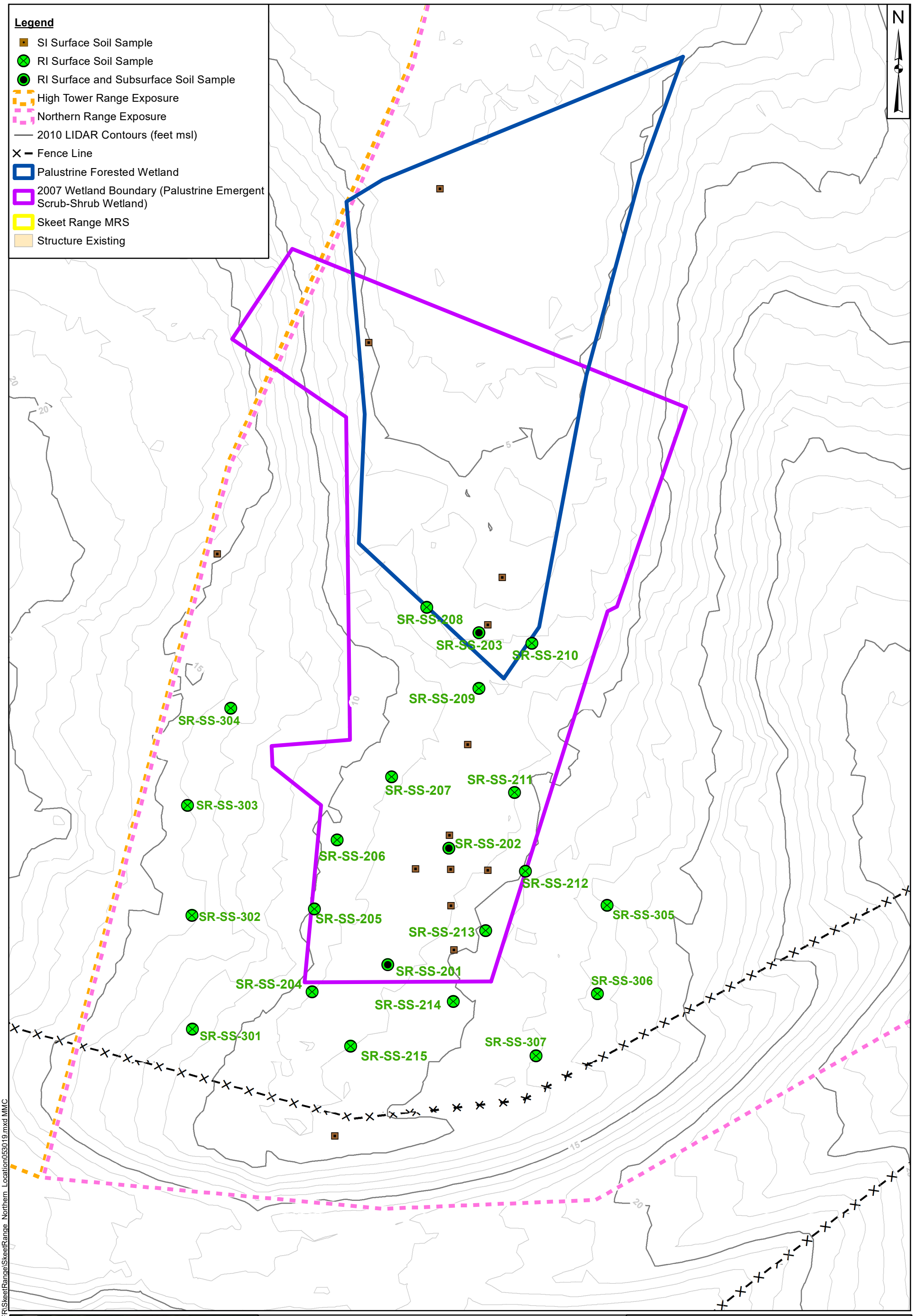
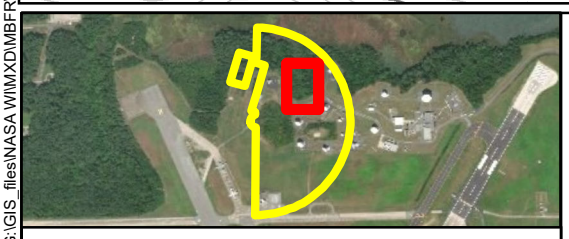




Base Map:
Aerial Imagery 2013 ESRI map service

LEAD SAMPLE LOCATIONS
NORTHERN RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

0 30 60 Feet

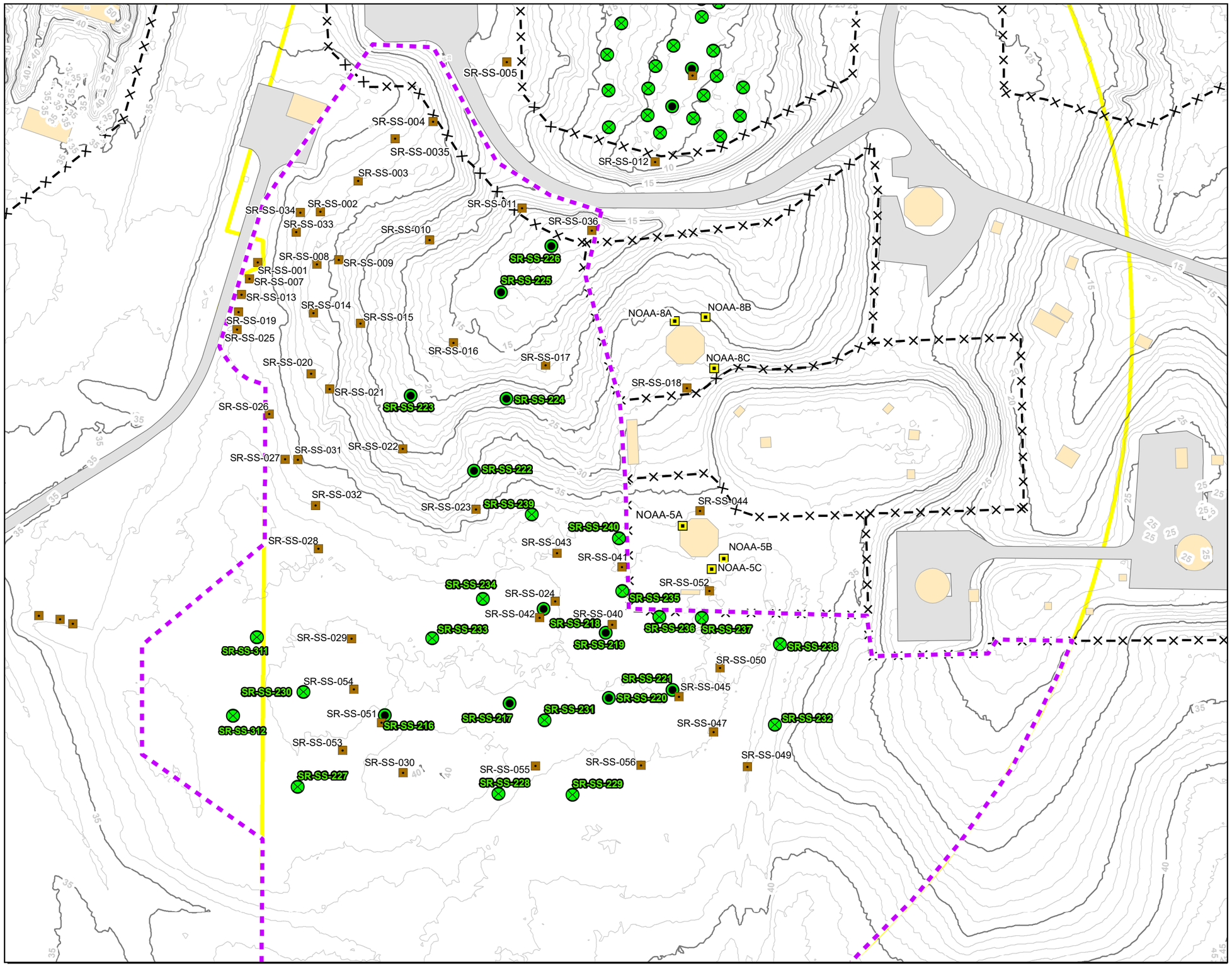
FIGURE: 3-1

Prepared For: NASA

Prepared By: TETRA TECH

Date: 1/13/2020

NOR: G:\GIS_files\NASA WI\MXD\MBF\SkeetRange\SkeetRange_Northern_Location053019.mxd MMC



Legend

- NOAA Soil Sample
- SI Surface Soil Sample
- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- 2010 LIDAR Contours (feet msl)
- Fence Line
- Southern Range Exposure Area
- Structure Existing Area
- Skeet Range MRS

N

0 50 100 200 Feet

FIGURE 3-2
LEAD SAMPLE LOCATIONS
SOUTHERN RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

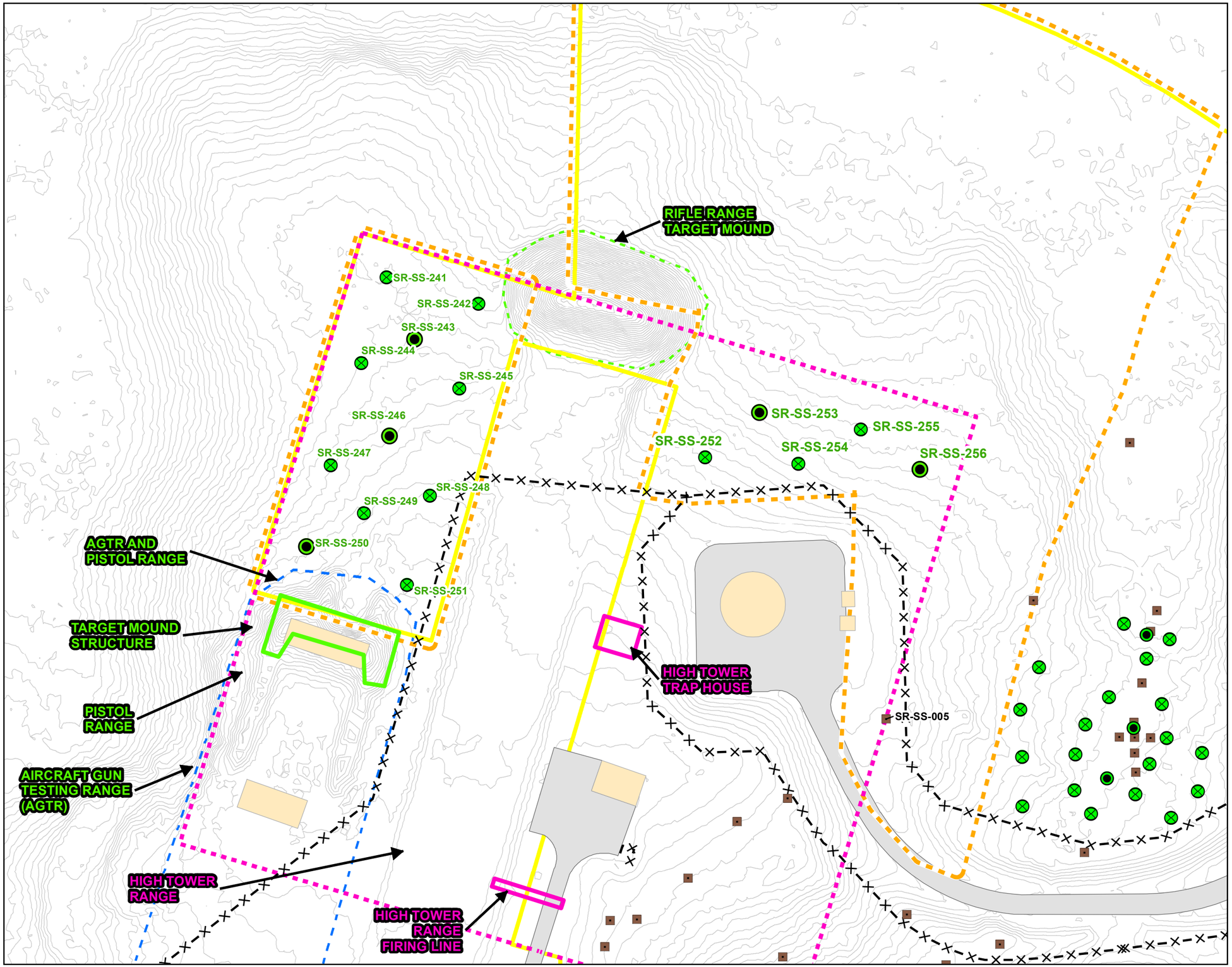
TETRA TECH

7/17/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SkeetRange_southern_Location053019.mxd MMC



Legend

- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- SI Surface Soil Sample
- Fence Line
- High Tower Range Exposure Area
- 2010 LIDAR Contours (feet msl)
- Structure Existing Area
- Rifle Range Target Mound
- Approximate AGTR Boundary
- High Tower Range
- Skeet Range MRS

N

0 37.5 75 150 Feet

FIGURE 3-3
LEAD SAMPLE LOCATIONS
HIGH TOWER RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH

7/17/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SR_pro_hightower_Location053019.mxd MMC

Legend

- Fence Line
- SI Surface Soil Sample
- RI Surface Soil Sample
- RI Surface and Subsurface Soil Sample
- Skeet Range Shooting Exposure Area (PAHs)
- Skeet Range MRS
- Structure Existing Area
- Paved Surfaces
- 2010 LIDAR Contours (feet msl)

N

SR-SS-039
SR-SS-006
SR-SS-038
SR-SS-005
SR-SS-037
SR-SS-004
SR-SS-035
SR-SS-012
SR-SS-003
SR-SS-264
SR-SS-034
SR-SS-257
SR-SS-002
SR-SS-265
SR-SS-033
SR-SS-011
SR-SS-036
SR-SS-010
SR-SS-009
SR-SS-260
SR-SS-001
SR-SS-008
SR-SS-007
SR-SS-258
SR-SS-013
SR-SS-014
SR-SS-019
SR-SS-274
SR-SS-015
SR-SS-259
SR-SS-025
SR-SS-261
SR-SS-263
NOAA ANTENNAE SITE 8
SR-SS-271
SR-SS-016
SR-SS-273
SR-SS-266
SR-SS-017
SR-SS-325
SR-SS-020
SR-SS-267
SR-SS-272
SR-SS-021
SR-SS-018
SR-SS-262
SR-SS-270
SR-SS-268
SR-SS-026
SR-SS-326
SR-SS-269
SR-SS-022
SR-SS-327
SR-SS-031
SR-SS-027
SR-SS-032
SR-SS-023
SR-SS-044
NOAA ANTENNAE SITE 5
SR-SS-028
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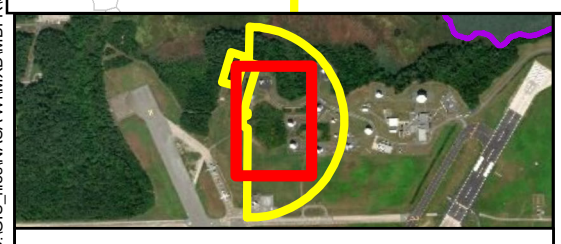


Base Map:
Aerial Imagery 2013 ESRI map service

PAH SAMPLE LOCATIONS
SKEET RANGE SHOOTING AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

0 70 140 Feet

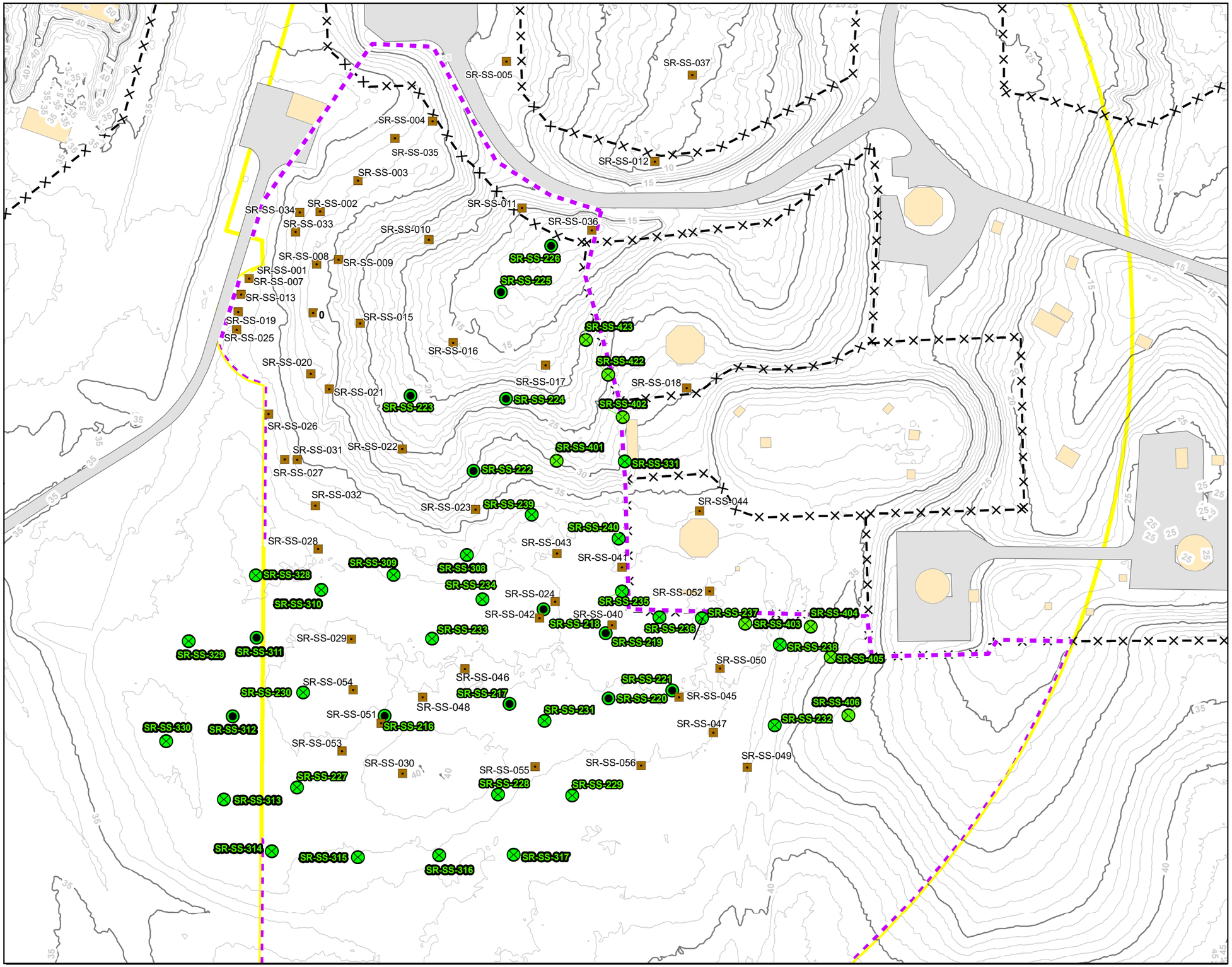
FIGURE: 3-4

Prepared For: NASA

Prepared By: TETRA TECH

Date: 7/12/2019

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SkeetRange_PAH_Location053019.mxd KMB



Legend

- SI Surface Soil Sample
- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- 2010 LIDAR Contours (feet msl)
- Fence Line
- Southern Range Exposure Area
- Structure Existing Area
- Skeet Range MRS

N

0 50 100 200 Feet

FIGURE 3-5
LEAD SHOT LOCATIONS
SOUTHERN RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH

7/17/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

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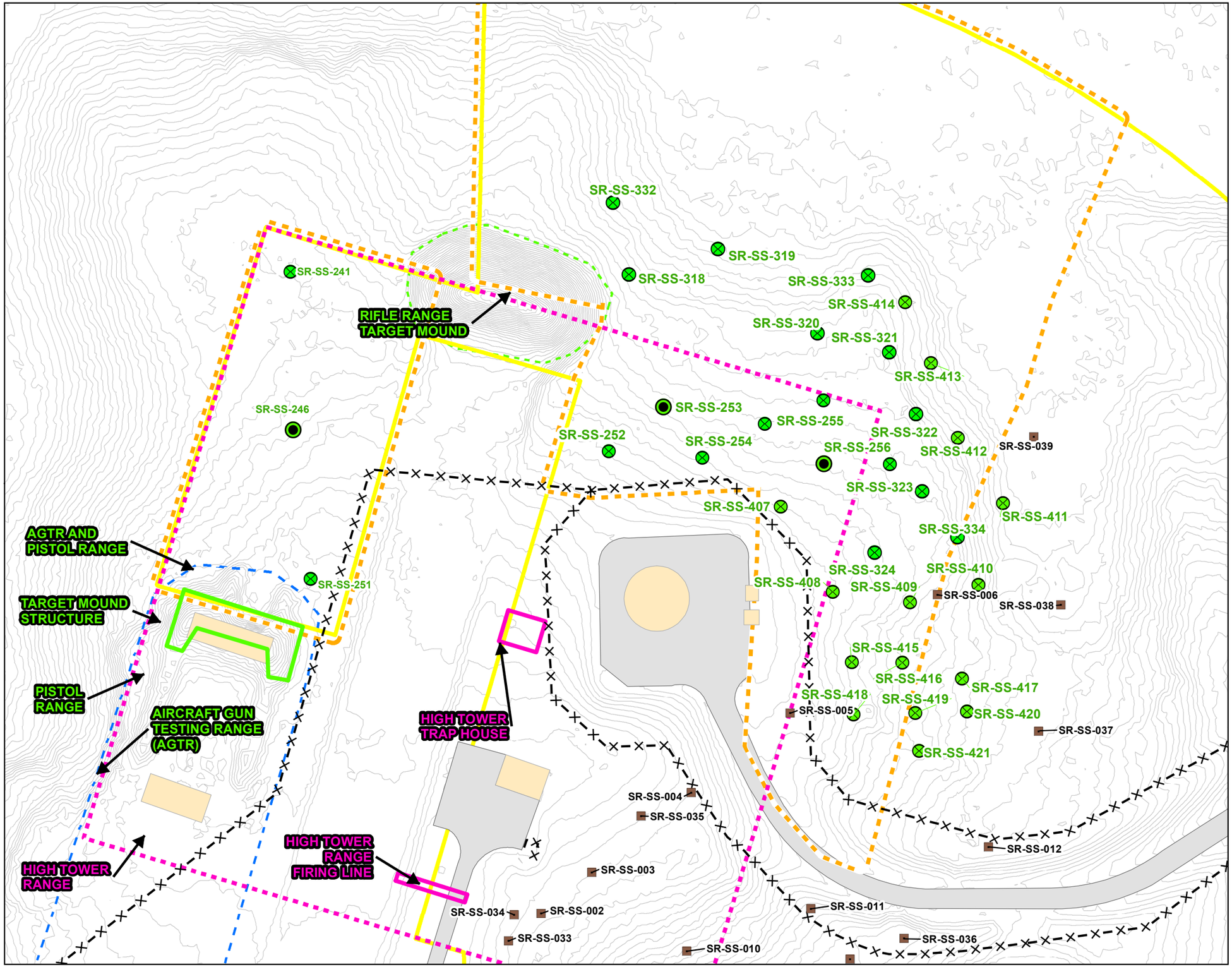
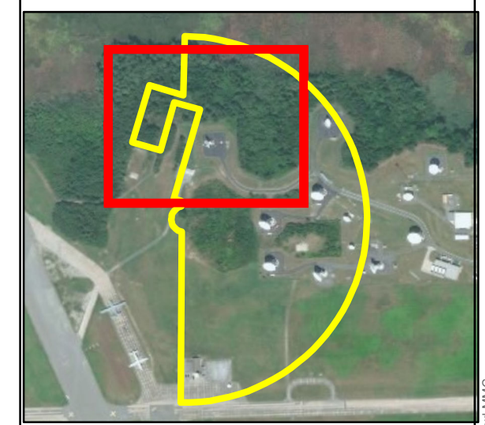


Legend

- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- SI Surface Soil Sample
- Fence Line
- 2010 LIDAR Contours (feet msl)
- High Tower Range Exposure Area
- Structure Existing Area
- Rifle Range Target Mound
- Approximate AGTR Boundary
- High Tower Range
- Skeet Range MRS



N

0 30 60 120 Feet

FIGURE 3-6
LEAD SHOT LOCATIONS
HIGH TOWER RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH

7/18/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SR_pro_hightower_LSLocation\053019.mxd MMC

Legend

- SI Surface Soil Sample
- RI Surface Soil Sample
- RI Surface and Subsurface Soil Sample
- Lead concentrations greater than 530 mg/kg
- High Tower Range Exposure Area
- Northern Range Exposure Area
- 2010 LIDAR Contours (feet msl)
- Fence Line
- Palustrine Forested Wetland
- Skeet Range MRS
- Structure Existing Area

Notes:
msl - mean seal level
All lead concentrations are in milligrams per kilogram (mg/kg)

N

SR-SS-039

DEPTH	LEAD (mg/kg)
0-6"	104

SR-SS-203 03/2018

DEPTH	LEAD (mg/kg)
0-6"	387
6-12"	85.4
12-24"	13.0

SR-SS-038 10/2007

DEPTH	LEAD (mg/kg)
0-6"	235

SR-SS-208 03/2018

DEPTH	LEAD (mg/kg)
0-6"	286
6-12"	37.4

SR-SS-209 03/2018

DEPTH	LEAD (mg/kg)
0-6"	206
6-12"	22.2

SR-SS-108 07/2009

DEPTH	LEAD (mg/kg)
0-6"	1050

SR-SS-206 10/2017

DEPTH	LEAD (mg/kg)
0-6"	317

SR-SS-210 03/2018

DEPTH	LEAD (mg/kg)
0-6"	179
6-12"	35.6

SR-SS-207 03/2018

DEPTH	LEAD (mg/kg)
0-6"	463
6-12"	209

SR-SS-107 07/2009

DEPTH	LEAD (mg/kg)
0-6"	325

SR-SS-202 03/2018

DEPTH	LEAD (mg/kg)
0-6"	2020
6-12"	44.6
12-24"	140

SR-SS-211 03/2018

DEPTH	LEAD (mg/kg)
0-6"	226
6-12"	82.6

SR-SS-304 03/2018

DEPTH	LEAD (mg/kg)
0-6"	264
6-12"	70.4

SR-SS-103 07/2009

DEPTH	LEAD (mg/kg)
0-6"	1330

SR-SS-104 07/2009

DEPTH	LEAD (mg/kg)
0-6"	354

SR-SS-037 10/2007 07/2009
SR-SS-100/101

DEPTH	LEAD (mg/kg)	LEAD (mg/kg)
0-6"	1150	1190/1400

SR-SS-303 03/2018

DEPTH	LEAD (mg/kg)
0-6"	360
6-12"	50.6

SR-SS-206 03/2018

DEPTH	LEAD (mg/kg)
0-6"	445
6-12"	209

SR-SS-212 03/2018

DEPTH	LEAD (mg/kg)
0-6"	253
6-12"	223

SR-SS-302 03/2018

DEPTH	LEAD (mg/kg)
0-6"	174
6-12"	99.5

SR-SS-305 03/2018

DEPTH	LEAD (mg/kg)
0-6"	350
6-12"	156

SR-SS-205 03/2018

DEPTH	LEAD (mg/kg)
0-6"	350
6-12"	62

SR-SS-105 07/2009

DEPTH	LEAD (mg/kg)
0-6"	564

SR-SS-204 03/2018

DEPTH	LEAD (mg/kg)
0-6"	446
6-12"	499

SR-SS-102 10/2007

DEPTH	LEAD (mg/kg)
0-6"	701

SR-SS-306 03/2018

DEPTH	LEAD (mg/kg)
0-6"	162
6-12"	48.1

SR-SS-201 03/2018

DEPTH	LEAD (mg/kg)
0-6"	602
6-12"	846
12-24"	17.6

SR-SS-301 03/2018

DEPTH	LEAD (mg/kg)
0-6"	165
6-12"	14.2

SR-SS-213 03/2018

DEPTH	LEAD (mg/kg)
0-6"	22,200
6-12"	694

SR-SS-214 03/2018

DEPTH	LEAD (mg/kg)
0-6"	453
6-12"	153

SR-SS-012 10/2007

DEPTH	LEAD (mg/kg)
0-6"	104

SR-SS-106 07/2009

DEPTH	LEAD (mg/kg)
0-6"	728

SR-SS-215 03/2018

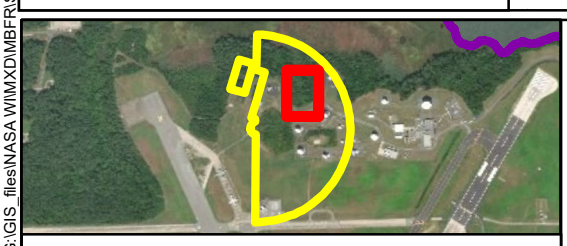
DEPTH	LEAD (mg/kg)
0-6"	327
6-12"	45.8

SR-SS-307 03/2018

DEPTH	LEAD (mg/kg)
0-6"	142
6-12"	384

SR-SS-208 SR-SS-203 SR-SS-210 SR-SS-209 SR-SS-304 SR-SS-207 SR-SS-211 SR-SS-303 SR-SS-206 SR-SS-202 SR-SS-212 SR-SS-302 SR-SS-305 SR-SS-205 SR-SS-213 SR-SS-201 SR-SS-204 SR-SS-306 SR-SS-214 SR-SS-301 SR-SS-307 SR-SS-215

Average Lead 0-6" = 1,112 mg/kg
Average Lead 6-12" = 185 mg/kg
Average Lead 12-24" = 57 mg/kg



Base Map:
Aerial Imagery 2013 ESRI map service

LEAD ANALYTICAL RESULTS
NORTHERN RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Feet
0 30 60

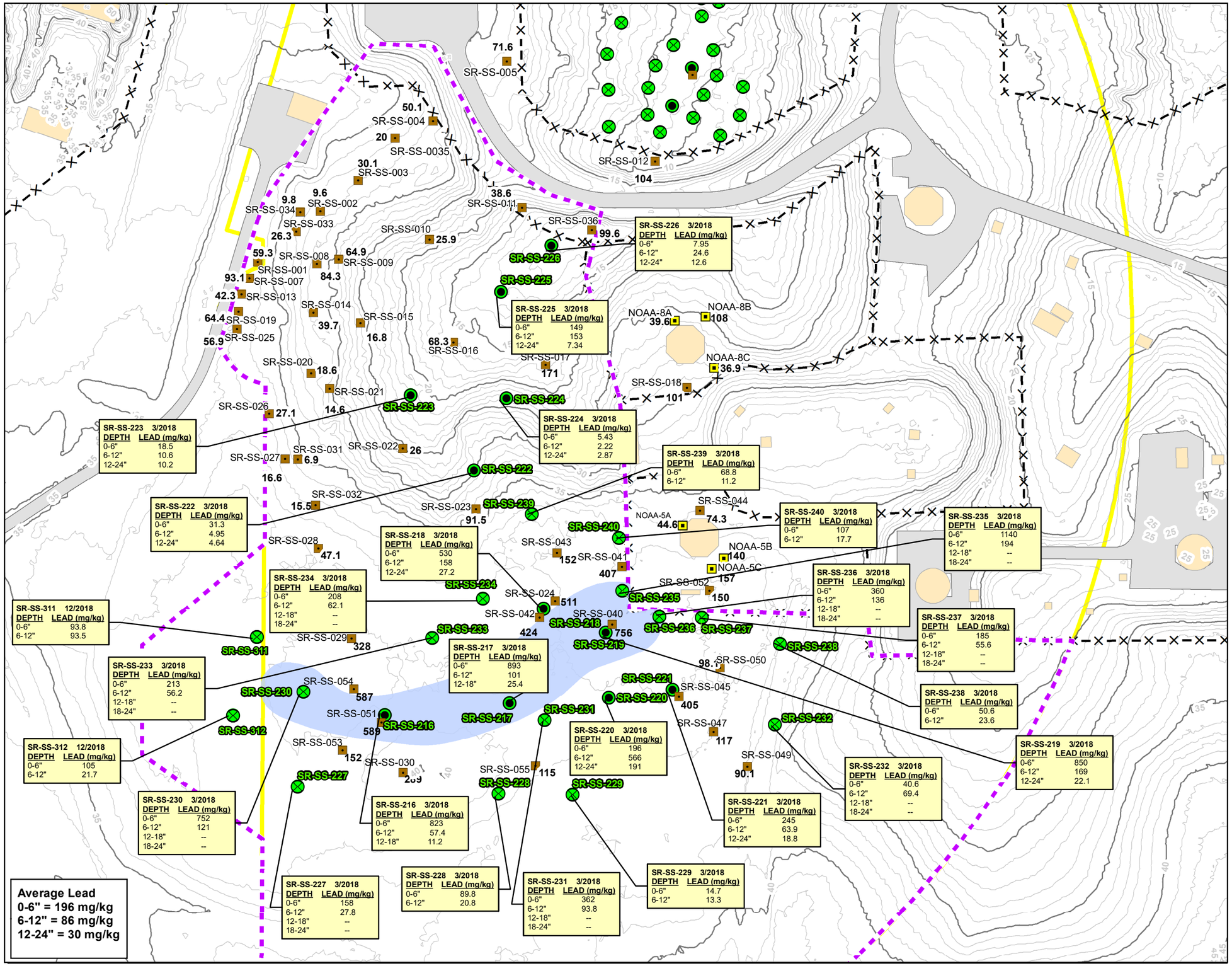
FIGURE: 4-1

Prepared For: NASA

Prepared By: TETRA TECH

Date: 7/17/2019

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SkeetRange_Northern_030119.mxd MMC



Legend

- NOAA Soil Sample
- SI Surface Soil Sample
- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- 2010 LIDAR Contours (feet msl)
- Fence Line
- Lead concentrations greater than 750 mg/kg
- Southern Range Exposure Area
- Structure Existing Area
- Skeet Range MRS

Notes:

- # Next to sample label indicates Lead Concentration (mg/kg)
- 750 mg/kg represents the not to exceed lead concentration for plants
- msl - mean seal level

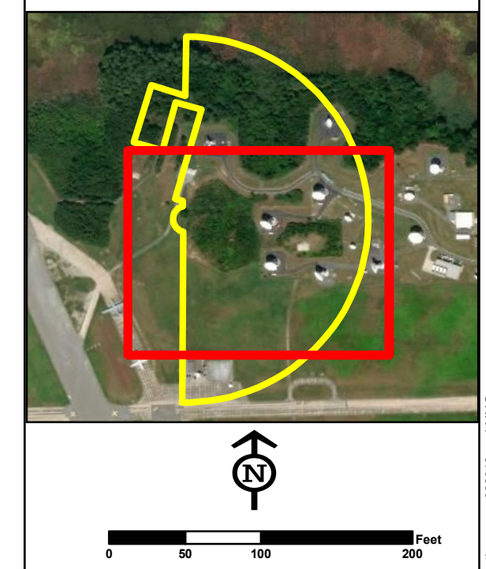


FIGURE 4-2
LEAD ANALYTICAL RESULTS
SOUTHERN RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

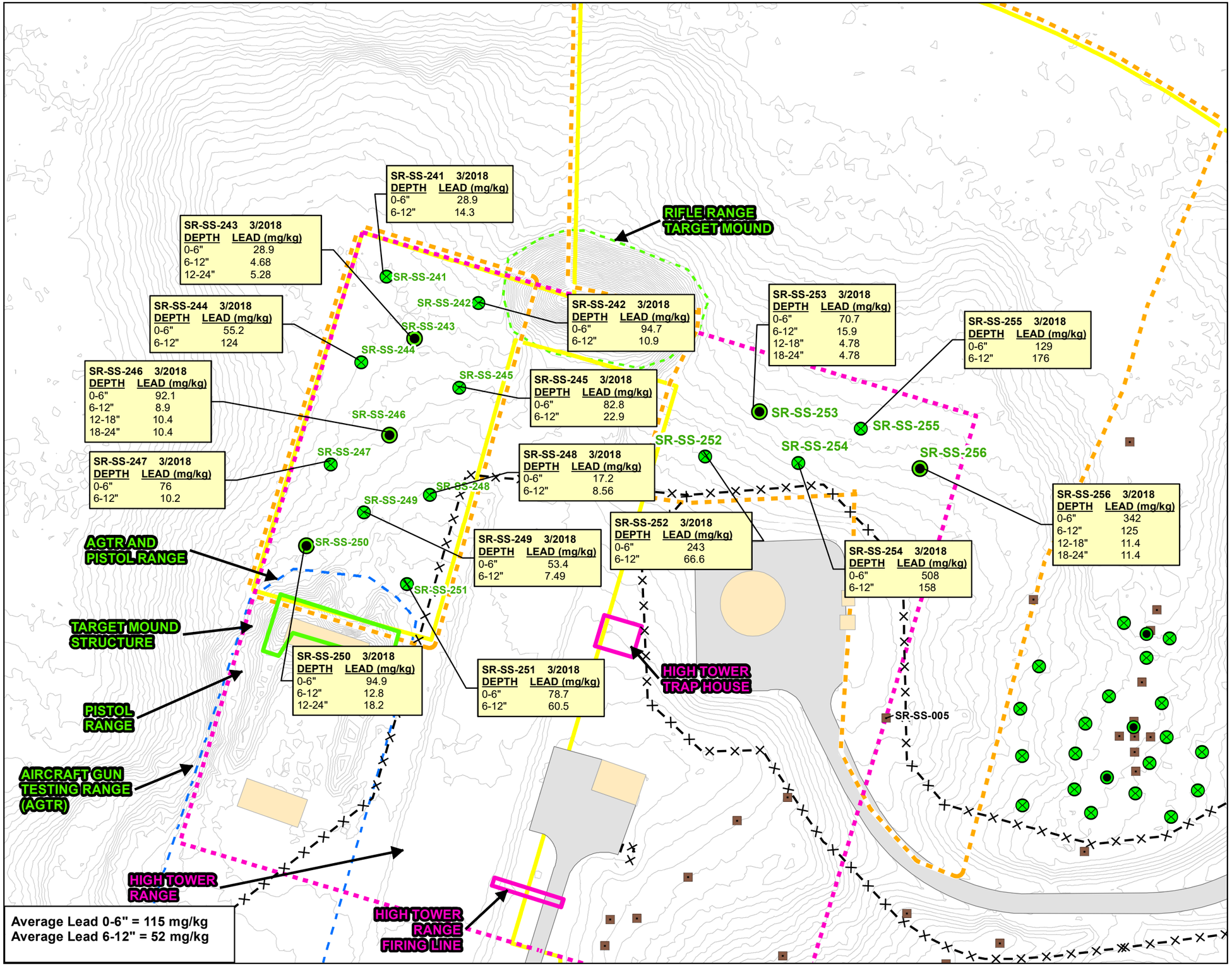
TETRA TECH

8/15/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SkeetRange_southern_pro_022819.mxd MMC



Legend

- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- SI Surface Soil Sample
- Fence Line
- High Tower Range Exposure Area
- 2010 LIDAR Contours (feet msl)
- Structure Existing Area
- Rifle Range Target Mound
- Approximate AGTR Boundary
- High Tower Range
- Skeet Range MRS

Notes:
- msl - mean seal level
- All lead concentrations in milligrams per kilogram (mg/kg)

N

0 37.5 75 150 Feet

FIGURE 4-3
LEAD ANALYTICAL RESULTS
HIGH TOWER RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH

7/17/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SR_pro_hightower_031919.mxd MMC

Legend

- Fence Line
- SI Surface Soil Sample
- RI Surface Soil Sample
- RI Surface and Subsurface Soil Sample
- Total risk from PAH COPCs > 1 x 10^{-4}
- Skeet Range Shooting Exposure Area (PAHs)
- Skeet Range MRS
- Structure Existing Area
- Paved Surfaces
- 2010 LIDAR Contours (feet msl)

Notes:
COPC - chemical of potential concern
mg/kg - milligrams per kilogram
msl - mean seal level
PAH - polycyclic aromatic hydrocarbon
- Duplicate sample exceeded Total Risk but not the parent sample

N

SR-SS-039
SR-SS-006
SR-SS-038
SR-SS-005
SR-SS-037
SR-SS-004
SR-SS-035
SR-SS-012
SR-SS-003
SR-SS-264
SR-SS-034
SR-SS-002
SR-SS-257
SR-SS-033
SR-SS-265
SR-SS-011
SR-SS-036
SR-SS-010
SR-SS-009
SR-SS-260
SR-SS-001
SR-SS-008
SR-SS-007
SR-SS-258
SR-SS-013
SR-SS-014
SR-SS-019
SR-SS-274
SR-SS-015
SR-SS-259
SR-SS-025
SR-SS-261
SR-SS-263
NOAA ANTENNAE SITE 8
SR-SS-271
SR-SS-016
SR-SS-273
SR-SS-266
SR-SS-017
SR-SS-325
SR-SS-020
SR-SS-267
SR-SS-272
SR-SS-021
SR-SS-018
SR-SS-262
SR-SS-270
SR-SS-268
SR-SS-026
SR-SS-326
SR-SS-269
SR-SS-022
SR-SS-327
SR-SS-031
SR-SS-027
SR-SS-032
SR-SS-023
SR-SS-044
NOAA ANTENNAE SITE 5
SR-SS-028
SR-SS-043
SR-SS-041
SR-SS-052
SR-SS-024
SR-SS-042
SR-SS-040
SR-SS-276*
SR-SS-275
SR-SS-277
SR-SS-278
SR-SS-029
SR-SS-050
SR-SS-045
SR-SS-054
SR-SS-051
SR-SS-047
SR-SS-053
SR-SS-055
SR-SS-056
SR-SS-049
SR-SS-030

Base Map:
Aerial Imagery 2013 ESRI map service

TOTAL RISK SUMMARY
SKEET RANGE SHOOTING AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

0 70 140 Feet

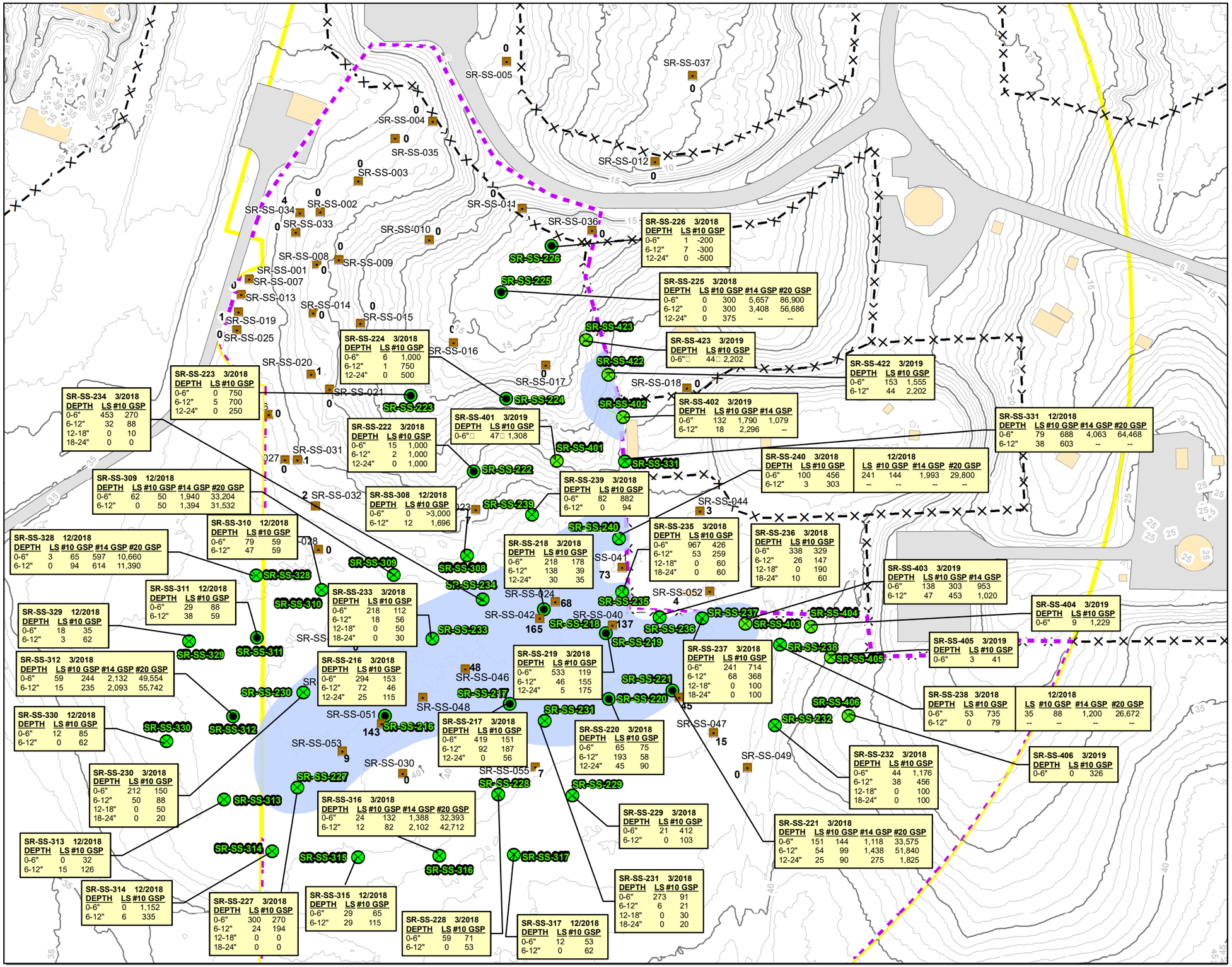
FIGURE: 4-4

Prepared For: NASA

Prepared By: TETRA TECH

Date: 7/17/2019

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SkeetRange_PAH_pro_031919.mxd KMB

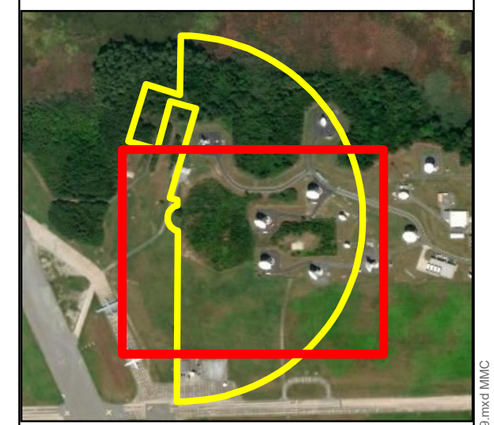


Legend

- SI Surface Soil Sample
- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- 2010 LIDAR Contours (feet msl)
- Fence Line
- Exceeds 100 LS/Foot^2
- Southern Range Exposure Area
- Structure Existing Area
- Skeet Range MRS

Notes:

- msl - mean seal level
- LS- Lead Shot
- GSP- Grit Sized Particles
- #10 GSP retained #10 sieve
- # - Lead Shot (LS) counts



N

0 50 100 200 Feet

FIGURE 4-5
LEAD SHOT RESULTS
SOUTHERN RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

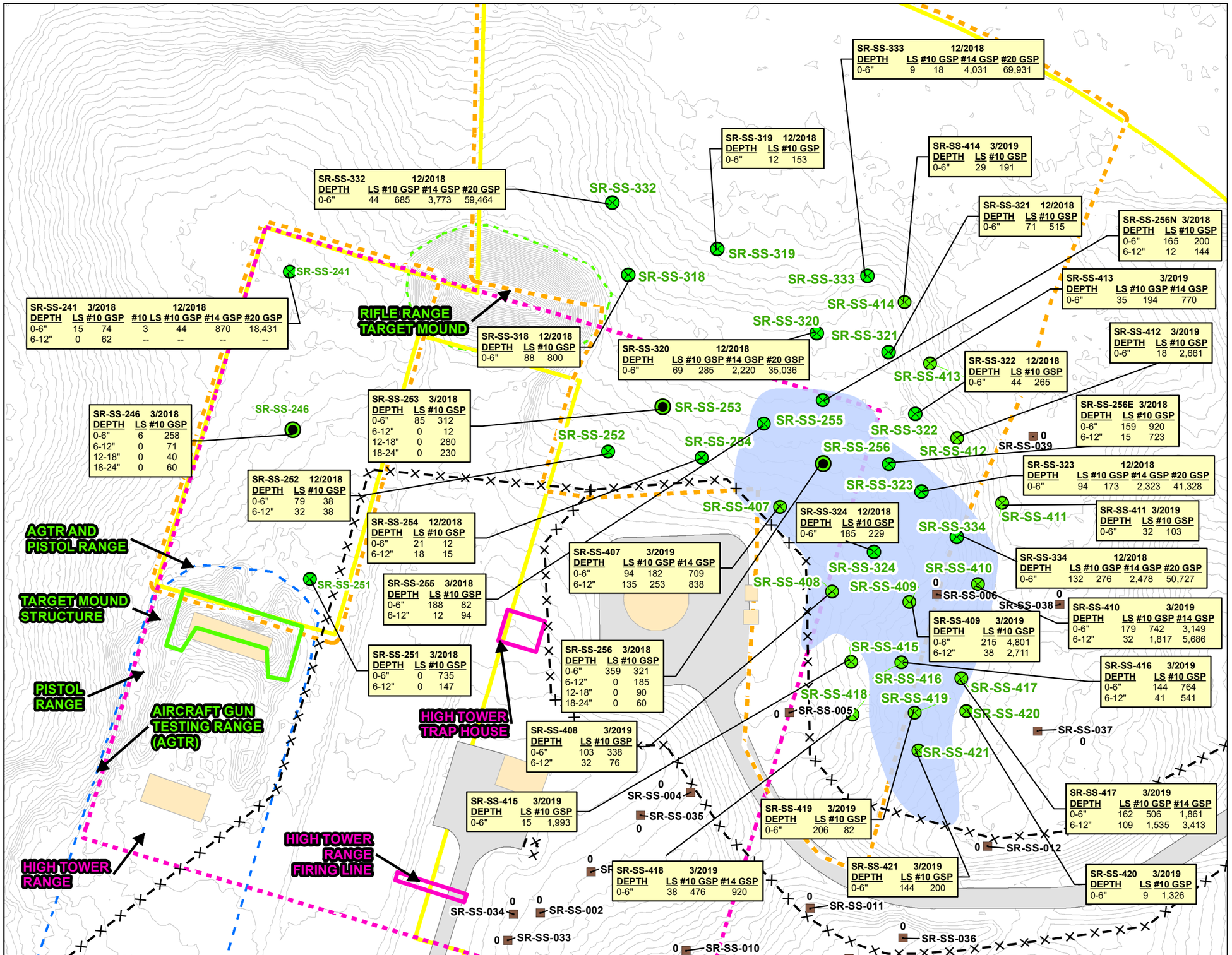
TETRA TECH

8/15/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SkeetRange_southern_proLSTag_032019.mxd MMC

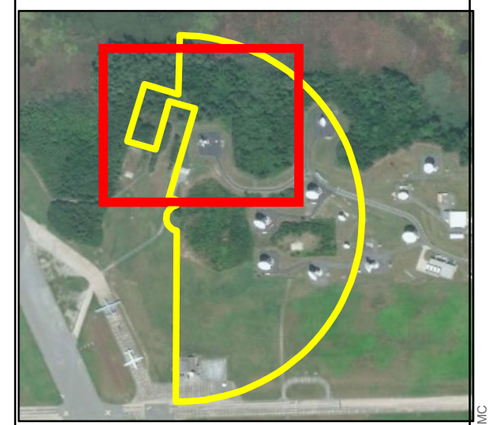


Legend

- RI Surface and Subsurface Soil Sample
- RI Surface Soil Sample
- SI Surface Soil Sample
- Fence Line
- 2010 LIDAR Contours (feet msl)
- High Tower Range Exposure Area
- Structure Existing Area
- Rifle Range Target Mound
- Approximate AGTR Boundary
- High Tower Range
- Skeet Range MRS
- Exceeds 100 LS/Foot ^{2}

Notes:

- LS- Lead Sample
- GSP - Grit Sized Particles
- #10 GSP retained #10 sieve



N

0 30 60 120 Feet

FIGURE 4-6
LEAD SHOT RESULTS
HIGH TOWER RANGE AREA
SKEET RANGE MRS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH

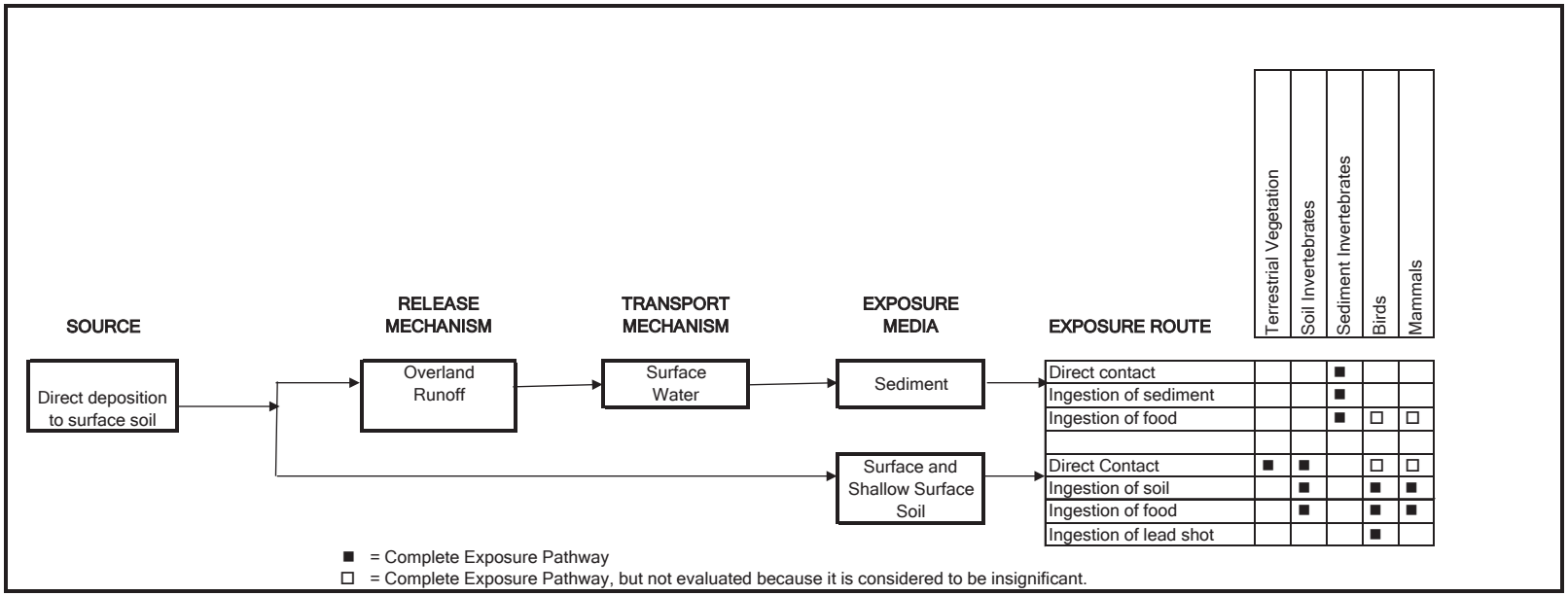
7/17/2019

Aerial Imagery 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\SkeetRange\SR_pro_hightower_LSTag032019.mxd MMC

FIGURE 7-1
ECOLOGICAL CONCEPTUAL SITE MODEL
FORMER SKEET RANGE
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA



Blank space indicates incomplete exposure pathway or relatively insignificant, or not applicable, potential exposure.

Appendix A
2009 SI Groundwater Information

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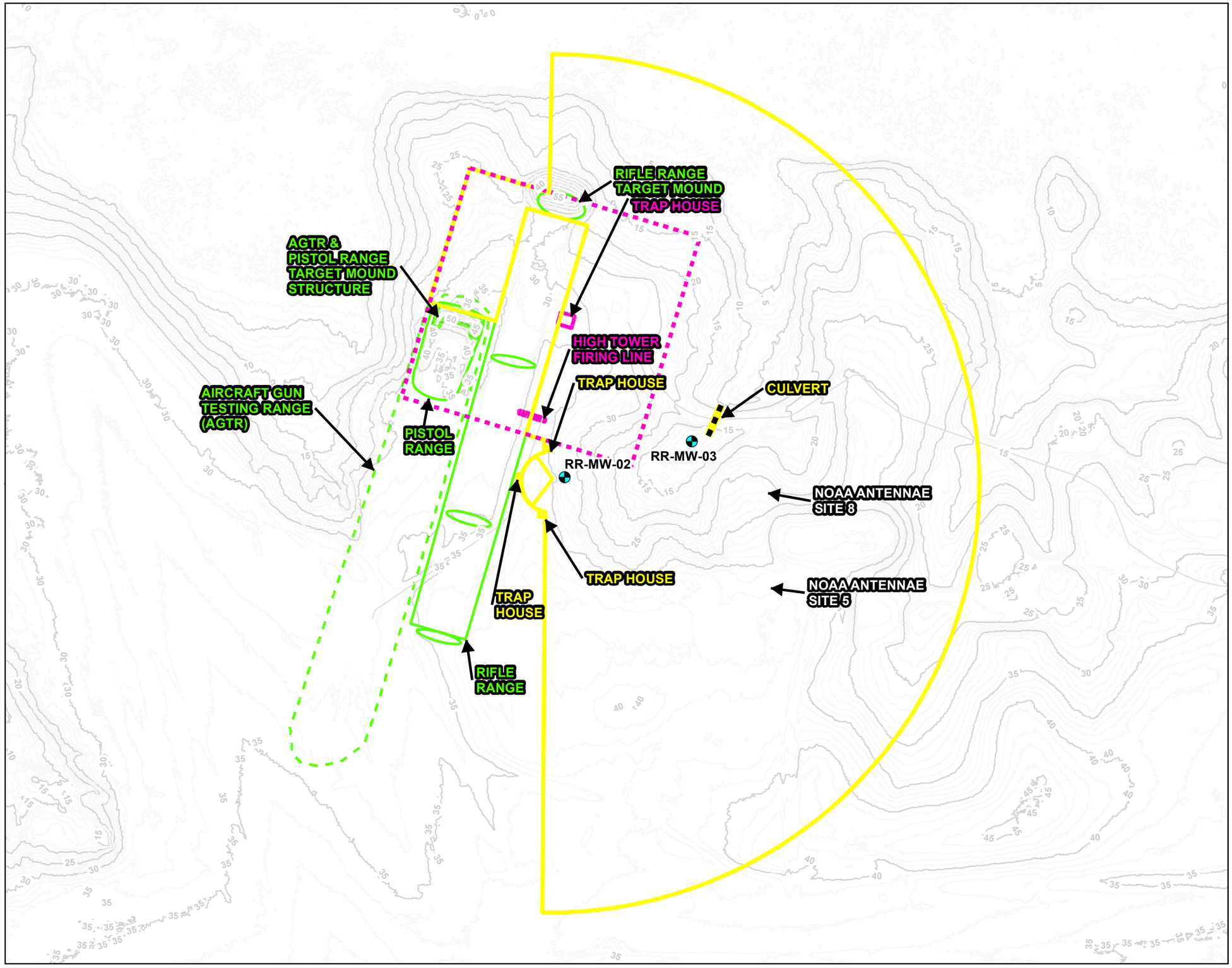
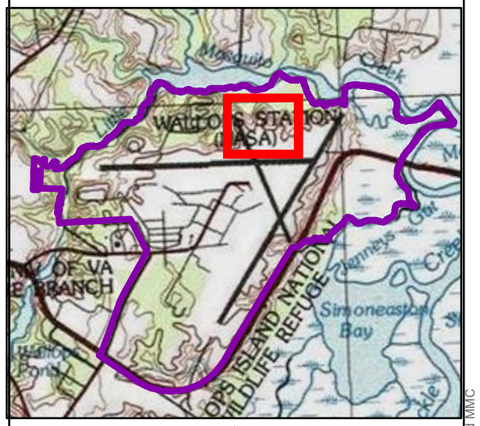


Legend

- Monitoring Well
- 2010 LIDAR Contours (feet msl)
- High Tower Range
- Approximate AGTR Boundary
- Other MBFR Features
- Skeet Range MRS
- Installation Boundary
- Culvert



N

0 100 200 400 Feet

FIGURE 1
SKEET RANGE GROUNDWATER SAMPLE LOCATION MAP
2009 SITE INVESTIGATION
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH

12/3/2019

Aerial Imagery 2013 ESRI map service
USA Topo Map 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA\WIMXD\MBFR\SkeetRange\MBFR_complex_sitelayout_120319..mxd MMC

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
2009 SITE INVESTIGATION
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

Sample	Federal Maximum Contaminant Level (MCL)	USEPA Tapwater RSL[1]	RRMW-02	RRMW-03	RRMW-03-D
Sample Date			10/23/2007	10/23/2007	10/23/2007
INORGANICS (µg/L)					
Aluminum	NC	2000	21.2	31.6	28
Antimony	6	0.78	**0.94 B**	0.87 U	0.87 U
Arsenic	10	0.052	**0.96 B**	**2.6 B**	**3.1 B**
Barium	2000	380	12.6	142	145
Beryllium	4	2.5	0.12 U	0.12 U	0.12 U
Cadmium	5	0.92	0.1 U	0.1 U	0.1 U
Calcium	NC	NC	3920 L	14200 L	14300 L
Chromium	100	2200	0.78 B	0.66 B	0.61 B
Cobalt	NC	0.6	0.26 U	0.39 B	0.53 B
Copper	1300	80	0.22 U	0.22 U	0.22 U
Iron	NC	14000	41.3 B	12100	12300
Lead	15	15	0.97	1.2	1.1
Magnesium	NC	NC	3020	2000	2020
Manganese	NC	43	7.9	**1810**	**1830**
Mercury	2	0.063	0.02 U	0.02 U	0.02 U
Nickel	NC	39	0.67 B	0.97 B	1.3 B
Potassium	NC	NC	1000	2150	2150
Selenium	20	10	2.2 B	1.5 U	1.5 U
Silver	NC	9.4	0.46 U	0.54 B	0.47 B
Sodium	NC	NC	4600	13400	13700
Thallium	2	0.02	0.71 U	0.71 U	0.71 U
Vanadium	NC	8.6	0.29 U	0.29 U	0.29 U
Zinc	NC	600	3.7 B	37.2	38.1
POLYAROMATIC HYDROCARBONS (µg/L)					
2-Methylnaphthalene	NC	3.6	0.2 U	0.2 U	0.2 U
Acenaphthene	NC	53	0.2 U	0.2 U	0.2 U
Acenaphthylene	NC	NC	0.2 U	0.2 U	0.2 U
Anthracene	NC	180	0.2 U	0.2 U	0.2 U
Benz(a)anthracene	NC	0.03	0.2 U	0.2 U	0.2 U
Benzo(a)pyrene	0.2	0.025	0.2 U	0.2 U	0.2 U
Benzo(b)fluoranthene	NC	0.25	0.2 U	0.2 U	0.2 U
Benzo(g,h,i)perylene	NC	NC	0.2 U	0.2 U	0.2 U
Benzo(k)fluoranthene	NC	2.5	0.2 U	0.2 U	0.2 U
Chrysene	NC	25	0.2 U	0.2 U	0.2 U
Dibenz(a,h)anthracene	NC	0.025	0.2 U	0.2 U	0.2 U
Fluoranthene	NC	80	0.2 U	0.2 U	0.2 U
Fluorene	NC	29	0.2 U	0.2 U	0.2 U
Indeno(1,2,3-cd)pyrene	NC	0.25	0.2 U	0.2 U	0.2 U
Naphthalene	NC	0.17	0.2 U	0.2 U	0.2 U
Phenanthrene	NC	NC	0.2 U	0.2 U	0.2 U
Pyrene	NC	12	0.2 U	0.2 U	0.2 U

Notes:
B - Blank contamination
J - Estimated value
L - Biased low
U - Non-detect value.
NC - No criteria
µg/L - micrograms per liter

(1) United States Environmental Protection Agency (USEPA) RSL, November 2019. Carcinogenic values represent an incremental cancer risk of 1 X 10-6. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1. Risk range is 10-6 - 10-4, HI = 0.1.
Bold values indicates exceedance of USEPA Tapwater RSL

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NASA Former Range Complex
PROJECT NUMBER: 112G00198
DRILLING COMPANY: Earth Matters
DRILLING RIG: John Deere DPT

BORING No.: MW-02
DATE: 10-16-07
GEOLOGIST: Vince Shickora
DRILLER: Paul Van Dorn

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
1120	S-1	0					DK Brn	Silty Sand with Grass Roots		dry	0	0	0	0
		2					org Brn	Silty fine Sand with Trace pebbles		dry				
											0	0	0	0
		4												
	S-2						Tan Brn	Fine Sand with Trace Silt		dry to damp	0	0	0	0
		6						↓						
							Tan Brn	Same as above		damp to moist				
		8						↓			0	0	0	0
	S-3							↓						
		10					Wht Gry	Fine to Medium Sand Trace Silt		moist	0	0	0	0
								↓						
		12						↓						
	S-4							↓			0	0	0	0
		14					Wht Gry	Same as above		very moist				
								↓			0	0	0	0
		16						↓						
	S-5							↓						
		18					Wht Gry	Same as above		very moist	0	0	0	0
		20					Wht Gry	Fine to Course Sand Trace fine pebbles/silt		very moist	0	0	0	0
	S-6							↓						
		22						↓						
							Wht Gry	Fine Sand with Trace medium Sand / silt		very moist	0	0	0	0
		24						↓						
	S-7				*			↓		wet at ~ 25'				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 2"x4" Acetate sleeves - DPT Rig

Drilling Area Background (ppm): 0

Converted to Well: Yes X No ____ Well I.D. #: MW-02

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NASA Former Range Complex
PROJECT NUMBER: 112G00198
DRILLING COMPANY: Earth Matters
DRILLING RIG: John Deere - DPT

BORING No.: MW-02
DATE: 10-16-07
GEOLOGIST: V. Shickora
DRILLER: P. Vandorn

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
		26					Gry Wht	Same as above		wet	0	0	0	0
		28												
	5-8						Gry Wht	Same as above		Saturated	0	0	0	0
1150		30												
					EOB									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: (see page 1)

Drilling Area Background (ppm): 0

Converted to Well: Yes X No _____ Well I.D. #: MW-02

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NASA former Range Complex
PROJECT NUMBER: 112G00198
DRILLING COMPANY: Earth Matters
DRILLING RIG: John Deere DPT

BORING No.: MW-03
DATE: 10-16-07
GEOLOGIST: Vincie Shickora
DRILLER: Paul Van Dorn

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	S-1	0					DK Brn	Silty Sand with Grass and roots		dry	0	0	0	0
		2												
							DK Brn	Fine Sand and Silt		very moist	0	0	0	0
		4												
	S-2				*									
		6					DK Gry	Sandy Silt with Trace Clay		wet at ~5' BGS	0	0	0	0
							Gry Brn	Clayey Silt		wet				
		8									0	0	0	0
	S-3						DK Gry	Fine to Medium Sand with Trace Silt/clay		wet				
		10					Gry	Sand-Silt-Clay Mix		wet	0	0	0	0
							Gry	Dense Clay with Trace Silt		moist-Hard				
		12			EOB									
		14												
		16												
		18												
		20												
		22												
		24												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 2" x 4' Acetate sleeves - DPT Rig

Drilling Area Background (ppm): 0

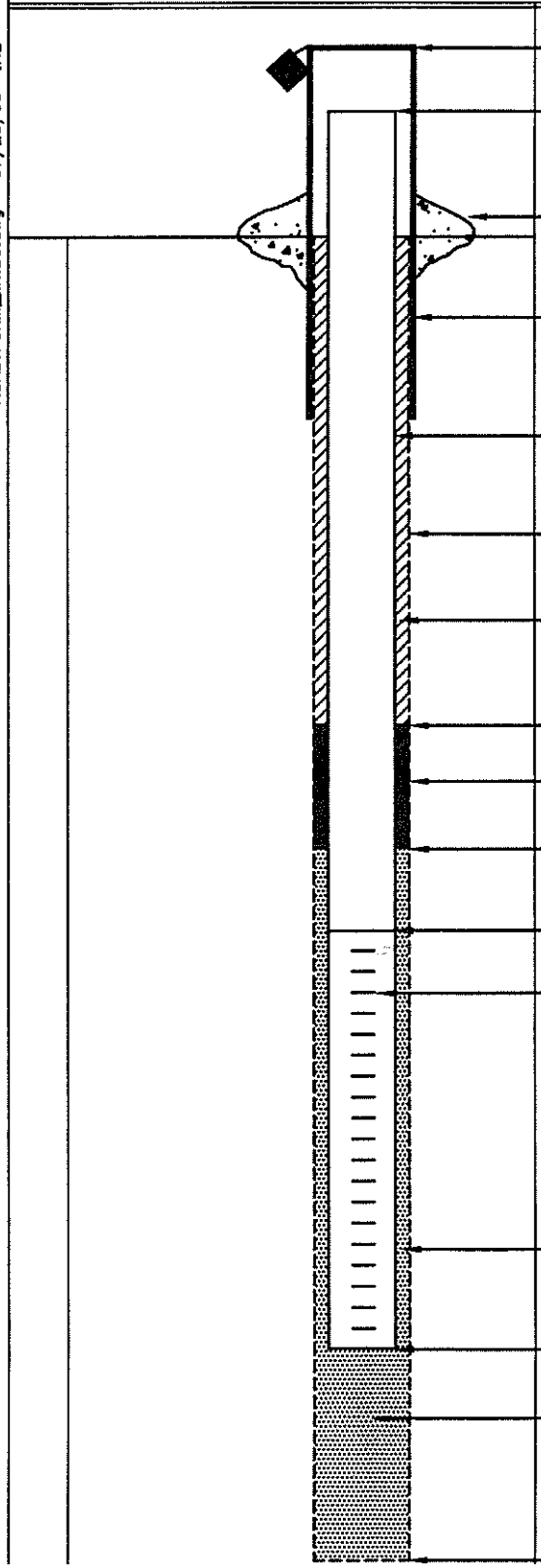
Converted to Well: Yes X No _____ Well I.D. #: MW-03

WELL NO.: MW-02

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT NASA WFF	LOCATION Former Range Complex	DRILLER Paul Van Dorn
PROJECT NO. 112G00198	BORING MW-02	DRILLING METHOD DPT
DATE BEGUN 10-16-07	DATE COMPLETED 10-16-07	
FIELD GEOLOGIST Vince Shickora		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /36"

TYPE OF SURFACE SEAL: None

I.D. OF SURFACE CASING: None

TYPE OF SURFACE CASING: None

RISER PIPE I.D.: 1 inch

TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 2.75 inch

TYPE OF BACKFILL: 3/8" Bentonite Holeplug

ELEVATION/DEPTH TOP OF SEAL: /15.0'

TYPE OF SEAL: Granular Bentonite (Hydrated with Potable water)

DEPTH TOP OF SAND PACK: 20.0'

ELEVATION/DEPTH TOP OF SCREEN: /23.50'

TYPE OF SCREEN: Schedule 40 PVC/Stainless Mesh

SLOT SIZE x LENGTH: 0.020" x 5 feet

I.D. OF SCREEN: 1 inch

TYPE OF SAND PACK: Pre-packed Well Screen and #2 Silica Quartz Sand

ELEVATION/DEPTH BOTTOM OF SCREEN: /28.50

ELEVATION/DEPTH BOTTOM OF SAND PACK: /28.50

BACKFILL MATERIAL BELOW SAND: Natural Formation Material

ELEVATION/DEPTH OF HOLE: /30.0'

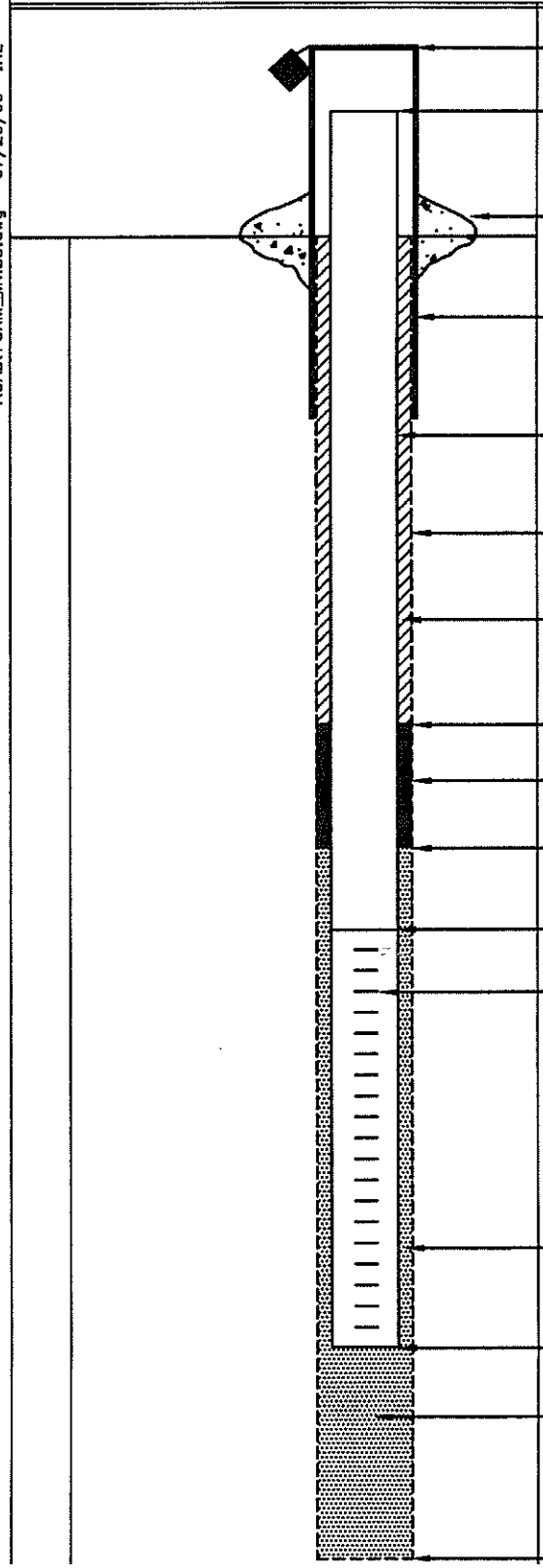
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: MW-03

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT NASA WFF	LOCATION Former Range Complex	DRILLER Paul Van Dam
PROJECT NO. 112G00198	BORING MW-03	DRILLING METHOD DPT
DATE BEGUN 10-16-07	DATE COMPLETED 10-16-07	
FIELD GEOLOGIST Vince Shickora		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /36"

TYPE OF SURFACE SEAL: None

I.D. OF SURFACE CASING: None
TYPE OF SURFACE CASING: None

RISER PIPE I.D.: 1 inch
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 2.75 inch

TYPE OF BACKFILL: NA

ELEVATION/DEPTH TOP OF SEAL: 1.00'

TYPE OF SEAL: Granular Bentonite (Hydrated with Potable Water)

DEPTH TOP OF SAND PACK: 3.00'

ELEVATION/DEPTH TOP OF SCREEN: 4.80'

TYPE OF SCREEN: Schedule 40 PVC/Stainless Mesh

SLOT SIZE x LENGTH: 0.020" x 5'

I.D. OF SCREEN: 1 inch

TYPE OF SAND PACK: Pre-packed Well Screen and #2 Silica Quartz Sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 9.80'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 9.80'
BACKFILL MATERIAL BELOW SAND: Natural Formation Material

ELEVATION/DEPTH OF HOLE: 11.0'

ACAD:FORM_MWSU.dwg 07/20/99 INL

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of _____

Site: NASA Former Range Complex
Well: MW-02
Date Installed: 10-16-07
Date Developed: 10-17-07
Dev. Method: Peristaltic Pump
Pump Type: Peristaltic Pump

Depth to Bottom (ft.): 31.52' (TOC)
Static Water Level Before (ft.): 27.72'
Static Water Level After (ft.): 27.80'
Screen Length (ft.): 5 Feet
Specific Capacity: _____
Casing ID (in.): 1 inch

Project Name: NASA WFF Former Range Complex
Project Number: 112G00198
Site Geologist: Vince Shickora
Drilling Co.: TtNUS Developed.

* ~1 gallon water removed with hand bailer prior to start of Pumping

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1500	–	0	27.72	–	–	–	–	initial
1505	–	0	27.78	17.58	5.35	0.102	414	cloudy - Brown Gray (start) (Surge hose)
1510	–	0.30	27.80	17.77	5.25	0.099	400	"
1515	–	0.70	27.80	17.21	5.23	0.101	352	"
1520	–	1.05	27.80	16.98	5.18	0.115	202	"
1525	–	1.40	27.80	16.77	5.15	0.114	99.4	"
1530	–	1.75	27.80	16.80	5.13	0.111	64.7	slightly cloudy (Tan) (Surge hose)
1535	–	2.05	27.80	16.89	5.11	0.114	477	cloudy - Brown/Gray
1545	–	2.70	27.80	16.81	5.08	0.113	201	"
1550	–	3.05	27.80	16.77	5.07	0.113	116	"
1555	–	3.35	27.80	16.79	5.04	0.113	88.6	slightly cloudy (Tan)
1600	–	3.70	27.80	16.81	5.03	0.113	63.0	slight Tint (Tan)
1605	–	4.00	27.80	16.84	5.02	0.114	46.6	"
1610	–	4.30	27.80	16.88	5.02	0.115	39.9	very slight Tint (Tan)
1615	–	4.60	27.80	16.90	5.02	0.115	41.1	"
1620	–	4.90	27.80	16.92	5.02	0.116	43.6	"
1625	–	5.20	27.80	16.90	5.02	0.116	40.5	"
1630	–	5.50	27.80	16.93	5.02	0.116	42.7	" (End Purge)

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of _____

Site: NASA WOFF
Well: MW-03
Date Installed: 10-16-07
Date Developed: 10-18-07
Dev. Method: Bailer / Pump
Pump Type: Peristaltic

Depth to Bottom (ft.): 12.83 (TOC)
Static Water Level Before (ft.): 7.57
Static Water Level After (ft.): _____
Screen Length (ft.): 5 feet
Specific Capacity: _____
Casing ID (in.): 1 inch

Project Name: Former Range Complex
Project Number: 112G00198
Site Geologist: Vince Shickora
Drilling Co.: Tetra Tech developed

* Removed ~1.5 gallons muddy water/sediment from well with Hand bailer prior to pumping

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1045	–	–	7.57'	–	–	–	–	initial
1050	–	0	7.74	18.65	5.53	0.325	285	start pump - very cloudy (Brown)
1055	–	0.30	11.68	18.55	5.53	0.321	313	(slow pump) "
1100	–	0.45	11.42	18.45	5.47	0.319	195	cloudy - Brown
1105	–	0.60	10.84	18.47	5.45	0.319	170	"
1110	–	0.80	10.18	18.49	5.43	0.319	131	"
1115	–	1.05	10.01	18.53	5.41	0.318	42.4	slight Tint (Tea)
1120	–	1.30	9.86	19.55	5.41	0.320	30.5	(surge hose) "
1130	–	1.80	9.75	18.59	5.41	0.321	56.7	slight Tint (Tea)
1135	–	2.05	9.69	18.61	5.41	0.321	22.0	clear
1140	–	2.30	9.61	18.62	5.41	0.322	14.4	"
1145	–	2.60	9.63	18.63	5.40	0.322	8.5	"
1150	–	2.90	9.59	18.62	5.40	0.323	8.1	End development (clear)

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASA WFF Former Range Complex
Project No.: 112G00198

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: RRMW-02
Sample Location: Skeet Range
Sampled By: VAS
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 10-23-07								
Time: 1335								
Method: Peristaltic pump	clear	5.10	0.084	18.04	1.0	7.78	0.0	185

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 10-23-07								
Method: Peristaltic pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 1-inch PVC								
Total Well Depth (TD): 31.52								
Static Water Level (WL): 27.78								
One Casing Volume(gal/L):								
Start Purge (hrs): 1235								
End Purge (hrs): 1335								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L):								

See Low Flow Purge sheets

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PAHs	None/4°C	1 Liter Amber X 2	6
Total Metals	HNO_3	500 ML Poly X 1	3

OBSERVATIONS / NOTES:

- Sample collected from well MW-02 located near the Skeet Range shooting stations.
- No odors, stains, or elevated PID readings observed.

Circle if Applicable:

MS/MSD: Yes

Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NASA WFF Former Range Complex
PROJECT NUMBER: 112G00198
WELL ID.: RRMW-02
DATE: 10-23-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1230	27.78	—	—	—	—	—	—	—	—	Initial
1235	27.82	325	5.31	0.087	61.5	9.45	17.66	196	0.0	startpump
1240	27.83	325	5.15	0.085	29.5	8.52	17.45	191	0.0	very slight Tint (Tan)
1245	27.83	325	5.12	0.085	20.4	8.01	17.70	184	0.0	clear
1250	27.83	325	5.10	0.085	17.6	7.93	17.66	182	0.0	"
1255	27.83	325	5.08	0.085	14.2	7.88	17.66	183	0.0	"
1300	27.83	325	5.10	0.084	11.5	7.88	17.75	183	0.0	"
1305	27.83	325	5.10	0.084	8.7	7.90	17.90	183	0.0	"
1310	27.83	325	5.10	0.084	5.5	7.91	17.92	183	0.0	"
1315	27.83	325	5.11	0.084	2.0	7.79	17.99	184	0.0	"
1320	27.83	325	5.11	0.084	1.5	7.83	18.01	184	0.0	"
1325	27.83	325	5.10	0.084	1.0	7.77	18.03	185	0.0	"
1330	27.83	325	5.10	0.084	1.5	7.74	18.05	185	0.0	"
1335	27.83	325	5.10	0.084	1.0	7.78	18.04	185	0.0	" - collect sample

SIGNATURE(S): [illegible]

PAGE___OF___

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASA WFF Former Range Complex
Project No.: 112G00198

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: RRMW-03
Sample Location: Skeet Range
Sampled By: VAS
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 10-23-07								
Time: 1540								
Method: Peristaltic pump	clear	5.47	0.245	19.03	8.0	2.17	0.0	-39

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 10-23-07								
Method: Peristaltic pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 1-inch PVC								
Total Well Depth (TD): 12.83'								
Static Water Level (WL): 7.58'								
One Casing Volume(gal/L):								
Start Purge (hrs): 1430								
End Purge (hrs): 1540								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PAHs	None/4°C	1 Liter Amber X 2	4
Total Metals	HNO_3	500ML Poly X 1	2

OBSERVATIONS / NOTES:

- Sample collected from well MW-03 located at downgradient area of Skeet Range adjacent to NOAA property.
- No odors, stains, or elevated PID readings observed.

Circle if Applicable:

MS/MSD	Duplicate ID No.: RRDUP-02

Signature(s): [signature]

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NASA WFF Former Range Complex
PROJECT NUMBER: 112G00198

WELL ID.: RRMW-03
DATE: 10-23-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1425	7.58	–	–	–	–	–	–	–	–	initial
1430	7.59	250	5.50	0.257	101	3.43	19.18	-10	0.0	start pump (cloudy - Tan)
1435	7.63	250	5.39	0.251	62.5	2.44	19.09	-15	0.0	slight Tint (Tan)
1440	7.64	250	5.41	0.250	38.7	1.95	19.03	-24	0.0	very slight Tint (Tan)
1445	7.65	250	5.43	0.250	24.5	1.90	19.04	-29	0.0	clear
1450	7.65	250	5.45	0.249	19.0	1.87	18.95	-26	0.0	"
1455	7.66	250	5.46	0.249	15.5	1.93	18.95	-27	0.0	"
1500	7.66	250	5.46	0.248	13.5	2.01	19.00	-31	0.0	"
1505	7.66	250	5.47	0.247	11.5	1.99	18.98	-30	0.0	"
1510	7.67	250	5.48	0.246	10.3	2.00	18.96	-29	0.0	"
1515	7.67	250	5.47	0.245	9.7	2.10	18.95	-31	0.0	"
1520	7.68	250	5.47	0.244	9.5	2.21	18.90	-34	0.0	"
1525	7.68	250	5.47	0.244	9.0	2.24	18.88	-33	0.0	"
1530	7.69	250	5.47	0.244	9.1	2.20	18.89	-32	0.0	"
1535	7.69	250	5.48	0.245	8.0	2.18	19.01	-36	0.0	"
1540	7.69	250	5.47	0.245	8.0	2.17	19.03	-39	0.0	" - collect sample

SIGNATURE(S): [signature]

PAGE___OF___

Appendix B
Photographic Log

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NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG

Date:	View:	Photographer:
3/29/2018	East	J. Birkett

In the Southern Range Area looking out over the bowl with NOAA satellite dishes in the distance.

Date:	View:	Photographer:
3/29/2018	Northwest	J. Birkett

Looking back across the Southern Range Area back at the firing line. The Pistol Range backstop is visible in the background as well as Building A-131.

NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG

Date:	View:	Photographer:
3/29/2018	East	J. Birkett

Looking across the Skeet Range in the bowl area back towards the NOAA satellite dishes.

Date:	View:	Photographer:
3/29/2018	East	J. Birkett

Sample locations (SR-SS-236 and -237), indicated by white flags, adjacent to fence marking NOAA property.

NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG

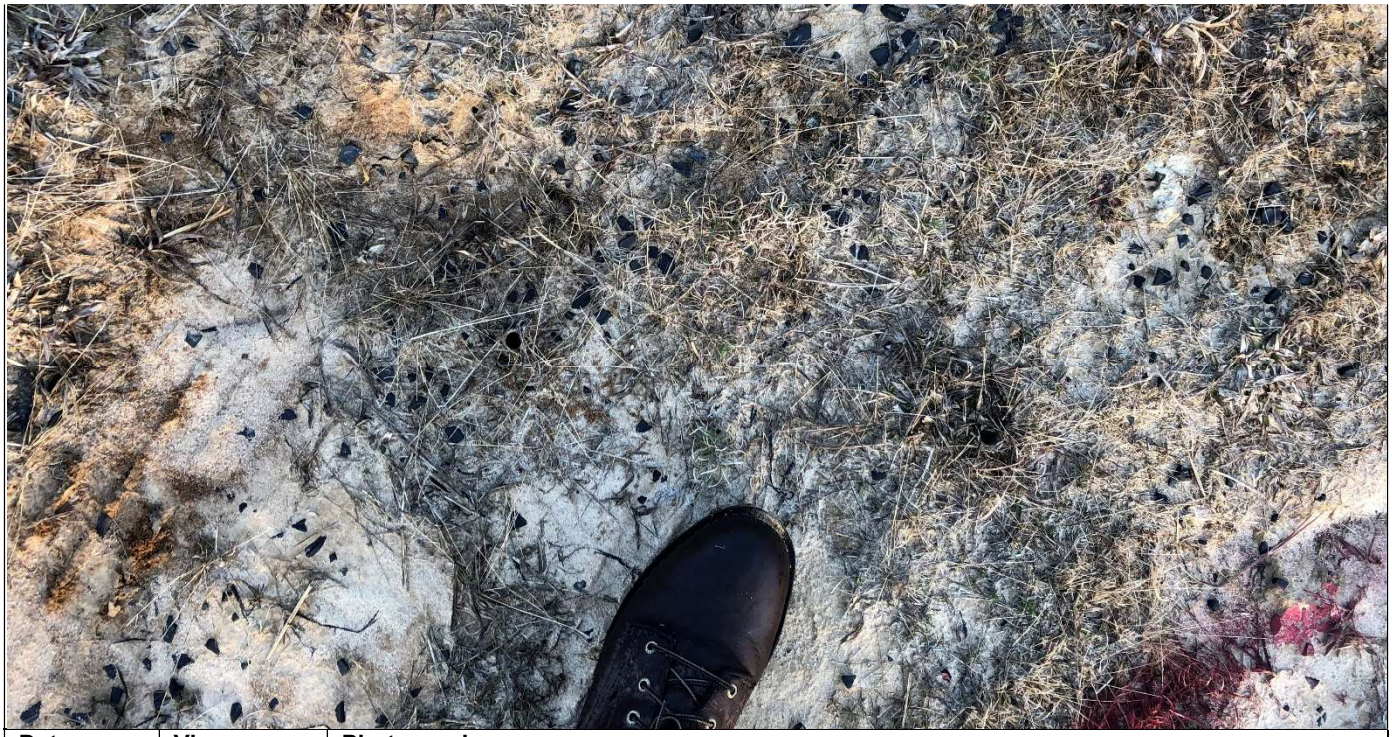
Date:	View:	Photographer:
3/29/2018	North	J. Birkett

Looking at the culvert that connects the bowl of the Southern Range Area to the Northern Range Area.

Date:	View:	Photographer:
3/28/2018	North	B. Sweeney

Geologist (left) using GPS to mark-out soil sample locations while geologist (right) clears vegetation to make site more accessible.

NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG



Date:	View:	Photographer:
3/23/2018	N/A	J. Birkett

Clay pigeons visible near previously collected sample SR-SS-032.

Date:	View:	Photographer:
3/26/2018	South	J. Birkett

Geologists collecting soil at SR-SS-232 adjacent to gravel road.

NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG

Date:	View:	Photographer:
3/27/2018	N/A	J. Birkett

Geologist collecting surface soil from a 7” × 7” plot.

Date:	View:	Photographer:
3/22/2018	N/A	J. Birkett

Geologist dry sieves soil sample using #10 sieve.

NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG

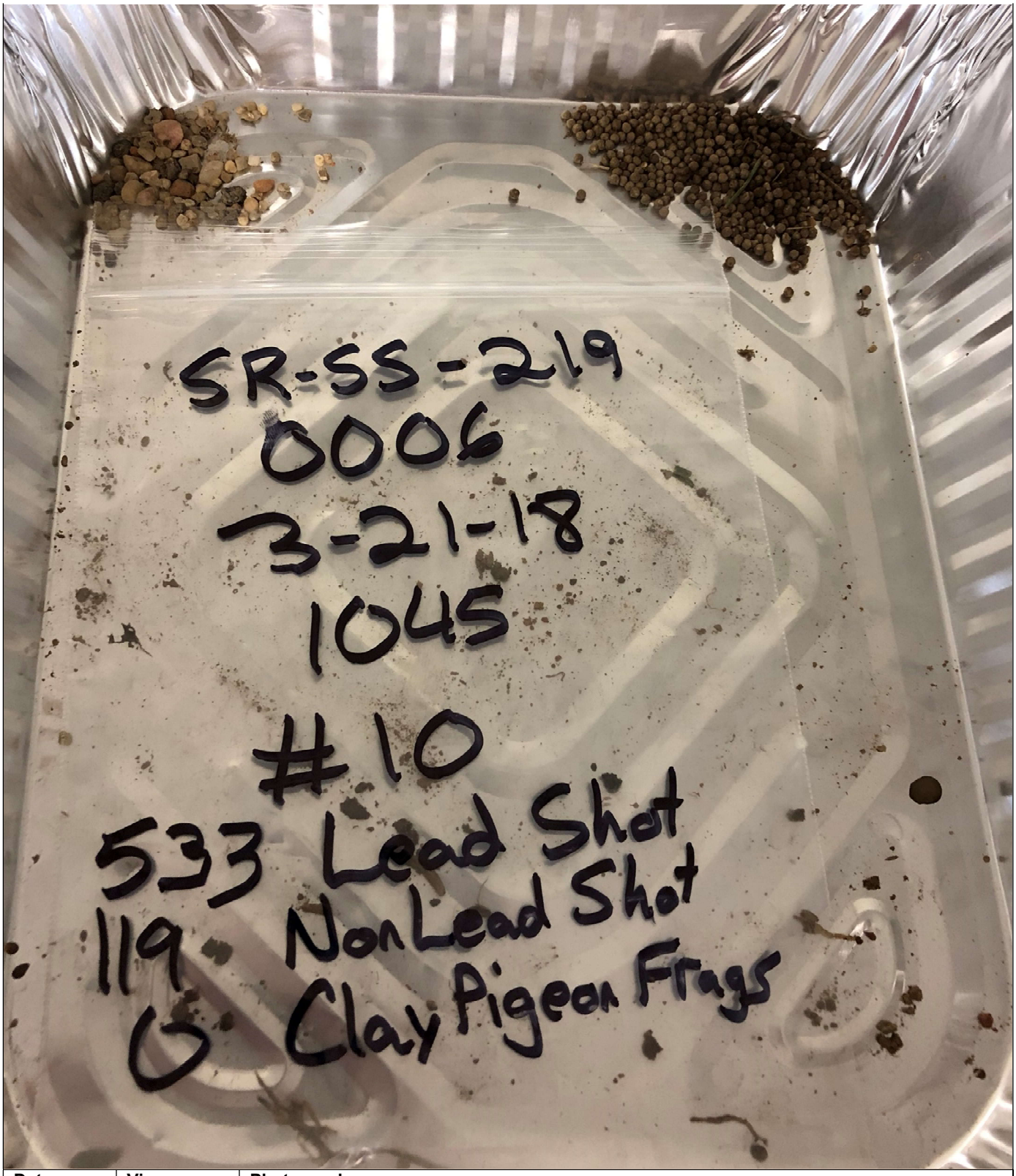
Date:	View:	Photographer:
3/20/2018	West	J. Birkett

Geologists dry sieve surface soil samples at SR-SS-226 using #10 sieves.

Date:	View:	Photographer:
3/20/2018	NA	J. Birkett

Recovered fractions from the #10 and #35 sieves from the 0 to 6” and 6 to 12” intervals at SR-SS-225.

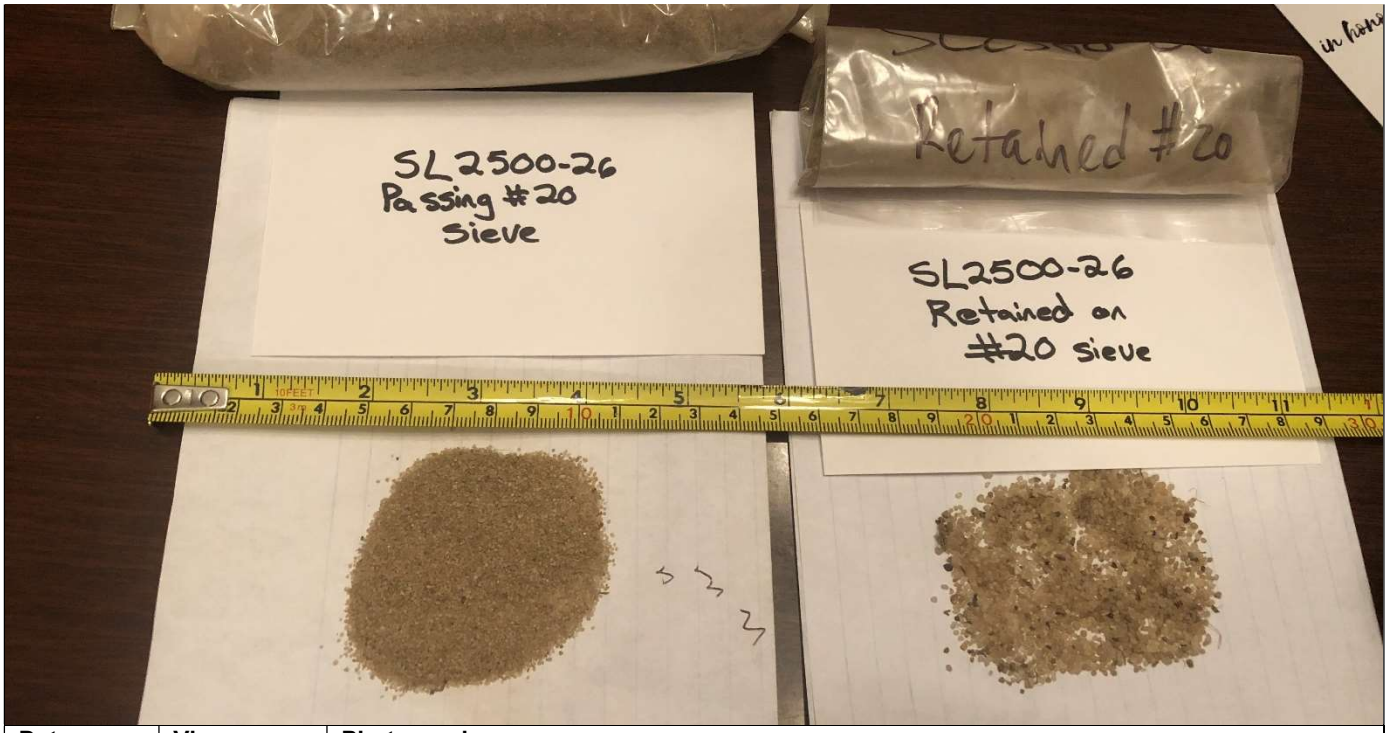
NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG



Date:	View:	Photographer:
3/21/2018	NA	J. Birkett

Lead and non-lead fraction caught on the #10 sieve. Counts were done for the lead and non-lead fractions.

NASA WFF FORMER SKEET RANGE SAMPLING PHOTOGRAPHIC LOG



Date:	View:	Photographer:
5/13/2018	NA	J. Birkett

Laboratory recovered fractions from the #20 sieve from the 0 to 6” interval at SR-SS-221.

Date:	View:	Photographer:
4/15/2018	NA	B. Benfield

Scientist performing wetlands delineation of the Northern Range Area.

Appendix C
Soil Sample Log Sheets

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SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-201-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S201	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:35			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-201-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S201	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	YES

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:39	6-12 IN	BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. WET
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	2	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-201-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S201	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil — **[X] Low Concentration**
[ ] Sediment — **[ ] High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:42			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SANDY SILT WITH SOME CLAY. WET
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: — **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-202-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S202	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:50	0-6 IN	DK BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. WET
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-202-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S202	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:55			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SANDY SILT WITH LITTLE CLAY AND ROOTS. WET
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-202-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S202	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil — **[X] Low Concentration**
[ ] Sediment — **[ ] High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:59			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SANDY SILT WITH LITTLE CLAY. WET
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: — **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-203-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S203	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	SR-DUP06-032218	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:21			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-203-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S203	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:25			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-203-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S203	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil — **[X] Low Concentration**
[ ] Sediment — **[ ] High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:29			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SILTY FINE TO MEDIUM SAND WITH TRACE CLAY AND ROOTS. WET
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: — **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-204-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S204	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:28			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-204-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S204	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:34			
Method:	Hand Auger-Trowel	6-12 IN	DK BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-205-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S205	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:04			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-205-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S205	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:08			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. VERY MOIST.
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-206-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S206	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:23	0-6 IN	DK BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-206-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S206	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:27			
Method:	Hand Auger-Trowel	6-12 IN	LT BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-207-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S207	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:04			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-207-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S207	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:10			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILTY FINE SAND WITH SOME CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-208-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S208	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:42	0-6 IN	DK BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. WET
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-208-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S208	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:47			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. WET
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-209-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S209	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:32			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-209-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S209	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:37			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SANDY SILT WITH LITTLE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-210-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S210	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:53	0-6 IN	DK BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. VERY MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-210-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S210	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:58			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. WET
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-211-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S211	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:12			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-211-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S211	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:16			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-212-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S212	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:14			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH TRACE CLAY AND ROOTS. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-212-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S212	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:18			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-213-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S213	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:50	0-6 IN	DK BROWN	SANDY SILT WITH SOME CLAY AND ROOTS. VERY MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-213-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S213	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:57			
Method:	Hand Auger-Trowel	6-12 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-214-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S214	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:21	0-6 IN	DK BROWN	SILT AND FINE GRAINED SAND WITH TRACE CLAY AND TREE ROOTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-214-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S214	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:25			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILTY FINE SAND WITH TRACE CLAY AND ROOTS. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-215-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S215	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:10	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY AND ORGANIC MATERIAL (ROOTS, LEAVES) VERY MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-215-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S215	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:15			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SILT AND FINE GRAINED SAND WITH LITTLE CLAY AND TREE ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: NONE

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-216-0006	Sampled By: VS
Sample Location: S216	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment

- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1550	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method: Handauger / Trowel	0-6" bgs	DK Brn light brn	~~Silty San~~ Sandy silt tr. clay moist
Monitor Reading (ppm): NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 294

Non-organic/non-lead particles: 153

#35 sieve: Lead shot: —

Non-organic/non-lead particles: —

Clay pigeon frag count: 5

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-216-0612	Sampled By: BB
Sample Location: S216	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1617
Method: Hand auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light Brn	Sandy silt tr. clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 72
Non-organic/non-lead particles: 46

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 3 large

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-216-1224	Sampled By: JB
Sample Location: S216	Sample Date: 3-22-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[X] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: ~~1251~~ 1245
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	light brn	Sandy silt tr. clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	no

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 5
Non-organic/non-lead particles: ~23

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-217-0006	Sampled By: JB
Sample Location: SR-Dup05-032118	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1527
Method: Hand auger/Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	brn light brn	sandy silt tr. clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 419
Non-organic/non-lead particles: 151

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-217-0612	Sampled By: BS
Sample Location: 5217	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[✓] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[✗] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1728
Method: Hand Auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12' bgs	light	sandy silt some clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 92
Non-organic/non-lead particles: 167

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-217-1224	Sampled By: JB
Sample Location: S217	Sample Date: 3-22-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1143
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	light brn	Silt some clay tr. sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 11

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): JB

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-218-0006	Sampled By: VS
Sample Location: S218	Sample Date: 3-20-18
QA/QC Duplicate ID:	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1617
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	Brn	Silt some clay tr. F sand very wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 218
Non-organic/non-lead particles: 178

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-218-0612	Sampled By: BJB
Sample Location: S218	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1627
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy silt some clay wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 138
Non-organic/non-lead particles: 39

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-218-1224	Sampled By: BS
Sample Location: 5218	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: yes

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1201
Method: Hand Auger/Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	Light Brn	Silt some clay and F. sand wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	3	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 6
Non-organic/non-lead particles: 7

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-219-0006	Sampled By: JB
Sample Location: S219	Sample Date: 3-20-18
QA/QC Duplicate ID:	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1640
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	Brn	Silt some clay tr F sand very wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 533
Non-organic/non-lead particles: 119

#35 sieve: Lead shot: 0
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-219-0612	Sampled By: BB
Sample Location: S219	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1650
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy Silt some clay wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 46
Non-organic/non-lead particles: 155

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-219-1224	Sampled By: JB
Sample Location: 5219	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1205
Method: Hand auger/Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	light	Clay some silt and sand wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 1
Non-organic/non-lead particles: 35

#35 sieve: Lead shot: 0
Non-organic/non-lead particles: 6

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: March 2018
Project Site Name: NASA WFF Skeet Range RI
Project No.: 112G07696

Sample ID No.: SR-SS-220-0006	Sampled By: JB
Sample Location: S220	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1315
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	brn	Sandy silt tr clay w/organics moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 66
Non-organic/non-lead particles: 75

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-220-0612	Sampled By: BS
Sample Location: S220	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1340
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	brn	Sandy silt tr. clay w/organics moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 193
Non-organic/non-lead particles: 58

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-220-1224	Sampled By: JB
Sample Location: S220	Sample Date: 3-22-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1145
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	light brn	Sandy silt tr. clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 9
Non-organic/non-lead particles: 18

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-221-0006	Sampled By: VS
Sample Location: 5221	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1215
Method: Hand auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	DkBrn	Silt little sand tr. clay very moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 148
Non-organic/non-lead particles: 144

#35 sieve: Lead shot: Unknown
Non-organic/non-lead particles: >100,000

Clay pigeon frag count: 10

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-221-0612	Sampled By: BB
Sample Location: S221	Sample Date: 3-21-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1220
Method: Hand auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12	Brn	Silt little sand tr. clay very moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 53
Non-organic/non-lead particles: 99

#35 sieve: Lead shot: Unknown
Non-organic/non-lead particles: >100,000

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-221-1224	Sampled By: JB
Sample Location: S221	Sample Date: 3-22-18
QA/QC Duplicate ID: No	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1045
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	light brn	Silt some clay tr. F sand very little M sand very moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 5
Non-organic/non-lead particles: 18

#35 sieve: Lead shot: —
Non-organic/non-lead particles: >100,000

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-222-0006	Sampled By: BB
Sample Location: S222	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1340
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	DK Brn light brn	sandy silt tr. clay w/organics very moist to moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 15
Non-organic/non-lead particles: >1000

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 4 small

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-222-0612	Sampled By: BB
Sample Location: S222	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment

- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1350
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy silt tr. clay very moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 2
Non-organic/non-lead particles: >1000

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-222-1224	Sampled By: BS
Sample Location: S222-	Sample Date: 3-21-18
QA/QC Duplicate ID: SR-Dup04-032118	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0835 Method: Hand auger / Trowel Monitor Reading (ppm): NA	12-24" bgs	light brn	Sandy Silt tr. clay and C. sand very moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 200

#35 sieve: Lead shot: –
Non-organic/non-lead particles: –

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-223-0006	Sampled By: JB VS BB BS
Sample Location: S223	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1326
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	dk brn light brn	Sandy silt tr. clay w/organics moist moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0 ~~15~~
Non-organic/non-lead particles: 750

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 50

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-223-0612	Sampled By: BB
Sample Location: 5223	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 3-20-18 1330
Method: Hand auger
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy silt tr. clay Moist Very few organics

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 5
Non-organic/non-lead particles: 700

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 40 large

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-223-1224	Sampled By: BS
Sample Location: S223	Sample Date: 3-21-18
QA/QC Duplicate ID: SR-Dup03-032118	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 0825
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	brn	Silty sand some clay tr. C. sand very moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 50

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 3

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-224-0006	Sampled By: JB BS
Sample Location: S224	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: yes

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1234
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0" to 6" bgs	light brn	F. sand tr. silt and M. sand moist few roots

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	3	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	no

OBSERVATIONS / NOTES:

Lead shot count conducted at interval yes

#10 sieve: Lead shot: 6
Non-organic/non-lead particles: >1000

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 2 small frags

MAP:

Coordinates:	N	E	

Signature(s):

c

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-224-0612	Sampled By: JB BS
Sample Location: S224	Sample Date: 3-20-18
QA/QC Duplicate ID: SR-Dup02-032018 (1200)	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1245			
Method: Hand auger/trowel	6" to 12" bgs	light brn	F sand tr. silt and M sand moist
Monitor Reading (ppm): NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:

PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval BS

#10 sieve: Lead shot: 1
Non-organic/non-lead particles: >750

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-224-1224	Sampled By: BS
Sample Location: S224	Sample Date: 3-21-18
QA/QC Duplicate ID:	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 0745
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	light brn	F sand some silt moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 100

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-225-0006	Sampled By: Ben Benfield
Sample Location: SR-SS-225	Sample Date: 3-20-18
QA/QC Duplicate ID: NA	MS/MSD Collected: No

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment

- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 0925
Method: Hand Auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0" to 6" BGS	Brown	Sandy Silt with Trace clay and organic material (roots, etc) (very moist)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	—
* 3-21-18 0741						
Grain Size	—	—	1	8oz	glass	yes
#35 Lead Shot Cnt	—	—	1	Bag	Bag	yes

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: >300

#35 sieve: Lead shot: >100,000
Non-organic/non-lead particles: unknown too hard to tell

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-225-0612	Sampled By: Vince Shickora
Sample Location: SR-SS-225	Sample Date: 3-20-18
QA/QC Duplicate ID: NA	MS/MSD Collected: No

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment

- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 0910
Method: Hand Auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0" to 6" BGS	Dark Brown	Sandy Silt with Trace clay and organics (leaves, roots, etc) (very moist to wet)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	—
3-21-18 0743						
Grain Size	—	—	1	8oz bag	8-z glass jar	yes
#35 Lead Shot Count	—	—	1		Bag	yes

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 8
Non-organic/non-lead particles: 300

#35 sieve: Lead shot: unknown
Non-organic/non-lead particles: >100,000

Clay pigeon frag count: 3 (#10 sieve) small ~1/4"

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-225-1224	Sampled By: JB
Sample Location: S225	Sample Date: 3-21-18
QA/QC Duplicate ID:	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 0745
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	brn	silty sand tr c. sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No
Grain Size	—	—	1	8oz	glass	yes

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 75

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

(226)

Sample ID No.: SR-SS-226-0006	Sampled By: Vince Shickota
Sample Location: SR-SS-226	Sample Date: 3-19-18
QA/QC Duplicate ID: SR-DUP01-031918 (1200 hours)	MS/MSD Collected: No

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1301 Method: Hand Auger / Trowel Monitor Reading (ppm): NA	0" to 6" BGS	Brown	Sandy silt with trace clay and organic frags (roots/leaves) (very moist)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:

PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	—

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 1

Non-organic/non-lead particles: 200

#35 sieve: Lead shot: —

Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): [signature]

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-226-0612	Sampled By: Vince Shickota
Sample Location: SR-SS-226	Sample Date: 3-19-18
QA/QC Duplicate ID: NA	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1330
Method: Hand Auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6" to 12" BGS	Brown	Silty Sand with Trace clay and organic frags (roots, leaves) (very moist)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	—

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 7
Non-organic/non-lead particles: ~300

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SB-226-1224	Sampled By: BB
Sample Location: 5226	Sample Date: 3-20-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1415
Method: Hand Auger/Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-24" bgs	light brn	Silty sand tr. clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 100

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-227-0006	Sampled By: JB
Sample Location: S227	Sample Date: 3-26-16
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: ~~1010~~ 1005
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6"	light brn	~~light brn~~ Sandy silt moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	no
Grain Size	—	None	1	8oz	glass jar	yes

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 102
Non-organic/non-lead particles: 92

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 6

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-227-0612	Sampled By: JB
Sample Location: S227	Sample Date: 3-26-18
QA/QC Duplicate ID: SR-Dup14-032618 (1209)	MS/MSD Collected: —

MATRIX / CONCENTRATION:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment

- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1125
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy silt moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO
Grain Size	—	None	1	8 oz	glass jar	yes

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 3
Non-organic/non-lead particles: 66

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SB-227-1224 (No sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S227	**Sample Date:**	03/26/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Lt Brown	Sandy silt. Moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

		12-18"	18-24"
Lead shot count conducted at interval			
#10 sieve:	Lead shot:	0	**0**
	Non-organic/non-lead particles:	0	**14**
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-223-0006	Sampled By: BB
Sample Location: S223	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1118
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy silt moist w/roots

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 20
Non-organic/non-lead particles: 24

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-223-0612	Sampled By: BB
Sample Location: S223	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1006
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy Silt moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 13

#35 sieve: Lead shot: 0
Non-organic/non-lead particles: 0

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-229-0006	Sampled By: JB
Sample Location: S229	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: Yes

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: ~~1330~~ 1230
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6	light brn	Silty F. sand w/ roots

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	3	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 7
Non-organic/non-lead particles: 140

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SS-229-062	Sampled By: JB
Sample Location: 5229	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1347
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy silt tr. clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 35

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-230-0006	Sampled By: VS
Sample Location: S230	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1010
Method: Handauger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6"	lightbrn	Sandy Silt moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	no

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 72
Non-organic/non-lead particles: 51

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 255

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-230-0612	Sampled By: VS
Sample Location: S230	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment

- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1115
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Silt some F. sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	17
	Non-organic/non-lead particles:	30
#35 sieve:	Lead shot:	—
	Non-organic/non-lead particles:	—

Clay pigeon frag count: 10

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SB-230-1224 (No sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S230	**Sample Date:**	03/26/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Lt Brown	Sandy silt. Moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

		12-18"	18-24"
Lead shot count conducted at interval			
#10 sieve:	Lead shot:	0	**0**
	Non-organic/non-lead particles:	2	**5**
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-231-0006	Sampled By: BB
Sample Location: S231	Sample Date: 3-27-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 0825
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	light brn	F. Sandy Silt Moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 93
Non-organic/non-lead particles: 31

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-231-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S231	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:00			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	2
	Non-organic/non-lead particles:	7
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-231-1224 (No sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S231	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Clayey silt some fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	0
	Non-organic/non-lead particles:	3	2
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR- SS - 232-006	Sampled By: VS
Sample Location: S232	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1350
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	light Brn	Silty Sand w/roots moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 15
Non-organic/non-lead particles: 400

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-232-0612	Sampled By: VS
Sample Location: 5232	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: —

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 1455
Method: ~~1455~~ Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	Sandy Silt Moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	13
	Non-organic/non-lead particles:	155
#35 sieve:	Lead shot:	—
	Non-organic/non-lead particles:	—

Clay pigeon frag count: 3

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SB-232-1224 (No sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S232	**Sample Date:**	03/26/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil — **[X] Low Concentration**
[ ] Sediment — **[ ] High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Lt Brown	Sandy silt. Moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	**0**
	Non-organic/non-lead particles:	7	**7**
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-233-0006	Sampled By: VS
Sample Location: S233	Sample Date: 3-27-18
QA/QC Duplicate ID: —	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Time: 0725
Method: Handauger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	lightbrn	F Sandy Silt moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	Yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 74
Non-organic/non-lead particles: 38

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-233-0612	Sampled By: VS
Sample Location: S233	Sample Date: 3-27-18
QA/QC Duplicate ID: SR-Dup15-20180327 (1200)	MS/MSD Collected: NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 0840
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	light brn	F Sandy Sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	no

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 6
Non-organic/non-lead particles: 19

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-233-1224 (No sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S233	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Clayey silt some fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	0
	Non-organic/non-lead particles:	5	3
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: March 2018
Project Site Name: NASA WFF Skeet Range RI
Project No.: 112G07696

Sample ID No.: SR-SS-234-0006	Sampled By: JB
Sample Location: S234	Sample Date: 3-27-18
QA/QC Duplicate ID: —	MS/MSD Collected: yes

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 0726
Method: Hand Auger / Trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	light brown	Silty F. sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	3	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 154
Non-organic/non-lead particles: 92

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-234-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S234	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:03			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	11
	Non-organic/non-lead particles:	30
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-234-1224 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S234	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Sandy silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	0
	Non-organic/non-lead particles:	1	0
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-235-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S235	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	329
	Non-organic/non-lead particles:	145
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 3

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-235-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S235	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	13:20			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	18
	Non-organic/non-lead particles:	88
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-235-1224 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S235	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			12-18" Sandy Silt, moist
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	18-24" Silty Clay some sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	0
	Non-organic/non-lead particles:	6	6
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-236-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S236	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:05			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Sandy silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	115
	Non-organic/non-lead particles:	112
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 3

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-236-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S236	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:27			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Sandy silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	9
	Non-organic/non-lead particles:	50
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-236-1224 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S236	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Sandy silt trace clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	1
	Non-organic/non-lead particles:	19	6
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-237-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S237	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	13:30			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	82
	Non-organic/non-lead particles:	243
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-237-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S237	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:58			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Sandy silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	23
	Non-organic/non-lead particles:	125
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-237-1224 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S237	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	0
	Non-organic/non-lead particles:	10	7
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-238-0006	Sampled By: BB
Sample Location: S238	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1439
Method: Hand auger / trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-6" bgs	Dk Brn light brn	Silty F-M sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 18
Non-organic/non-lead particles: 250

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.: SR-SS-238-0612	Sampled By: BB
Sample Location: S238	Sample Date: 3-26-18
QA/QC Duplicate ID: —	MS/MSD Collected: No

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time: 1300
Method: Hand auger/trowel
Monitor Reading (ppm): NA

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6-12" bgs	lightbrn	Silty F. Sand Moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm): NA

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	yes
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	No

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve: Lead shot: 0
Non-organic/non-lead particles: 27

#35 sieve: Lead shot: —
Non-organic/non-lead particles: —

Clay pigeon frag count: 6

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-239-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S239	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Fine sand some silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	28
	Non-organic/non-lead particles:	300
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-239-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S239	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	13:41			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty very fine to fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	32
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-240-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S240	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	11:47			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	34
	Non-organic/non-lead particles:	155
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-240-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S240	**Sample Date:**	03/27/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	1
	Non-organic/non-lead particles:	103
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-241-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S241	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	7:12			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty sand trace roots and clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	5
	Non-organic/non-lead particles:	25
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-241-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S241	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	21
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-242-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S242	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	SR-DUP13-032318 13:00	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:36			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Sandy silt some organics, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-242-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S242	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:37			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Sandy silt some clay moist to wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-243-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S243	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:30			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Fine organics some sand and silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-243-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S243	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:32			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Fine sand some silt trace organics, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-243-1224	**Sampled By:**	BB/BS/JB
Sample Location:	S243	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:33			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Sandy silt traceclay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-244-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S244	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:04			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Sandy silt with organics, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-244-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S244	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:07			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Sandy silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-245-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S245	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Silt, organics, some sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-245-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S245	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:47			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Sandy silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-246-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S246	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:51			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Organics some silt and sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	2
	Non-organic/non-lead particles:	88
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-246-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S246	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:53			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	3	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	24
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-246-1224	**Sampled By:**	BB/BS/JB
Sample Location:	S246	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	SR-DUP12-032318 12:00	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] **Surface Soil**

[x] **Subsurface Soil**

[ ] **Sediment**

[X] **Low Concentration**

[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:55			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Sandy silt some clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	**0**
	Non-organic/non-lead particles:	4	**6**
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-247-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S247	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:20			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Sandy silt and organics, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-247-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S247	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:22			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	3	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-248-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S248	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:10			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brn	Sandy silt some organics, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-248-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S248	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:12			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-249-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S249	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:52			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dk Brn	Sandy silt and organics, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-249-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S249	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	YES

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:54			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	3	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-250-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S250	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dk brn	Fine organics, sand, silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-250-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S250	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:47			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Sandy silt trace clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-250-1224	**Sampled By:**	BB/BS/JB
Sample Location:	S250	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[x] Subsurface Soil — **[X] Low Concentration**
[ ] Sediment — **[ ] High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:48			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Silt some clay and fine sand, very moist to wet

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: — **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-251-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S251	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	250
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-251-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S251	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:50			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	50
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-252-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S252	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:20			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Silty sand trace silt with organics roots, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-252-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S252	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	YES

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:22			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand trace clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	3	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-253-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S253	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	SR-DUP16-032818 12:00	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	7:25			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty sand trace roots and clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	29
	Non-organic/non-lead particles:	106
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 13

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-253-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S253	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:35			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Sand some silt

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	4
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-253-1224	**Sampled By:**	BB/BS/JB
Sample Location:	S253	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil — **[X] Low Concentration**
[ ] Sediment — **[ ] High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:20			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Fine sand some silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: — **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	**0**
	Non-organic/non-lead particles:	28	**23**
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-254-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S254	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:28			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Silty sand with organics roots, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-254-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S254	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:30			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-255-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S255	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:10			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brn	Silty sand with organics roots, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	64
	Non-organic/non-lead particles:	28
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-255-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S255	**Sample Date:**	03/23/18
QA/QC Duplicate ID:	SR-DUP11-032318 0800	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:15			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand trace organics moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	4
	Non-organic/non-lead particles:	32
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-256-0006	**Sampled By:**	BB/BS/JB
Sample Location:	S256	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	7:20			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty sand trace roots and clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	122
	Non-organic/non-lead particles:	109
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-256-0612	**Sampled By:**	BB/BS/JB
Sample Location:	S256	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	8:35			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	63
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-256-1224	**Sampled By:**	BB/BS/JB
Sample Location:	S256	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] **Surface Soil**

[X] **Subsurface Soil**

[ ] **Sediment**

[X] **Low Concentration**

[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:25			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	12-24" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval		12-18"	18-24"
#10 sieve:	Lead shot:	0	0
	Non-organic/non-lead particles:	9	6
#35 sieve:	Lead shot:	NA	NA
	Non-organic/non-lead particles:	NA	NA
Clay pigeon frag count:	0		0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-256N-0006 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S256N	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty sand trace roots and clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	56
	Non-organic/non-lead particles:	68
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

60' North of S256

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-256N-0612 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S256N	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	No
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	4
	Non-organic/non-lead particles:	49
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

60' North of S256

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-256E-0006 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S256E	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brn	Silty sand trace roots and clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	54
	Non-organic/non-lead particles:	313
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

60' East of S256

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-256E-0612 (no sample)	**Sampled By:**	BB/BS/JB
Sample Location:	S256E	**Sample Date:**	03/28/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No sample			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brn	Silty sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	No
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	5
	Non-organic/non-lead particles:	246
#35 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

60' East of S256

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-257-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S257	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	17:17	0-6 IN	BROWN	SANDY SILT LITTLE CLAY TRACE COARSE SAND AND ROOTS, MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-257-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S257	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	17:20			
Method:	Hand Auger-Trowel	6-12 IN	BRN	SILTY SAND WITH TRACE CLAY AND ROOTS, VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-257-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S257	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] **Surface Soil**

[X] **Subsurface Soil**

[ ] **Sediment**

[X] **Low Concentration**

[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	17:24			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SILTY F-M SAND WITH TRACE CLAY AND ROOTS, VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-258-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S258	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:39	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY AND COARSE SAND. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-258-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S258	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:43			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SANDY SILT TRACE C OARSE SAND AND CLAY, MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-258-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S258	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:47			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SANDY SILT WUTH LITTLE CLAY TRACE COARSE SAND AND ROOTS, MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-259-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S259	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:12	0-6 IN	DK BROWN	SANDY SILT WITH TRACE COARSE SAND AND ROOTS SOME GRAVEL. VERY MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-259-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S259	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	SR-DUP09-032218 1800	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:17			
Method:	Hand Auger-Trowel	6-12 IN	BROWN	SANDY SILT TRACE GRAVEL COARSE SAND AND ROOTS, MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-259-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S259	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:22			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SILTY FINE TO MEDIUM SAND TRACE COARSE SAND AND ROOTS, MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-260-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S260	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:51	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY TRACE COARSE SAND AND ROOTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-260-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S260	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	SR-DUP10-032218 20:00	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:55			
Method:	Hand Auger-Trowel	6-12 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY TRACE COARSE ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-260-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S260	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] **Surface Soil**

[X] **Subsurface Soil**

[ ] **Sediment**

[X] **Low Concentration**

[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	17:00			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SILTY FINE SAND WITH SOME CLAY TRACE COARSE SAND AND ROOTS, VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-261-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S261	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:27	0-6 IN	DK BROWN	SILTY F-M SAND WITH TRACE COARSE SAND AND ROOTS, MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-261-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S261	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:31			
Method:	Hand Auger-Trowel	6-12 IN	ORNG BRN	FINE TO MEDIUM SAND LITTLE SILT TRACE COARSE SAND AND ROOTS, MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-261-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S261	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:35			
Method:	Hand Auger-Trowel	12-24 IN	TAN	FINE TO MEDIUM SAND TRACE SILT AND COARSE SAND, MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-262-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S262	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:57	0-6 IN	ORNG BRN	FINE TO MEDIUM SAND WITH SOME SILT AND TRACE ROOTS, MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-262-00612	**Sampled By:**	VS/BB/BS
Sample Location:	S262	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:01			
Method:	Hand Auger-Trowel	6-12 IN	ORNG BRN	FINE TO MEDIUM SAND WITH SOME SILT TRACE ROOTS, MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-262-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S262	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	YES

MATRIX / CONCENTRATION:

[ ] **Surface Soil**

[X] **Subsurface Soil**

[ ] **Sediment**

[X] **Low Concentration**

[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	16:06			
Method:	Hand Auger-Trowel	12-24 IN	ORNG BRN	FINE TO MEDIUM SAND WITH LITTLE SILT TRACE COARSE SAND AND ROOT, VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	3	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-263-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S263	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:04			
Method:	Hand Auger-Trowel	0-6 IN	TAN/BROWN	FINE TO MEDIUM SAND WITH LITTLE SILT AND COARSE SAND. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-263-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S263	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:08	6-12 IN	LT BROWN	FINE TO MEDIUM SAND WITH LITTLE COARSE SAND AND TRACE ROOTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-263-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S263	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] **Surface Soil**

[X] **Subsurface Soil**

[ ] **Sediment**

[X] **Low Concentration**

[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:14			
Method:	Hand Auger-Trowel	12-24 IN	BROWN	SILTY FINE TO MEDIUM SAND WITH TRACE COARSE SAND AND ROOTS. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-264-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S264	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	17:05	0-6 IN	DK BROWN	SILTY FINE SAND TRACE CALY, COARSE SAND AND TOOTS, VERY MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-265-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S265	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	17:09	0-6 IN	DK BROWN	SANDY SILT LITTLE CLAY TRACE COARSE SAND AND ROOTS, VERY MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-266-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S266	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	17:13	0-6 IN	DK BROWN	SANDY SILT LITTLE CLAY TRACE COARSE SAND, VERY MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-267-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S267	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	SR-DUP08-032218	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:39	0-6 IN	DK BROWN	SANDY SILT WITH TRACE CLAY, PIGEON FRAGMENTS, AND ROOTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: YES

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-268-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S268	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:46			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH TRACE COARSE SAND, CLAY AND ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-269-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S269	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:52			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH TRACE COARSE SAND, AND ROOTS. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: YES

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-270-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S270	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:31			
Method:	Hand Auger-Trowel	0-6 IN	BROWN	FINE TO MEDIUM SAND WITH SOME SILT. TRACE COARSE SAND AND ROOTS. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-271-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S271	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:22	0-6 IN	DK BROWN	SILTY FINE SAND. TRACE MEDIUM SAND, CLAY AND ROOTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-272-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S272	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:48	0-6 IN	BROWN	SILTY FINE TO MEDIUM SAND WITH LITTLE SILT AND GRASS ROOTS. MOIST.
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-273-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S273	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:52	0-6 IN	LT BROWN	FINE TO MEDIUM SAND WITH LITTLE SILT AND GRASS ROOTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-274-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S274	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:59			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	FINE TO MEDIUM SAND WITH LITTLE SILT AND TRACE COARSE SAND. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-275-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S275	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:34	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY. TRACE ROOTS AND CLAY PIGEON FRAGMENTS. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: YES

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-275-0612	**Sampled By:**	VS/BB/BS
Sample Location:	S275	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:38			
Method:	Hand Auger-Trowel	6-12 IN	DK BROWN	SANDY SILT WITH ROOTS. MOIST. SOME COARSE GRAIN SAND FRAGMENTS.
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SB-275-1224	**Sampled By:**	VS/BB/BS
Sample Location:	S275	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[ ] **Surface Soil**

[X] **Subsurface Soil**

[ ] **Sediment**

[X] **Low Concentration**

[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:48	12-24 IN	BROWN	SANDY SILT WITH LITTLE CLAY AND COARSE GRAIN SAND. MOIST
Method:	Hand Auger-Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-276-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S276	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	SR-DUP07-032218	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:27			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH TRACE CLAYS AND GRASS ROOTS. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-277-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S277	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:15			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH LITTLE CLAY. MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G07696

Sample ID No.:	SR-SS-278-0006	**Sampled By:**	VS/BB/BS
Sample Location:	S278	**Sample Date:**	03/22/18
QA/QC Duplicate ID:	NO	**MS/MSD Collected:**	NO

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:20			
Method:	Hand Auger-Trowel	0-6 IN	DK BROWN	SANDY SILT WITH CLAY AND GRASS ROOTS. VERY MOIST
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A
#35 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: none

MAP:

Coordinates:	N	E	

Signature(s):

December 2018

Soil Sample Log Sheets

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-238-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S238	**Sample Date:**	12/17/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	11
	Non-organic/non-lead particles:	30
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	9,072

Clay pigeon frag count: 2

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-240-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S240	**Sample Date:**	12/17/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	81
	Non-organic/non-lead particles:	49
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	10,136

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-241-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S241	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light Brown	Silty sand trace roots and clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	1
	Non-organic/non-lead particles:	15
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	6,269

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-252-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S252	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brown	Silty sand trace silt with organics roots, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	27
	Non-organic/non-lead particles:	13
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-252-0612	**Sampled By:**	JB/DA/BB
Sample Location:	S252	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brown	Silty sand trace clay moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	11
	Non-organic/non-lead particles:	13
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-254-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S254	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brown	Silty sand with organics roots, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	7
	Non-organic/non-lead particles:	4
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 2

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-254-0612	**Sampled By:**	BB/DA/JB
Sample Location:	S254	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light Brown	Silty sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	6
	Non-organic/non-lead particles:	5
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 3

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-301-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S301	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:20			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-301-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S301	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	yes

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:25			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	2	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-302-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S302	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:30			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-302-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S302	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	SR-DUP02-20181219 1200	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:35			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-303-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S303	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:40			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-303-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S303	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:44			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-304-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S304	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:48			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-304-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S304	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:52			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-305-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S305	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:10			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-305-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S305	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:15			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-306-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S306	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:19			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-306-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S306	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:23			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-307-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S307	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	No	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:27			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-307-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S307	**Sample Date:**	
QA/QC Duplicate ID:		**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	15:31			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-308-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S308	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine to medium sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	>1,000
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-308-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S308	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	4
	Non-organic/non-lead particles:	577
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-309-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S309	**Sample Date:**	12/17/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	7
	Non-organic/non-lead particles:	17
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	11,294

Clay pigeon frag count: 6

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-309-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S309	**Sample Date:**	12/17/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	6-12" BGS	Brown	Fine sand some silt, moist
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	21
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	10,725

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-310-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S310	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	27
	Non-organic/non-lead particles:	20
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 17

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-310-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S310	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	16
	Non-organic/non-lead particles:	20
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 17

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-311-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S311	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	10:00			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	10
	Non-organic/non-lead particles:	30
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 78

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-311-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S311	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	9:05			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty fine sand trace clay and medium sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	13
	Non-organic/non-lead particles:	20
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 46

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-312-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S312	**Sample Date:**	12/17/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	12:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	20
	Non-organic/non-lead particles:	83
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	16,855

Clay pigeon frag count: 29

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-312-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S312	**Sample Date:**	12/17/18
QA/QC Duplicate ID:	SR-Dup01-20181217 12:00	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	14:50			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	YES
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	5
	Non-organic/non-lead particles:	80
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	18,960

Clay pigeon frag count: 13

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-313-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S313	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	11
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-313-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S313	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	5
	Non-organic/non-lead particles:	43
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-314-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S314	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brown	Very fine sandy silt moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	392
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

3 metal slag pieces (rounded but can be broken by hand 1/4" dia)

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-314-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S314	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	2
	Non-organic/non-lead particles:	114
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-315-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S315	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	10
	Non-organic/non-lead particles:	22
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-315-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S315	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sandy, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	10
	Non-organic/non-lead particles:	39
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-316-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S316	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brown	Sandy silt some organics, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	6
	Non-organic/non-lead particles:	45
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	11,018

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-316-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S316	**Sample Date:**	12/17/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Sandy silt, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	4
	Non-organic/non-lead particles:	28
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	14,528

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-317-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S317	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark Brown	Fine sandy silt trace clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	4
	Non-organic/non-lead particles:	18
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-317-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S317	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Dark Brown	Fine sandy silt trace clay, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	21
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-318-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S318	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	0-6" BGS	Brown	Silty Fine sand, moist
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	30
	Non-organic/non-lead particles:	272
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-319-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S319	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	4
	Non-organic/non-lead particles:	52
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-320-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S320	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	20
	Non-organic/non-lead particles:	97
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	11,917

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-321-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S321	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	24
	Non-organic/non-lead particles:	175
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-322-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S322	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	15
	Non-organic/non-lead particles:	90
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-323-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S323	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	32
	Non-organic/non-lead particles:	59
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	14,057

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-324-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S324	**Sample Date:**	12/18/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	63
	Non-organic/non-lead particles:	78
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-325-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S325	**Sample Date:**	12/20/18
QA/QC Duplicate ID:	SR-Dup03-20181220 12:00	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	7:45			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-326-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S326	**Sample Date:**	12/20/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	7:40			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-327-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S327	**Sample Date:**	12/20/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	yes

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:				
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	2	4-oz	glass jar	YES

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: NA

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-328-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S328	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	1
	Non-organic/non-lead particles:	22
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	3,626

Clay pigeon frag count: 2

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-328-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S328	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	32
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	3,874

Clay pigeon frag count: 1

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-329-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S329	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	6
	Non-organic/non-lead particles:	12
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 9

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-329-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S329	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	1
	Non-organic/non-lead particles:	21
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 4

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-330-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S330	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	4
	Non-organic/non-lead particles:	29
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-330-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S330	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	21
#20 sieve:	Lead shot:	NA
	Non-organic/non-lead particles:	NA

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-331-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S331	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	26
	Non-organic/non-lead particles:	234
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	21,928

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-331-0612	**Sampled By:**	JB/BB/DA
Sample Location:	S331	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	13
	Non-organic/non-lead particles:	205
#20 sieve:	Lead shot:	na
	Non-organic/non-lead particles:	na

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-332-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S332	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	14
	Non-organic/non-lead particles:	233
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	20,226

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-333-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S333	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	3
	Non-organic/non-lead particles:	6
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	23,786

Clay pigeon frag count: 150

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	December 2018
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-333-0006	**Sampled By:**	JB/BB/DA
Sample Location:	S333	**Sample Date:**	12/19/18
QA/QC Duplicate ID:	na	**MS/MSD Collected:**	na

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty Fine sand, moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	45
	Non-organic/non-lead particles:	94
#20 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	17,254

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

March 2019

Soil Sample Log Sheets

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-401-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S401	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Fine to medium sand, little silt and some pebbles

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	16
	Non-organic/non-lead particles:	445
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-402-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S402	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light brown	Silty fine moist sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	45
	Non-organic/non-lead particles:	609
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	367

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-402-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S402	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	6-12" BGS	Medium brown	Fine-medium sand with some pebbles
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	6
	Non-organic/non-lead particles:	781
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-403-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S403	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	light brn	Silty F. sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	47
	Non-organic/non-lead particles:	103
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	324

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-403-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S403	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light brown	Silty fine moist sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	16
	Non-organic/non-lead particles:	154
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	347

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-404-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S404	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light brown	Silt, some moisture, many roots

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	3
	Non-organic/non-lead particles:	418
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-405-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S405	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	0-6" BGS	Dark-medium brown	Fine sand, some silt, very few pebbles
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	1
	Non-organic/non-lead particles:	14
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-406-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S406	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light brown	Silt, some moisture, many roots

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	111
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-407-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S407	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	lt brn	Very fine silt with roots and trace amounts of sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	32
	Non-organic/non-lead particles:	62
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	241

Clay pigeon frag count: 12

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-407-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S407	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	6-12" BGS	Light brown	Silty fine moist sand
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	45
	Non-organic/non-lead particles:	86
#14 sieve:	Lead shot:	1
	Non-organic/non-lead particles:	285

Clay pigeon frag count: 11

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-408-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S408	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Fine-medium sand, slightly moist, few pebbles

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	35
	Non-organic/non-lead particles:	115
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-408-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S408	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	6-12" BGS	Medium brown	Moist silt
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	11
	Non-organic/non-lead particles:	26
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-409-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S409	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	light brn	Silty F. Sand moist

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	73
	Non-organic/non-lead particles:	1633
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Katie Gregory

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-409-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S409	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	6-12" BGS	Rusty brown	Silt, some sand, little moisture
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	13
	Non-organic/non-lead particles:	922
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Katie Gregory

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-410-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S410	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time	0-6" BGS	dk brown lt brn	0-5" organic-rich silt with some fine sand and trace medium sand. 5-6" very fine to fine sand with some silt and trace amounts of sand. Near wetland
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: | **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	61
	Non-organic/non-lead particles:	252
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	1,071

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-410-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S410	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Brown	Silty fine sand with trace medium sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	11
	Non-organic/non-lead particles:	618
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	1,934

Clay pigeon frag count: 0

MAP:

Water table is approximately 3" below ground surface

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-411-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S411	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	light brn	Silty F. sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	11
	Non-organic/non-lead particles:	35
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Katie Gregory

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-412-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S412	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	lt brn	Silty F. Sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	6
	Non-organic/non-lead particles:	905
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Katie Gregory

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-413-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S413	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Dark brown	Silty fine sand with some medium sand with few pebbles

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	12
	Non-organic/non-lead particles:	66
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	262

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-414-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S414	**Sample Date:**	03/26/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	0-6" BGS	Medium brown	Fine-medium sand with little silt and few pebbles
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	10
	Non-organic/non-lead particles:	65
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-415-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S415	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light brown	Silty slightly moist sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	5
	Non-organic/non-lead particles:	678
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-416-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S416	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time	0-6" BGS	Light-dark brown	Fine-medium sand with few pebbles
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	49
	Non-organic/non-lead particles:	260
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-416-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S416	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	6-12" BGS	Medium brown	Fine to medium sand with little silt and pebbles
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	14
	Non-organic/non-lead particles:	184
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-417-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S417	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Silty fine sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	55
	Non-organic/non-lead particles:	172
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	633

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-417-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S417	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	Light brown	Silty fine sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	37
	Non-organic/non-lead particles:	522
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	1161

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-418-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S418	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light brown	ine sand with some silt and trace amounts of medium san

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	13
	Non-organic/non-lead particles:	162
#14 sieve:	Lead shot:	0
	Non-organic/non-lead particles:	313

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-419-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S419	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	0-6" BGS	Medium brown	Sandy moist silt
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	70
	Non-organic/non-lead particles:	28
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-420-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S420	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel	0-6" BGS	Dark-medium brown	Fine silty sand with pebbles
Monitor Reading (ppm):	NA			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	3
	Non-organic/non-lead particles:	451
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-421-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S421	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Brown	Moist silt

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	49
	Non-organic/non-lead particles:	68
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s): Beau Benfield

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-422-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S422	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light brown	Silty fine sand with trace medium sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	52
	Non-organic/non-lead particles:	529
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-422-0612	**Sampled By:**	JB/BB/KG
Sample Location:	S422	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	6-12" BGS	lt brn	Silty F. Sand

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	25
	Non-organic/non-lead particles:	628
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:	March 2019
Project Site Name:	NASA WFF Skeet Range RI
Project No.:	112G08539

Sample ID No.:	SR-SS-423-0006	**Sampled By:**	JB/BB/KG
Sample Location:	S423	**Sample Date:**	03/27/19
QA/QC Duplicate ID:	no	**MS/MSD Collected:**	no

MATRIX / CONCENTRATION:

[X] **Surface Soil**
[ ] **Subsurface Soil**
[ ] **Sediment**

[X] **Low Concentration**
[ ] **High Concentration**

GRAB SAMPLE DATA:

		Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:	No Time			
Method:	Hand Auger/Trowel			
Monitor Reading (ppm):	NA	0-6" BGS	Light brown	ne sand with trace medium sand and silt with small pebbl

MULTIPLE / COMPOSITE SAMPLE DATA:

Method: **PID Readings (Range in ppm): NA**

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Lead	SW-846 6020B	None	1	2-oz	glass jar	NO
Select PAHs	SW-846 8270D	None	1	4-oz	glass jar	NO

OBSERVATIONS / NOTES:

Lead shot count conducted at interval

#10 sieve:	Lead shot:	15
	Non-organic/non-lead particles:	749
#14 sieve:	Lead shot:	N/A
	Non-organic/non-lead particles:	N/A

Clay pigeon frag count: 0

MAP:

Coordinates:	N	E	

Signature(s):

Appendix D
Chain of Custodies

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TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074

Date Year: 2018	Time	SL2500 Sample ID	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead								Comments
Container Type: Plastic (P) or Glass (G)										G								
Preservative Used:										None								
3/19	13:01	SR-SS-226-0006	S226	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/19	13:30	SR-SS-226-0612	S226	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/19	12:00	SR-DUP01-031918	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/20	14:15	SR-SS-226-1224	S226	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/20	9:25	SR-SS-225-0006	S225	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/20	9:10	SR-SS-225-0612	S225	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/20	12:34	SR-SS-224-0006	S224	0	0.5	SO	G	3		3	--	--	--	--	--	--	--	RUN MSMSD
3/20	12:45	SR-SS-224-0612	S224	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/20	13:26	SR-SS-223-0006	S223	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/20	13:30	SR-SS-223-0612	S223	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/20	13:40	SR-SS-222-0006	S222	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/20	13:50	SR-SS-222-0612	S222	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/20	16:17	SR-SS-218-0006	S218	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/20	16:27	SR-SS-218-0612	S218	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/20	16:40	SR-SS-219-0006	S219	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/20	16:50	SR-SS-219-0612	S219	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	

1. Relinquished By:	Date:	Time:	1. Received By:	Date:	Time:
Jacob Birkett	03/23/18	1700	FedEx		
2. Relinquished By: Fedex	Date: 3/24	Time: 1015	2. Received By:	Date: 3/26	Time: 900

Comments:

8100000

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074

Date Year: 2018	Time	SL2500 Sample ID	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead	Grain size	#35 lead shot count						Comments
Container Type: Plastic (P) or Glass (G)										G	G	P						
Preservative Used:										None	None	None						
3/20	12:00	SR-DUP02-032018	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/21	7:40	SR-SB-224-1224	S224	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/21	7:41	SR-SS-225-0006	S225	0	0.5	SO	G	2		--	1	1	--	--	--	--	--	
3/21	7:43	SR-SS-225-0612	S225	0.5	1	SO	G	2		--	1	1	--	--	--	--	--	
3/21	7:45	SR-SB-225-1224	S225	1	2	SO	G	1		--	1	—	--	--	--	--	--	
3/21	8:25	SR-SB-223-1224	S223	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/21	8:35	SR-SB-222-1224	S222	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/21	12:01	SR-SB-218-1224	S218	1	2	SO	G	3		3	--	--	--	--	--	--	--	RUN MSMSD
3/21	12:05	SR-SB-219-1224	S219	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/21	12:15	SR-SS-221-0006	S221	0	0.5	SO	G	2		1	--	1	--	--	--	--	--	
3/21	12:20	SR-SS-221-0612	S221	0.5	1	SO	G	2		1	--	1	--	--	--	--	--	
3/21	13:15	SR-SS-220-0006	S220	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/21	13:40	SR-SS-220-0612	S220	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/21	15:27	SR-SS-217-0006	S217	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/21	15:50	SR-SS-216-0006	S216	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/21	16:12	SR-SS-216-0612	S216	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	

1. Relinquished By: Jacob Birkett	Date: 03/23/18	Time: 1700	1. Received By: FedEx	Date:	Time:
2. Relinquished By: Fedex	Date: 3/24	Time: 1015	2. Received By:	Date: 5/26	Time: 900
Comments:					

000019

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		**Field Ops. Leader:** Jacob Birkett	**Phone:** 757-814-9916	**Address:** 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		**City, State, Zip:** Scarborough, ME 04074

Date Year: 2018	Time	Sample ID: SL2500	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead	#35 lead shot count							Comments
				Container Type: Plastic (P) or Glass (G)						G	P							
				Preservative Used:						None	None							
3/21	17:28	SR-SS-217-0612	S217	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/21	8:00	SR-DUP03-032118	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/21	12:00	SR-DUP04-032118	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/21	13:00	SR-DUP05-032118	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/22	10:45	SR-SB-221-1224	S221	1	2	SO	G	2		1	1	--	--	--	--	--	--	
3/22	11:45	SR-SB-220-1224	S220	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:48	SR-SB-217-1224	S217	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:45	SR-SB-216-1224	S216	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:35	SR-SS-201-0006	S201	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:39	SR-SS-201-0612	S201	0.5	1	SO	G	2		2	--	--	--	--	--	--	--	RUN MSMSD
3/22	12:42	SR-SB-201-1224	S201	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:50	SR-SS-202-0006	S202	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:55	SR-SS-202-0612	S202	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:59	SR-SB-202-1224	S202	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:21	SR-SS-203-0006	S203	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:25	SR-SS-203-0612	S203	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	

1. Relinquished By: Jacob Birkett	Date: 03/23/18	Time: 1700	1. Received By: FedEx	Date:	Time:
2. Relinquished By: Fedex	Date: 3/24	Time: 1015	2. Received By:	Date: 3/26	Time: 900

Comments:

000020

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074

Container Type: Plastic (P) or Glass (G)	G								
Preservative Used:	None								

SL2500

Date Year: 2018	Time	Sample ID	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead								Comments
3/22	12:29	SR-SB-203-1224	S203	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:28	SR-SS-204-0006	S204	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:34	SR-SS-204-0612	S204	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:04	SR-SS-205-0006	S205	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:08	SR-SS-205-0612	S205	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:23	SR-SS-206-0006	S206	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:27	SR-SS-206-0612	S206	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:04	SR-SS-207-0006	S207	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:10	SR-SS-207-0612	S207	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:42	SR-SS-208-0006	S208	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:47	SR-SS-208-0612	S208	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:32	SR-SS-209-0006	S209	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:37	SR-SS-209-0612	S209	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:53	SR-SS-210-0006	S210	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:58	SR-SS-210-0612	S210	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:12	SR-SS-211-0006	S211	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	

1. Relinquished By: Jacob Birkett	Date: 03/23/18	Time: 1700	1. Received By: FedEx	Date:	Time:
2. Relinquished By: Fedex	Date: 3/24	Time: 1015	2. Received By:	Date: 3/26	Time: 900

Comments:

0000021

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074

Date Year: 2018	Time	Sample ID (SL2500)	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead	LEAD (AQUEOUS)	PAHS (AQUEOUS)	PAHS					Comments
Container Type: Plastic (P) or Glass (G)										G	P	G	G					
Preservative Used:										None	HNO3	NONE	NONE					
3/22	12:16	SR-SS-211-0612	S211	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:14	SR-SS-212-0006	S212	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	11:18	SR-SS-212-0612	S212	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:50	SR-SS-213-0006	S213	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:57	SR-SS-213-0612	S213	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:21	SR-SS-214-0006	S214	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:25	SR-SS-214-0612	S214	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:10	SR-SS-215-0006	S215	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	10:15	SR-SS-215-0612	S215	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	12:00	SR-DUP06-032218	—	—	—	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/22	13:50	SR-RB01-032218	—	—	—	QC	G	3		—	1	2	--	--	--	--	--	RINSATE
3/22	17:17	SR-SS-257-0006	S257	0	0.5	SO	G	1		~~1~~ 0	--	--	~~1~~ --	--	--	--	--	
3/22	17:20	SR-SS-257-0612	S257	0.5	1	SO	G	1		~~1~~ 0	--	--	~~1~~ --	--	--	--	--	
3/22	17:24	SR-SB-257-1224	S257	1	2	SO	G	1		~~1~~ 0	--	--	~~1~~ --	--	--	--	--	
3/22	16:39	SR-SS-258-0006	S258	0	0.5	SO	G	1		~~1~~ 0	--	--	~~1~~ --	--	--	--	--	
3/22	16:43	SR-SS-258-0612	S258	0.5	1	SO	G	1		~~1~~ 0	--	--	~~1~~ --	--	--	--	--	

1. Relinquished By: Jacob Birkett	Date: 03/23/18	Time: 1700	1. Received By: FedEx	Date:	Time:
2. Relinquished By: FedEx	Date: 3/24	Time: 1015	2. Received By:	Date: 3/26	Time: 900

Comments:

00002

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074

SL2500

Date Year: 2018	Time	Sample ID	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	PAHS								Comments
				Container Type: Plastic (P) or Glass (G)						G								
				Preservative Used:						None								
3/22	16:47	SR-SB-258-1224	S258	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:12	SR-SS-259-0006	S259	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:17	SR-SS-259-0612	S259	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:22	SR-SB-259-1224	S259	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:51	SR-SS-260-0006	S260	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:55	SR-SS-260-0612	S260	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	17:00	SR-SB-260-1224	S260	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:27	SR-SS-261-0006	S261	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:31	SR-SS-261-0612	S261	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:35	SR-SB-261-1224	S261	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:57	SR-SS-262-0006	S262	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
3/22	16:01	SR-SS-262-0612	S262	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	16:06	SR-SB-262-1224	S262	1	2	SO	G	3		3	--	--	--	--	--	--	--	RUN MSMSD
3/22	15:04	SR-SS-263-0006	S263	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:08	SR-SS-263-0612	S263	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:14	SR-SB-263-1224	S263	1	2	SO	G	3		3	--	--	--	--	--	--	--	RUN MSMSD

1. Relinquished By: Jacob Birkett	Date: 03/23/18	Time: 1700	1. Received By: FedEx	Date:	Time:
2. Relinquished By: Fedex	Date: 3/24	Time: 1015	2. Received By:	Date: 3/26	Time: 900

Comments:

000023

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074

Date Year: 2018	Time	Sample ID: SL2500	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	PAHS								Comments
				Container Type: Plastic (P) or Glass (G)						G								
				Preservative Used:						None								
3/22	17:05	SR-SS-264-0006	S264	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	17:09	SR-SS-265-0006	S265	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	17:13	SR-SS-266-0006	S266	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:39	SR-SS-267-0006	S267	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:46	SR-SS-268-0006	S268	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:52	SR-SS-269-0006	S269	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:31	SR-SS-270-0006	S270	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	15:22	SR-SS-271-0006	S271	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:48	SR-SS-272-0006	S272	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:52	SR-SS-273-0006	S273	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:59	SR-SS-274-0006	S274	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
3/22	14:34	SR-SS-275-0006	S275	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:38	SR-SS-275-0612	S275	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:43	SR-SS-275-1224	S275	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:27	SR-SS-276-0006	S276	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:15	SR-SS-277-0006	S277	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	

1. Relinquished By:	Date:	Time:	1. Received By:	Date:	Time:
Jacob Birkett	03/23/18	1700	FedEx		
2. Relinquished By:	**Date:**	**Time:**	**2. Received By:**	**Date:**	**Time:**
FedEx	3/24	1015		3/26	900

Comments:

0000024

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074
		Container Type: Plastic (P) or Glass (G)	G	
		Preservative Used:	None	

Date Year: 2018	Time	Sample ID: SL2500	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	PAHS	Lead							Comments
3/22	14:20	SR-SS-278-0006	S278	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/22	14:27	SR-DUP07-032218	—	—	—	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/22	16:00	SR-DUP08-032218	—	—	—	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/22	18:00	SR-DUP09-032218	—	—	—	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/22	20:00	SR-DUP10-032218	—	—	—	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/23	0810	SR-SS-255-0006	S255	0	0.5			1		—	1 --	--	--	--	--	--	--	
	0815	SR-SS-255-0612	S255	0.5	1			1		—	1 --	--	--	--	--	--	--	
	0820	SR-SS-252-0006	S252	0	0.5			1		—	1 --	--	--	--	--	--	--	
	0822	SR-SS-252-0612	S252	0.5	1			3		—	3 --	--	--	--	--	--	--	RUN MS/MSD
	0828	SR-SS-254-0006	S254	0	0.5			1		—	1 --	--	--	--	--	--	--	
	0830	SR-SS-254-0612	S254	0.5	1			1		—	1 —	—	--	--	--	--	--	
	0845	SR-SS-245-0006	S245	0	0.5			1		—	1 --	--	--	--	--	--	--	
	0847	SR-SS-245-0612	S245	0.5	1			1		—	1 --	--	--	--	--	--	--	
	0851	SR-SS-246-0006	S246	0	0.5			1		—	1 --	--	--	--	--	--	--	
	0853	SR-SS-246-0612	S246	0.5	1			1		—	1 --	--	--	--	--	--	--	
	0855	SR-SB-246-1224	S246	1	2			1		—	1 --	--	--	--	--	--	--	

1. Relinquished By:	Date:	Time:	1. Received By:	Date:	Time:
Jacob Birkett	03/23/18	1700	FedEx		
2. Relinquished By:	**Date:**	**Time:**	**2. Received By:**	**Date:**	**Time:**
Fedex	3/24	1015		3/26	900

Comments:

000025

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora, Brad Sweeney		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-1040		City, State, Zip: Scarborough, ME 04074

Date Year: 2018	Time	Sample ID (SL2500)	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead								Comments
		Container Type: Plastic (P) or Glass (G)								G								
		Preservative Used:								None								
3.23.18	0800	SR-Dup11-032318	—	—	—	SO	G	1		1	—	—	--	--	--	--	--	Duplicate
	1200	SR-Dup12-032318	—	—	—	SO	G	1		1	—	—	--	--	--	--	--	Duplicate
	0904	SR-SS-244-0006	S244	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
	0907	SR-SS-244-0612	S244	0.5	1	SO	G	1		1	—	—	--	--	--	--	--	
	0910	SR-SS-248-0006	S248	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
	0912	SR-SS-248-0612	S248	0.5	1	SO	G	1		1	—	—	--	--	--	--	--	
	0920	SR-SS-247-0006	S247	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
	0922	SR-SS-247-0612	S247	0.5	1	SO	G	1		1	—	—	--	--	--	--	--	
	0930	SR-SS-243-0006	S243	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
	0932	SR-SS-243-0612	S243	0.5	1	SO	G	1		1	—	—	--	--	--	--	--	
	0933	SR-SS-243-1224	S243	1	2	SO	G	1		1	—	—	--	--	--	--	--	
	0936	SR-SS-242-0006	S242	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
	0937	SR-SS-242-0612	S242	0.5	1	SO	G	1		1	—	—	--	--	--	--	--	
	0945	SR-SS-250-0006	S250	0	0.5	SO	G	1		1	—	—	--	--	--	--	--	
	0947	SR-SS-250-0612	S250	0.5	1	SO	G	1		1	—	—	--	--	--	--	--	
↓	1300	SR-Dup13-032318	—	—	—	SO	G	1		1	—	—	--	--	--	--	--	Duplicate

1. Relinquished By: Jacob Birkett	Date: 03/23/18	Time: 1700	1. Received By: FedEx	Date:	Time:
2. Relinquished By: Fedex	Date: 3/24	Time: 1015	2. Received By:	Date: 3/26	Time: 900
Comments:					

000026

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: _____ Temp: _____ °C
Storage ID: _____ Storage Secured: Yes ☐ No ☐

TAT (check one): Standard: ☒ 21 days
Rush (surcharge may apply) ☐ 14 days ☐ 7 days Specify: _____

Project ID: See First PO#: _____ Sampler: _____ (name)

Invoice to: Name Company Address City State Ph# Fax#

Relinquished by (printed name and signature) Date 3-23-18 Time 1700 Received by (printed name and signature) Date Time
Jacob Birkett [signature] FedEx

Relinquished by (printed name and signature) Date Time Received by (printed name and signature) Date Time
[signature] 3/26 900

SHIP TO: ~~Vista Analytical Laboratory~~
~~1104 Windfield Way~~
~~El Dorado Hills, CA 95762~~
~~(916) 673-1520 * Fax (916) 673-0106~~

ATTN: _____

Method of Shipment: FedEx

Tracking No.: 8102-9167-1040

Add Analysis(es) Requested

Container(s)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	~~PFOA/PFOS~~ Glass	~~UCMR3 PFAS List 6~~ Lead	~~537 List 14~~	~~Pdf List of 26~~	~~Other~~: Please List Below	~~Mod. EPA Method 537~~ Nitric Lead (Aqueous)	PAH (Aqueous)	~~PFOA/PFOS~~	~~UCMR3 PFAS List 6~~	~~PFAS List 14~~	Comments
SR-SB-250-1224	3-23-18	0948	S250	1	G	SO	1										
SR-SS-249-0006	↓	0952	S249	1	G	SO	1										
SR-SS-249-0612	↓	0954	S249	3	G	SO	3										Run MSMSD
SR-RB02-032318	↓	0735	—	3	G/P	QA					1	2					

JBB 3-23-18

Special Instructions/Comments: _____

SEND DOCUMENTATION AND RESULTS TO:
Name: _____
Company: _____
Address: _____
City: _____ State: ____ Zip: _____
Phone: _____ Fax: _____
Email: _____

Container Types: P= HDPE, PJ= HDPE Jar
O = Other: _____

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma: _____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,
SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: _____

0000027

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora		**Field Ops. Leader:** Jacob Birkett	**Phone:** 757-814-9916	**Address:** 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-0400		**City, State, Zip:** Scarborough, ME 04074

Date Year: 2018	Time	Sample ID: SL2689	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead	Grain Size	Lead (Aqueous)						Comments
Container Type: Plastic (P) or Glass (G)										G	G	P						
Preservative Used:										None	None	HNO3						
3/26	10:05	SR-SS-227-0006	S227	0	0.5	SO	G	1		1	1	--	--	--	--	--	--	
3/26	10:06	SR-SS-228-0612	S228	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/26	10:10	SR-SS-230-0006	S230	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/26	11:15	SR-SS-230-0612	S230	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/26	11:18	SR-SS-228-0006	S228	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/26	11:25	SR-SS-227-0612	S227	0.5	1	SO	G	1		1	1	--	--	--	--	--	--	
3/26	12:30	SR-SS-229-0006	S229	0	0.5	SO	G	3		3	--	--	--	--	--	--	--	RUN MSMSD
3/26	13:00	SR-SS-238-0612	S238	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/26	13:47	SR-SS-229-0006	S229	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/26	13:50	SR-SS-232-0006	S232	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/26	14:39	SR-SS-238-0006	S238	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/26	14:55	SR-SS-232-0612	S232	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/26	16:30	SR-RB03-032618	--	--	--	QC	G	1		--	--	1	--	--	--	--	--	Rinsate Blank
3/26	12:00	SR-DUP14-032618	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/27	15:20	SR-RB04-032718	--	--	--	QC	G	1		--	--	1	--	--	--	--	--	Rinsate Blank
3/27	7:26	SR-SS-234-0006	S234	0	0.5	SO	G	3		3	--	--	--	--	--	--	--	RUN MSMSD

1. Relinquished By:	Date:	Time:	1. Received By:	Date:	Time:
Jacob Birkett	03/29/18	1200	FedEx		
2. Relinquished By: Fedex	**Date:**	**Time:**	**2. Received By:**	**Date:** 3/30/18	**Time:** 850

Comments:

000010

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-0400		City, State, Zip: Scarborough, ME 04074

Date Year: 2018	Time	Sample ID (SL2689)	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead								Comments
Container Type: Plastic (P) or Glass (G)										G								
Preservative Used:										None								
3/27	7:25	SR-SS-233-0006	S233	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/27	8:25	SR-SS-231-0006	S231	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/27	8:40	SR-SS-233-0612	S233	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	9:00	SR-SS-231-0612	S231	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	9:03	SR-SS-234-0612	S234	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	11:47	SR-SS-240-0006	S240	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/27	11:45	SR-SS-239-0006	S239	0	0.5	SO	G	3		3	--	--	--	--	--	--	--	RUN MSMSD
3/27	11:45	SR-SS-235-0006	S235	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/27	12:45	SR-SS-240-0612	S240	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	13:30	SR-SS-237-0006	S237	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/27	13:20	SR-SS-235-0612	S235	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	13:41	SR-SS-239-0612	S239	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	14:05	SR-SS-236-0006	S236	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/27	14:27	SR-SS-236-0612	S236	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	14:58	SR-SS-237-0612	S237	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/27	12:00	SR-DUP15-032718	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE

1. Relinquished By: Jacob Birkett	Date: 03/29/18	Time: 1206	1. Received By: FedEx	Date:	Time:
2. Relinquished By: FedEx	Date:	Time:	2. Received By:	Date: 3/30/18	Time: 850
Comments:					

1100000

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora		**Field Ops. Leader:** Jacob Birkett	**Phone:** 757-814-9916	**Address:** 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-0400		**City, State, Zip:** Scarborough, ME 04074

Date Year: 2018	Time	Sample ID	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead	Grain Size	VOCs (Aqueous)	BTEX (Aqueous)	DRO (Aqueous)	TOX (Aqueous)	SVOCs and METALS (Aqueous)		Comments
				Container Type: Plastic (P) or Glass (G)						G	G	G	G	G	G	G		
				Preservative Used:						None	None	HNO3	None	HCl	None*	None		
		SL26689 + SL26690 (IDW)																
3/28	7:25	SR-SS-253-0006	S253	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	7:12	SR-SS-241-0006	S241	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	7:20	SR-SS-256-0006	S256	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	8:35	SR-SS-252-0612	S252	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	9:20	SR-SB-253-1224	S253	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/28	8:45	SR-SS-241-0612	S241	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	8:50	SR-SS-256-0612	S256	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	10:25	SR-SB-256-1224	S256	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/28	10:45	SR-SS-251-0006	S251	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	12:50	SR-SS-251-0612	S251	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	13:00	SR-SS-246-0006	S246	0	0.5	SO	G	1		--	1	--	--	--	--	--	--	
3/28	13:30	SR-SS-246-0612	S246	0.5	1	SO	G	1		--	1	--	--	--	--	--	--	
3/28	13:40	SR-SB-246-1224	S246	1	2	SO	G	1		--	1	--	--	--	--	--	--	
3/28	12:00	SR-DUP16-032818	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/28	16:15	SR-AQIDW-032818	--	--	--	IDW	C	22		--	--	6	6	4	2*	4	--	*Need Lab to preserve with H2SO4

1. Relinquished By: Jacob Birkett	Date: 03/29/18	Time: 1200	1. Received By: FedEx	Date:	Time:
2. Relinquished By: Fedex	Date:	Time:	2. Received By:	Date: 3/30	Time: 850

Comments:

2100000

TETRA TECH

CHAIN OF CUSTODY

NO.

Project No:	Facility:	Project Manger:	Phone:	Laboratory Name and Contact:
112G07696	NASA WFF Skeet Range	Rob Sok	757-466-4904	Katahdin Analytical Services
Samplers: Jacob Birkett, Beau Benfield, Vince Shickora		Field Ops. Leader: Jacob Birkett	Phone: 757-814-9916	Address: 600 Technology Way
		Fed Ex Airbill Number: 8102-9107-0400		City, State, Zip: Scarborough, ME 04074

Date Year: 2018	Time	Sample ID (SL26689 + SL26690 (IDW))	Location ID	Top Depth (FT)	Bottom Depth (FT)	Matrix (GW, SO, SW, QC)	Grab, Composite (G, C)	Total No. of Containers	ANALYSIS	Lead	Grain Size	VOCs (Aqueous)	BTEX (Aqueous)	DRO (Aqueous)	TOX (Aqueous)	SVOCs and METALS (Aqueous)		Comments
				Container Type: Plastic (P) or Glass (G)						G	G	G	G	G	G	G		
				Preservative Used:						None	None	HNO3	None	HCl	None*	None		
3/28	7:25	SR-SS-253-0006	S253	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	7:12	SR-SS-241-0006	S241	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	7:20	SR-SS-256-0006	S256	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	8:35	SR-SS-252-0612	S252	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	9:20	SR-SB-253-1224	S253	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/28	8:45	SR-SS-241-0612	S241	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	8:50	SR-SS-256-0612	S256	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	10:25	SR-SB-256-1224	S256	1	2	SO	G	1		1	--	--	--	--	--	--	--	
3/28	10:45	SR-SS-251-0006	S251	0	0.5	SO	G	1		1	--	--	--	--	--	--	--	
3/28	12:50	SR-SS-251-0612	S251	0.5	1	SO	G	1		1	--	--	--	--	--	--	--	
3/28	13:00	SR-SS-246-0006	S246	0	0.5	SO	G	1		--	1	--	--	--	--	--	--	
3/28	13:30	SR-SS-246-0612	S246	0.5	1	SO	G	1		--	1	--	--	--	--	--	--	
3/28	13:40	SR-SB-246-1224	S246	1	2	SO	G	1		--	1	--	--	--	--	--	--	
3/28	12:00	SR-DUP16-032818	--	--	--	SO	G	1		1	--	--	--	--	--	--	--	DUPLICATE
3/28	16:15	SR-AQIDW-032818	--	--	--	IDW	C	22		--	--	6	6	4	2*	4	--	*Need Lab to preserve with H2SO4

1. Relinquished By: Jacob Birkett	Date: 03/29/18	Time: 1200	1. Received By: FedEx	Date:	Time:
2. Relinquished By: Fedex	Date:	Time:	2. Received By:	Date: 3/30	Time: 850

Comments:

60000009

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client: Tetra Tech
Contact: Rob Sok
Phone #: (757) 466-4904
Fax #: ( )
Address: 5700 Lake Wright Drive Suite 102
City: Norfolk
State: VA
Zip Code: 23502
Purchase Order #:
Proj. Name / No.: NASA WFF Skeet Range 112G08539
Katahdin Quote #:
Bill (if different than above): See Contract
Address:
Sampler (Print / Sign): Jacob Birkett
Copies To:

LAB USE ONLY
WORK ORDER #: TL2691
KATAHDIN PROJECT NUMBER:
REMARKS:

SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO: 8131 5224 4886
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Lead (soil) Filt. ☐Y ☒N	Lead (aqueous) Filt. ☐Y ☒N	PAHs (soil) Filt. ☐Y ☒N	PAHs (aqueous) Filt. ☐Y ☒N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	SR-SS-312-0612	12-17-18/ 1450	SO	1	1														
	SR-Dup01-20181217	12-17-18/ 1200	SO	1	1						Duplicate								
	SR-SS-312-0006	12-17-18/ 1245	SO	1	1														
	SR-SS-311-0612	12-18-18/ 0905	SO	1	1														
	SR-SS-311-0006	12-18-18/ 1000	SO	1	1														
	SR-EB01-20181218	12-18-18/ 1055	AQ	1		1					Rinsate Blank								
	SR-SS-301-0006	12-19-18/ 1420	SO	1	1														
	SR-SS-301-0612	/ 1425		2	2						Run MSMSD								
	SR-SS-302-0006	/ 1430		1	1														
	SR-SS-302-0612	/ 1435		1	1														
	SR-Dup02-20181218	/ 1200		1	1						Duplicate								
	SR-SS-303-0006	/ 1440		1	1														
	SR-SS-303-0612	/ 1444		1	1														
	SR-SS-304-0006	/ 1448		1	1														
	SR-SS-304-0612	/ 1452		1	1														
	SR-SS-305-0006	/ 1510		1	1														

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	12-20-18 1700	FedEx	Fedex	12/21 950	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client: Tetra Tech | Contact: Rob Sok | Phone #: (757) 466-4904 | Fax #: ( )

Address: 5700 Lake Wright Dr, Suite 102 | City: Norfolk | State: VA | Zip Code: 23502

Purchase Order #: See Contract | Proj. Name / No.: NASAWFF Skeet Range 112G08539 | Katahdin Quote #:

Bill (if different than above): | Address:

Sampler (Print / Sign): Jacob Birkett | Copies To:

LAB USE ONLY | WORK ORDER #: TL2691 / 2692 | KATAHDIN PROJECT NUMBER: IDW

REMARKS:

SHIPPING INFO: ☒ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: 8131 5224 4886

TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Lead (soil) Filt. ☐Y ☒N	PAHs (soil) Filt. ☐Y ☒N	PAHs (aqueous) Filt. ☐Y ☒N	Lead (aqueous) Filt. ☐Y ☒N	VOCs Filt. ☐Y ☐N	BTEX Filt. ☐Y ☐N	DRO Filt. ☐Y ☐N	SVOCs Filt. ☐Y ☐N	TOX Filt. ☐Y ☐N	Metals Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	
	SR-SS-305-0612	12-19-18/1515	SO	1	1														
	SR-SS-306-0006	/1519		1	1														
	SR-SS-306-0612	/1523		1	1														
	SR-SS-307-0006	/1527		1	1														
	SR-SS-307-0612	/1531		1	1														
	SR-EB02-20181219	/1600	AQ	1				1											
	SR-SS-327-0006	12-20-18/0735	SO	2		2												Run MSMS	
	SR-SS-326-0006	/0740	SO	1		1													
	SR-SS-325-0006	/0745	SO	1		1													
	SR-Dup03-20181220	/1200	SO	1		1												Duplicate	
	SR-EB03-20181220	/1000	AQ	2			2											Rinsate	
	SR-AQIDW-20181220	/1100	AQ	11					3	2	2	2	1	1				Aqueous IDW	2 drm
		/																	
		/																	
		/																	
		/																	

12-20-18

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	12-20-18 1700	FedEx	Fedex	12/21 950	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS

Appendix E
QA Sample Log Sheets

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March 2018

QA Sample Log Sheets

Tetra Tech

QA SAMPLE LOG SHEET

Project Site Name: NASA WFF Skeet Range
Project Number: 112G07896
Sample Location:
QA Sample Type:

Sample ID Number: SR-RB 01 - 032218
Sampled By: VS BB BS
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-22-18
Time: 1350
Method: Pour over equipment into bottle

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Food Lion Purified Distilled water
Supplier: Food Lion
Manufacturer: Niagara Bottling
Order Number: —
Lot Number: MOR5 260218
Expiration Date: 27-Aug-19

RINSATE INFORMATION (If Applicable):

Media Type: Soil
Equipment Used: Hand auger bucket (deconed)
Equipment Type:
[] Dedicated
[X] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Volatiles~~	~~Cool 4°C & HCl~~		~~YES / NO~~
~~Semivolatiles~~ PAHs	Cool 4°C	2 1-L amber bottles	YES / NO
~~Pesticides / PCBs~~	~~Cool 4°C~~		~~YES / NO~~
~~Metals~~ Lead	Cool 4°C & HNO_3	1 250mL poly bottle	YES / NO
~~Cyanide~~	~~Cool 4°C & NaOH~~		~~YES / NO~~

OBSERVATIONS / NOTES:

Collected between Northern Drainge and Southern Range Areas

Signature(s):

125
2.3

Tetra Tech

QA SAMPLE LOG SHEET

Project Site Name: NASA WFF Skeet Range
Project Number: 112G07896
Sample Location:
QA Sample Type:

Sample ID Number: SR-RB02 - 032318
Sampled By: BB VS
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-23-18
Time: 0735
Method: Pour over equipment into bottle

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Food Lion Purified Distilled Water
Supplier: Food Lion
Manufacturer: Niagara Bottling
Order Number: —
Lot Number: MOR5 260218
Expiration Date: 27-Aug-19

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used: Hand auger bucket (deconed
Equipment Type:
[] Dedicated
[X] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Volatiles~~	~~Cool 4°C & HCl~~		~~YES / NO~~
~~Semivolatiles~~ PAHs	Cool 4°C	2 1-L Amber bottles	YES / NO
~~Pesticides / PCBs~~	~~Cool 4°C~~		~~YES / NO~~
~~Metals~~ Lead	Cool 4°C & HNO_3	1 250mL poly bottle	YES / NO
~~Cyanide~~	~~Cool 4°C & NaOH~~		~~YES / NO~~

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech

QA SAMPLE LOG SHEET

Project Site Name: NASA WFF Skeet Range
Project Number: 112G07896
Sample Location:
QA Sample Type:

Sample ID Number: SR-RB03-032618
Sampled By: BB VS
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-26-18
Time: 1630
Method: Pour over equipment into bottle

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Food Lion Purified Distilled Water
Supplier: Food Lion
Manufacturer: Niagara Bottling
Order Number: M —
Lot Number: MOR5 260218
Expiration Date: 27-Aug-19

RINSATE INFORMATION (If Applicable):

Media Type: Soil
Equipment Used: ~~Hand auger bucket~~ (deconed
Equipment Type: #10 sieve
[] Dedicated
[X] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Volatiles~~	~~Cool 4°C & HCl~~		~~YES / NO~~
~~Semivolatiles~~ PAHs	Cool 4°C	—	YES / NO
~~Pesticides / PCB~~	~~Cool 4°C~~		~~YES / NO~~
~~Metals~~ Lead	Cool 4°C & HNO_3	1 250 mL poly bottle	YES / NO
~~Cyanide~~	~~Cool 4°C & NaOH~~		~~YES / NO~~

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech

QA SAMPLE LOG SHEET

Project Site Name: NASA WFF Skeet Range
Project Number: 112G07896
Sample Location:
QA Sample Type:

Sample ID Number: SR-RB 04-032718
Sampled By: BB VS
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-27-18
Time: 1520
Method: Pour over equipment into bottle

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Food Lion Purified Distilled Water
Supplier: Food Lion
Manufacturer: Niagara Bottling
Order Number: M
Lot Number: MOR5 260218
Expiration Date: 27-Aug-19

RINSATE INFORMATION (If Applicable):

Media Type: Soil
Equipment Used: ~~Hand auger bucket~~ (deconed
Equipment Type: #10 sieve
[] Dedicated
[X] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Volatiles~~	~~Cool 4°C & HCl~~		~~YES / NO~~
~~Semivolatiles~~ PAHs	Cool 4°C	—	YES / NO
~~Pesticide / PCB~~	~~Cool 4°C~~		~~YES / NO~~
~~Metals~~ Lead	Cool 4°C & HNO_3	1 250mL poly bottle	YES / NO
~~Cyanide~~	~~Cool 4°C & NaOH~~		~~YES / NO~~

OBSERVATIONS / NOTES:

Signature(s):

December 2018

QA Sample Log Sheets

Tetra Tech

QA SAMPLE LOG SHEET

Project Site Name: NASA WFF Skeet Range
Project Number: 112G08539
Sample Location: —
QA Sample Type:

Sample ID Number: SR-EB01-20181218
Sampled By: JB
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 12-18-18
Time: 1055
Method: Pour over equipment into bottle

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Great Value Distilled Water
Supplier: Walmart
Manufacturer: Crossroads Beverage Group
Order Number:
Lot Number: 1 120718 1737
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: Soil
Equipment Used: #10 S.S. screen
Equipment Type:
[] Dedicated
[X] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl		YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals (Lead)	Cool 4°C & HNO_3	1 250mL poly bottle	YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech

QA SAMPLE LOG SHEET

Project Site Name: NASA WFF Skeet Range
Project Number: 112G08539
Sample Location: —
QA Sample Type:

Sample ID Number: SR-EB02-20181219
Sampled By: JB
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 12-19-18
Time: 1600
Method: Pour over equipment into bottle

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Great Value Distilled Water
Supplier: Walmart
Manufacturer: Crossroads Beverage Group
Order Number:
Lot Number: 1 120718 1737
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: Soil
Equipment Used: S.S. Hand auger
Equipment Type:
[] Dedicated
[X] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl		YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals (Lead)	Cool 4°C & HNO_3	1 250 mL poly bottle	YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech

QA SAMPLE LOG SHEET

Project Site Name: NASA WFF Skeet Range
Project Number: 112G08539
Sample Location:
QA Sample Type:

Sample ID Number: SR-EB03-20181220
Sampled By: JB
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 12-20-18
Time: 1000
Method: Pour over equipment into bottle

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Great Value Distilled Water
Supplier: Walmart
Manufacturer: Crossroads Beverage Group
Order Number:
Lot Number: 1 120718 1737
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: Soil
Equipment Used: S.S. Hand auger
Equipment Type:
[] Dedicated
[X] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl		YES / NO
Semivolatiles (PAHs	Cool 4°C	2 1-L Amber glass	YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Appendix F
Wetlands Delineation Memorandum

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TETRA TECH

MEMO

To:	NASA Wallops Flight Facility
Cc:	-
From:	Tetra Tech
Date:	June 8 2018
Subject:	Review of previously delineated Wetland Boundary, Habitat 7 of the Ecological Site Descriptions for Small Arms Firing Range Complex

The following assessment addresses the wetland complex mapped at the former Small Arms Firing Range Complex Site 7 (the site) on the National Aeronautic and Space Administration (NASA) Wallops Flight Facility (WFF) in Wallops Island, Virginia. The site is a component of a larger site at the WFF undergoing investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The assessment is intended to provide a baseline evaluation of soil, hydrology, and dominant vegetation in order to update the existing wetland boundary. The boundary defined along the site will be used to determine presence/absence of aquatic receptors along pre-determined sampling points.

Site Background: The WFF consists of three separate tracts in close proximity on Virginia's Eastern Shore (Accomack County): Wallops Main Base, Wallops Mainland, and Wallops Island. The overall site encompasses approximately 9 acres on Wallops Main Base, directly north of the intersection of Runways 10-28 and 17-35 (Figure 1). It includes a former pistol range, a former rifle range, a former machine-gun range, a former skeet range, Building A-131, and a fenced area leased to the National Oceanographic and Atmospheric Administration (NOAA). The assessment focuses on the northeast component of the 9 acre site (Habitat 7), previously identified as a wetland habitat (Figure 2).

Habitat 7 was characterized, in 2007, as a Palustrine Wetland dominated by of herbaceous canopy of common threesquare (*Scirpus pungens*), marsh fern (*Thelypteris palustris*), New York ironweed (*Vernonia noveboracensis*), false nettle (*Boehmeria cylindrical*), New England aster (*Symphyotrichum novae-angliae*), common cattail (*Typha latifolia*), and sweet goldenrod (*Solidago odora*). Sapling and shrub species observed at the time included black willow (*Salix nigra*), red maple (*Acer rubrum*), and wax myrtle (*Morella cerifera*).

The soil surface was saturated during the 2007 site visit. Despite connection to the Little Mosquito Creek, the difference between site elevation and highest tidal influence elevation indicated that the wetlands were non-tidal. Soil saturation within the site likely resulted from runoff entering the swale, but also could have included a shallow groundwater discharge component. Given the characterization of vegetaion, Habitat 7 was classified as a mixture

of palustrine emergent and palustrine scrub-shrub wetland (PEM/SS) using the classification system developed by the U.S. Fish and Wildlife Service (Cowardin *et al*., 1979).

Assessment Methodology: Wetland boundaries were delineated in the field using the USACE methodology per the *1987 Corps Manual* (U.S. Army Corps of Engineers [USACE], 1987) and *Regional Supplement to the Corp of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (USACE 2010). This three-parameter approach uses vegetation, soils, and hydrology to identify the presence of freshwater wetlands. According to the *1987 Corps Manual*, an area is a wetland if, under normal circumstances, it meets all three of the following criteria:

1. Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions).
2. Hydric soils (soils that were formed under water, or in saturated conditions).
3. Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

The wetland boundary was initially identified through visual assessment of vegetation and hydrology. After the initial assessment, sample wetland and upland points were located along the identified wetland boundary. Vegetation, soil, and indicators of hydrology were examined within each sample point. Dominant plant species and estimated percent cover were recorded by stratum. Site soil borings were obtained by using a dutch soil auger and were generally extracted to a depth of 10 to 18 inches. Soil characteristics and depth to saturation were noted. Vegetative communities were characterized by identifying and recording dominant species within each stratum: trees, woody shrubs and saplings, woody vines, and herbs. Percent coverage of dominant vegetation was visually estimated for each stratum using aerial cover, stem density, and basal areas. Finally, the wetland was classified base on vegetation cover type (Cowardin et. al., 1979) and hydrogeomorphic classification (Brinson 1993). The wetland boundary was mapped based on exceeding the original limits of the 2007 habitat assessment (Habitat 7). The northern boundary of W-JC01 is not the northern limit of the wetland, which extends further North into Mosquito Creek.

W-JC01, 2018 Assessment: The 2018 wetland boundary is provided below (Figure 3) and is categorized by National Wetland Inventories (NWI) as a palustrine scrub-shrub, broad-leaved deciduous seasonally flooded-tidal wetland (PSS1R) (US Fish and Wildlife Service [USFWS], 2012). Modifications of the formerly mapped wetland (Habitat 7), now classified as upland, were determined based on observations of hydrology and absence of prominent hydrophytic vegetation. Based on ground surveys, W-JC01 is a slope (Brinson, 1993) palustrine forested wetland (PFO) dominated by red maple and black gum (*Nyssa sylvatica*) that seasonally tidally drains into Little Mosquito Creek. Herbaceous emergent vegetation exists in fractured communities through the wetland complex, dominated by Phragmites (*Phragmites australis*), jewelweed (*Impatiens capensis*), common rush (*Juncus effusus*), and common cattail.

W-JC01 is characterized by a drop in elevation moving North from the culvert drain, driving hydrologic indicators that include saturation, inundation, and standing water that connect it to Little Mosquito Creek. The area South of the wetland boundary, now classified as upland, had little indication of necessary wetland hydrology beyond drainage patterns, which could have also been indications of foot traffic by small game animals. Additionally, soils in this area were unusually bright, characterized by what could be considered anomalous bright loamy soils (F20 – see Atlantic and Gulf Coastal Plain data form for full list). However, due to the land use and soil texture requirements for this indication of hydric soils, it was not appropriate to apply this indicator. USACE Atlantic Gulf and Coast Plain data forms were completed for wetland data points only and photos were taken to display various points along the boundary. GPS points were taken in field to indicate location of photos.

Conclusion: Based on the findings of the 2018 survey, the wetland boundary of W-JC01 is more closely related to the NWI than previously indicated during the assessment of Habitat 7 in 2007, despite true cover type differing from the NWI. Areas no longer mapped as wetland, modified from the 2007 weltland boundary determination, are considered marginal. As such, there may be potential need for ongoing hydrologic evaluation in order to discern changing wetland status.

References

Brinson, M.M. 1993. A Hydrogeomorphic Classification of Wetlands. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS, USA. Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

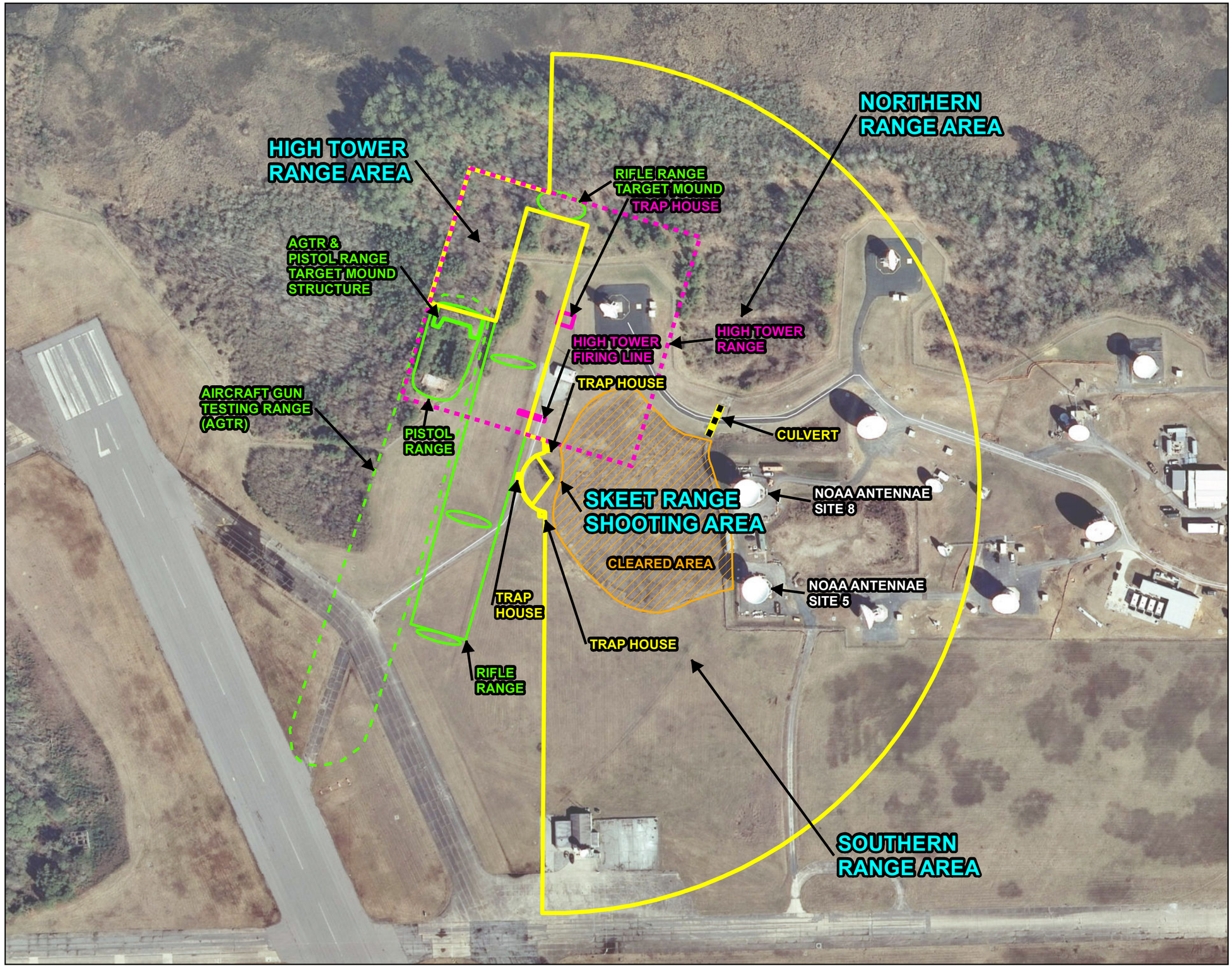
Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. U.S. Department of Interior, Fish and Wildlife Service, Office of Biological Services, Washington D.C. December.

USACE (U.S. Army Corps of Engineers), 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Environmental Laboratory, USACE Waterways Experiment Station, Vicksburg, Mississippi. January.

USACE, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*. ERDC/EL TR-10-20. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi. November.

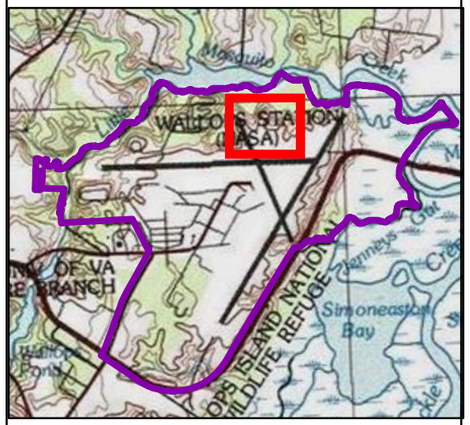
USFWS (U.S. Fish and Wildlife Service), 1988. *National List of Plant Species that Occur in Wetlands: National Summary. Biological Report 88(24).* National Wetlands Inventory. September.

USFWS, 2012. *National Wetlands Inventory Mapping*. http://107.20.228.18/Wetlands/WetlandsMapper.html (accessed June 6, 2018).



Legend

- Approximate AGTR Boundary
- Other MBFR Features
- High Tower Range
- Cleared Area by NOAA
- Former Skeet Range Site Features
- Former Skeet Range MRS
- Installation Boundary
- Culvert



N

0 100 200 400 Feet

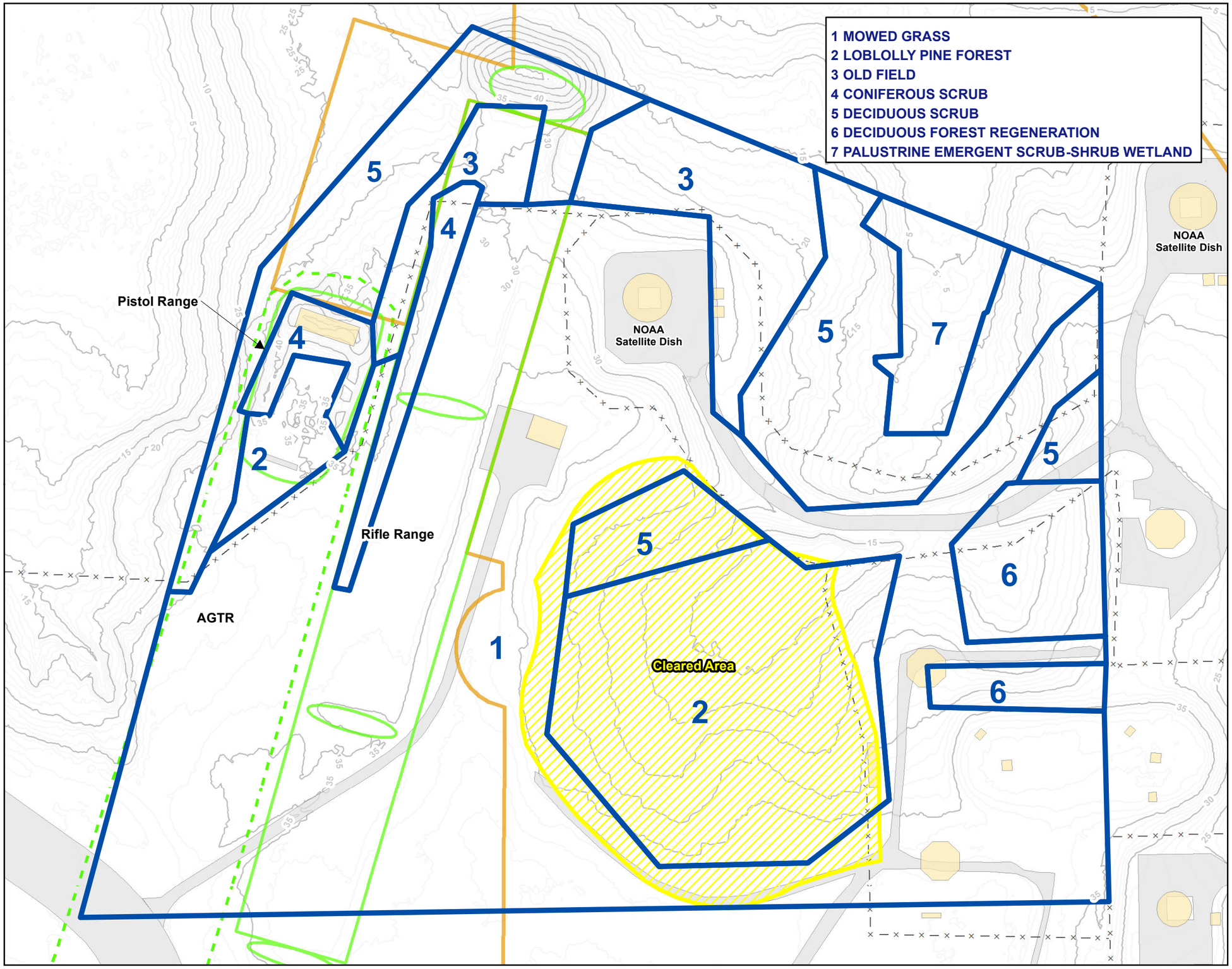
FIGURE 1
SITE LAYOUT - FORMER SKEET RANGE
MAIN BASE FIRING RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH | 3/8/2018

Aerial Imagery 2013 ESRI map service
USA Topo Map 2013 ESRI map service

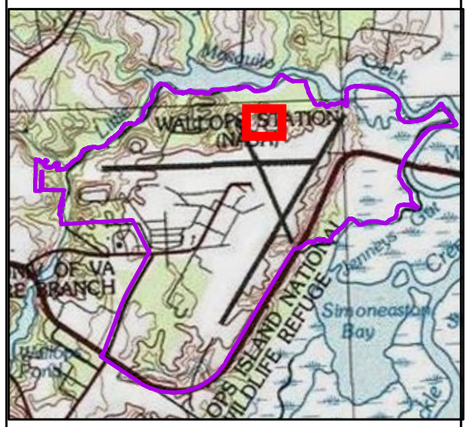
Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\MBFR_complex_sitelayout_081116.mxd MMC



Legend

- 2010 LIDAR Contours (feet msl)
- Fence Line
- Structure Existing Area
- Paved Surfaces
- Cleared Area by NOAA
- Habitat Areas
- Former Skeet Range MRS
- Approximate AGTR Boundary
- Other MBFR Feature
- Installation Boundary



N

0 50 100 200 Feet

FIGURE 2
MAIN BASE FIRING RANGE COMPLEX
HABITAT AREAS
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

TETRA TECH

2/17/2017

Aerial Imagery 2013 ESRI map service
USA Topo Map 2013 ESRI map service

Coordinate System: North American Datum, 1983 VA South, Meters

NOR: G:\GIS_files\NASA WI\MXD\MBFR\MBFR_complex_habitats_081516.mxd MMC

Legend

data point

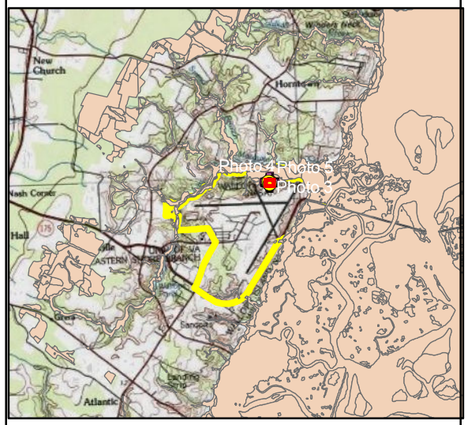
NWI Wetland

Estuarine and Marine

Freshwater Forested/Shrub Wetland

Habitat 7

W-JC01



N

0 25 50 100 Feet

Figure 3
Surveyed Wetlands
Skeet Range- Northern Range Area
NASA Wallops Flight Facilty
Wallops Island, Virginia

TETRA TECH

1/10/2019

Aerial Imagery 2013 ESRI map service
USA Topo Map 2013 ESRI map service
USFWS NWI Wetlands 2014

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 18, North, Meters

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TETRA TECH

MEMO

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Tetra Tech, Inc.
5700 Lake Wright Dr., Suite 102, Norfolk VA, 23502

TETRA TECH, INC. PHOTOGRAPHIC RECORD

Company: Tetra Tech
Project: Wallops Island, Habitat 7 Delineation

Photographer: J. Cook
Date: 04/05/2018
Photo No.: IMG_0016.jpg
Feature Name: W-JC01-Wet

Comments:

Slope PFO wetland dominated largely by red maple and black gum. Point taken along road access shows fractures herbaceous vegetation with common rush and common cattail

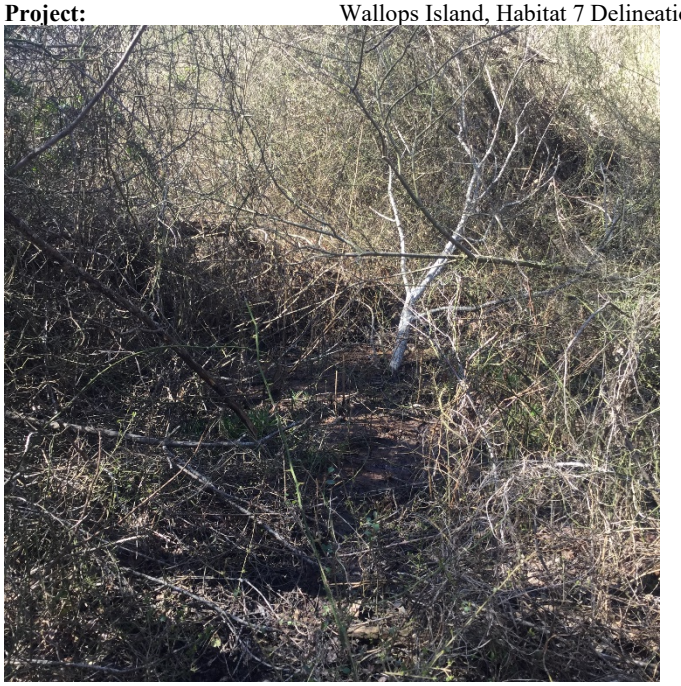
Photographer: J. Cook
Date: 04/05/2018
Photo No.: IMG_0012.jpg
Feature Name: W-JC01-UP

Comments:

Upland point that serves as counterpoint to data taken for W-JC01-Wet. Location was extremely brushy with significant black cherry and maple population.

TETRA TECH, INC. PHOTOGRAPHIC RECORD

Company: Tetra Tech
Project: Wallops Island, Habitat 7 Delineation



Photographer: J. Cook
Date: 04/05/2018
Photo No.: IMG_001.jpg
Feature Name: JC_photo1

Comments:

Representative photo of W-JC01, interior of wetland.

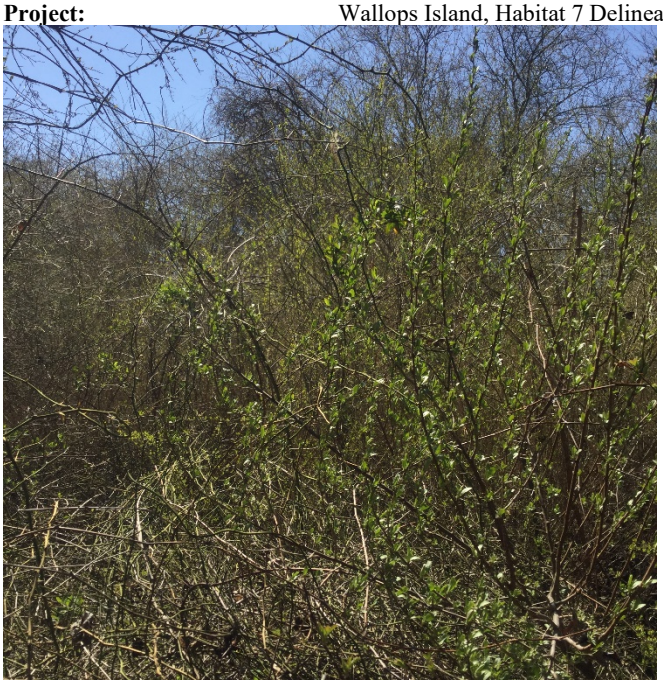
Photographer: J. Cook
Date: 04/05/2018
Photo No.: IMG_003.jpg
Feature Name: JC_photo2

Comments:

Representative photo of W-JC01, interior of wetland at formed road crossing. Photo indicates a fractured forest community with an herbaceous emergent buffer.

TETRA TECH, INC. PHOTOGRAPHIC RECORD

Company: Tetra Tech
Project: Wallops Island, Habitat 7 Delineation



Photographer: J. Cook
Date: 04/05/2018
Photo No.: IMG_004.jpg
Feature Name: Photo 3

Comments:

Photo taken to indicate, on map, location where the wetland was transitioning into a scrubby black cherry dominated uplant.

Photographer: J. Cook
Date: 04/05/2018
Photo No.: IMG_005.jpg
Feature Name: Photo 4

Comments:

Photo taken at interior wetland point, showing inundation, standing water, and iron deposits.

TETRA TECH, INC. PHOTOGRAPHIC RECORD

Company: Tetra Tech
Project: Wallops Island, Habitat 7 Delineation

Photographer: J. Cook
Date: 04/05/2018
Photo No.: IMG_0017.jpg
Feature Name: Photo 5

Comments:

Photo taken in location that was previously mapped as wetland. Location was considerably marginal with open understory that could indicate historical drainage. However, hydrologic parameters were not met and the soil didn't qualify based on region and texture.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Wallops Island City/County: Accomack Sampling Date: 04/05/2018

Applicant/Owner: NASA State: VA Sampling Point: **W-JC01-Wet**

Investigator(s): James Cook Section, Township, Range: N/a

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRRT Lat: 37.947557 Long: -75.462941 Datum: WGS 84

Soil Map Unit Name: Molena loamy sand, 6 to 35 percent slopes NWI classification: PFOR1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes ✔ No _____**
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks: Cowardin Code: PFO HGM: Slope Water Type: RPWWD

Floodplain wetland dominated by mixed canopy of forested, emergent, and scrubshrub. A majority of the wetland is dominated by red maple and sweet gum bottom land hardwood.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✔ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✔ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)
- ✔ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 1
Water Table Present?	Yes ✔	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Heavily saturated wetlands with abrupt hydrologic shift to upland (non saturated)

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: **W-JC01-Wet**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	25	✔	FAC
2. *Nyssa sylvatica*	15	✔	FAC
3. *Pinus taeda*	3		FACU
4.			
5.			
6.			
7.			
8.			
	43 = Total Cover		
50% of total cover: 21.5	20% of total cover: 8.6		

Sapling/Shrub Stratum (Plot size: 15)			
1. *Ilex opaca*	3		FACU
2. *Acer rubrum*	10	✔	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	13 = Total Cover		
50% of total cover: 6.5	20% of total cover: 2.6		

Herb Stratum (Plot size: 5)			
1. *Phragmites australis*	20	✔	FACW
2. *Juncus effusus*	30	✔	FACW
3. *Impatiens capensis*	2		FACW
4. *Typha latifolia*	10		OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	62 = Total Cover		
50% of total cover: 31.0	20% of total cover: 12.4		

Woody Vine Stratum (Plot size: 15)			
1. *Vitis aestivalis*	5	✔	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1.0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: **W-JC01-Wet**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					SL	High Organics

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ✔ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/a

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** _____

Remarks:

High content of organics coupled with extensive saturation/inundation, profiling difficult.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Wallops Island City/County: Accomack Sampling Date: 04/05/2018

Applicant/Owner: NASA State: VA Sampling Point: **W-JC01-UP**

Investigator(s): James Cook Section, Township, Range: N/a

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 10

Subregion (LRR or MLRA): LRRT Lat: 37.947539 Long: -75.463074 Datum: WGS 84

Soil Map Unit Name: Molena Loama Sand, 6 to 35 percent slopes NWI classification: N/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks: Cowardin Code: Upland HGM: Water Type:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15) **(LRR U)**
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

None

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: **W-JC01-UP**

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prunus serotina*	25	✔	FACU
2. *Liquidambar styraciflua*	10	✔	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7.0		

Sapling/Shrub Stratum (Plot size: 15)			
1. *Rubus allegheniensis*	30	✔	UPL
2. *Prunus serotina*	25	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	55 = Total Cover		
50% of total cover: 27.5	20% of total cover: 11.0		

Herb Stratum (Plot size: 5)			
1. *Festuca rubra*	5	✔	FACU
2. *Trifolium pratense*	5	✔	FACU
3. *Fragaria virginiana*	6	✔	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	16 = Total Cover		
50% of total cover: 8.0	20% of total cover: 3.2		

Woody Vine Stratum (Plot size: 15)			
1. *Vitis rotundifolia*	20	✔	FAC
2.			
3.			
4.			
5.			
	20 = Total Cover		
50% of total cover: 10.0	20% of total cover: 4.0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: **W-JC01-UP**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 4/2	100					SaLo	
4-20	10 YR 5/6	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) **(MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

None

Appendix G
Data Validation Reports

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TETRA TECH **INTERNAL CORRESPONDENCE**

TO:	**R. SOK**	**DATE:**	**JUNE 5, 2018**
FROM:	**TERRI L. SOLOMON**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – LEAD, GRAIN SIZE, TOTAL SOLIDS**
NASA WALLOPS ISLAND
SAMPLE DELIVERY GROUP (SDG) SL2689

SAMPLES: 41/Soil
Lead, Total Solids

SR-DUP14-032618	SR-DUP15-032718	SR-DUP16-032818
SR-SB-253-1224	SR-SB-256-1224	SR-SS-227-0006
SR-SS-227-0612	SR-SS-228-0006	SR-SS-228-0612
SR-SS-229-0006	SR-SS-229-0612	SR-SS-230-0006
SR-SS-230-0612	SR-SS-231-0006	SR-SS-231-0612
SR-SS-232-0006	SR-SS-232-0612	SR-SS-233-0006
SR-SS-233-0612	SR-SS-234-0006	SR-SS-234-0612
SR-SS-235-0006	SR-SS-235-0612	SR-SS-236-0006
SR-SS-236-0612	SR-SS-237-0006	SR-SS-237-0612
SR-SS-238-0006	SR-SS-238-0612	SR-SS-239-0006
SR-SS-239-0612	SR-SS-240-0006	SR-SS-240-0612
SR-SS-241-0006	SR-SS-241-0612	SR-SS-251-0006
SR-SS-251-0612	SR-SS-253-0006	SR-SS-253-0612
SR-SS-256-0006	SR-SS-256-0612	

5/Soil
Grain Size, Total Solids

SR-SB-246-1224	SR-SS-227-0006	SR-SS-227-0612
SR-SS-246-0006	SR-SS-246-0612	

2/Rinse Blanks
Lead

SR-RB03-032618	SR-RB04-032718

Overview

The sample set for NASA Wallops Island, SDG SL2689 consisted of forty-four (44) soil samples and two (2) rinse blanks. Samples were analyzed for lead, grain size and total solids as referenced above. Three (3) field duplicate pairs (SR-SS-227-0612 / SR-DUP14-032618, SR-SS-233-0612 / SR-DUP15-032718 and SR-SS-253-0006 / SR-DUP16-032818) were included in this SDG.

The samples were collected by Tetra Tech on March 26, 27 and 28, 2018 and analyzed by Katahdin Analytical Services. Analyses were conducted in accordance with SW-846 methods 6020A and 3540C, ASTM D422 and D2217 analytical and reporting protocols.

The data contained in these SDGs were validated with regard to the following parameters: data completeness, holding times, initial/continuing calibrations, laboratory instrument/preparation blanks, laboratory control sample results, matrix spike / matrix spike duplicate results, post digestion spike results, internal standard recoveries, field duplicate results, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

None.

Minor

- The matrix spike (MS) percent recovery (%R) for lead was below the quality control limit for sample SR-SS-229-0006 (preparation batch LD06IMS2). The post digestion spike recovery was < 75% quality control limit. The matrix spike duplicate (MSD) %R and relative percent difference (RPD) were within quality control limits. Samples SR-DUP14-032618, SR-SS-227-0006, SR-SS-227-0612, SR-SS-228-0006, SR-SS-228-0612, SR-SS-229-0006, SR-SS-229-0612, SR-SS-230-0006, SR-SS-230-0612, SR-SS-231-0006, SR-SS-232-0006, SR-SS-232-0612, SR-SS-233-0006, SR-SS-233-0612, SR-SS-238-0006 and SR-SS-238-0612 were affected. The detected results reported for lead in the affected samples were qualified as estimated (J).

- The rinse blank collected on 3/26/18 contained a concentration of 1190 ug/L. All samples collected on 3/26/18 which were associated with the rinse blank were qualified as estimated (J). The laboratory was asked to re-analyze the sample and according to the laboratory, the sample yielded a similar result. Sample concentrations collected on this day were all greater than 100 times the soil reporting limit.

Notes

It was noted on the chain of custody that two samples were collected with the sample ID, SR-SS-229-0006. As per the sampler, the sample collected on 03/26/2018 @13:47 was changed to SR-SS-229-0612 (laboratory ID SL2689-009).

It was noted by the laboratory that the sample collected on 03/28/2018@8:35 had a sample ID of SR-SS-252-05612 on the chain of custody and SR-SS-253-0612 on the sampling jar. The sampler was contacted and the sample ID SR-SS-253-0612 was used.

All samples were analyzed for lead at 5X or 10X dilutions.

The following analytes were detected in the laboratory instrument/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Reporting Limit (RL) > or <
Lead(1)	0.041 ug/L	< RL
Lead(2)	0.019 ug/L	< RL
Lead(3)	0.011 ug/L	< RL
Lead(4)	0.042 ug/L	< RL
Lead(5)	0.024 ug/L	< RL
Lead(6)	0.017 mg/kg	< RL
Lead(7)	0.018 mg/kg	< RL

(1) Maximum concentration present in an instrument blank affecting samples SR-RB03-032618 and SR-RB04-032718.

(2) Maximum concentration present in an instrument blank affecting samples SR-DUP14-032618, SR-SS-227-0006, SR-SS-227-0612, SR-SS-228-0006, SR-SS-228-0612, SR-SS-229-0006, SR-SS-229-0612, SR-SS-230-0006, SR-SS-230-0612, SR-SS-231-0006, SR-SS-232-0006, SR-SS-232-0612, SR-SS-233-0006, SR-SS-233-0612, SR-SS-238-0006 and SR-SS-238-0612.

(3) Maximum concentration present in an instrument blank affecting samples SR-DUP15-032718, SR-DUP16-032818, SR-SB-253-1224, SR-SB-256-1224, SR-SS-231-0612, SR-SS-234-0006, SR-SS-235-0612, SR-SS-236-0006, SR-SS-236-0612, SR-SS-237-0006, SR-SS-237-0612, SR-SS-239-0006, SR-SS-239-0612, SR-SS-240-0612, SR-SS-241-0006, SR-SS-241-0612, SR-SS-251-0006, SR-SS-251-0612, SR-SS-253-0006, SR-SS-253-0612, SR-SS-256-0006 and SR-SS-256-0612.

(4) Maximum concentration present in an instrument blank affecting samples SR-SS-234-0612 and SR-SS-240-0006.

(5) Maximum concentration present in an instrument blank affecting sample SR-SS-235-0006.

(6) Maximum concentration present in a preparation blank (batch LD09IMS1) affecting samples SR-SB-253-1224, SR-SS-231-0612, SR-SS-234-0006, SR-SS-234-0612, SR-SS-235-0006, SR-SS-235-0612, SR-SS-236-0006, SR-SS-236-0612, SR-SS-237-0006, SR-SS-237-0612, SR-SS-239-0612, SR-SS-240-0006, SR-SS-240-0612, SR-SS-241-0006, SR-SS-241-0612, SR-SS-253-0006, SR-SS-253-0612, SR-SS-256-0006 and SR-SS-256-0612.

(7) Maximum concentration present in a preparation blank (batch LD10IMS1) affecting samples SR-DUP16-032818, SR-SB-256-1224, SR-SS-239-0006, SR-SS-251-0006 and SR-SS-251-0612.

No validation actions were required as all soil sample results were greater than the reporting limit. No validation actions were warranted as field quality control blanks are not qualified for laboratory blank contamination.

It was also noted that the rinse blank collected on 3/27/18 contained lead at a concentration of 4.64 ug/L. This concentration was greater than 4 times the reporting limit for the water matrix. No action was taken on the associated soil samples collected on 3/27/18 because all sample results were greater than 100 times the soil reporting limit.

Executive Summary

Laboratory Performance: The MS %R for lead was below the quality control limit for sample SR-SS-229-0006.

Other Factors Affecting Data Quality: A rinse blank collected on 3/26/18 contained a high concentration of lead.

The data for these analyses were reviewed with reference to the US EPA National Functional Guidelines for Inorganic Data Review (January 2017) as applicable. The text of this report has been formulated to address only those areas affecting data quality.

for Tetra Tech, Inc.
Terri L. Solomon
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted method detection limit for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 08539	NSAMPLE	SR-RB03-032618			SR-RB04-032718		
SDG: SL2689	LAB_ID	SL2689-013			SL2689-015		
FRACTION: M	SAMP_DATE	3/26/2018			3/27/2018		
MEDIA: WATER	QC_TYPE	NM			NM		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		1190			4.64		

PROJ_NO: 08539	NSAMPLE	SR-DUP14-032618			SR-DUP15-032718			SR-DUP16-032818			SR-SB-253-1224		
SDG: SL2689	LAB_ID	SL2689-014			SL2689-032			SL2689-046			SL2689-037		
FRACTION: M	SAMP_DATE	3/26/2018			3/27/2018			3/28/2018			3/28/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.3			85.6			88.2			91.5		
	DUP_OF	SR-SS-227-0612			SR-SS-233-0612			SR-SS-253-0006					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		28	J	D	56.1			61.3			4.78		

PROJ_NO: 08539	NSAMPLE	SR-SB-256-1224			SR-SS-227-0006			SR-SS-227-0612			SR-SS-228-0006		
SDG: SL2689	LAB_ID	SL2689-040			SL2689-001			SL2689-006			SL2689-005		
FRACTION: M	SAMP_DATE	3/28/2018			3/26/2018			3/26/2018			3/26/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.9			84.9			87.4			84.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		11.4			158	J	D	27.8	J	D	89.8	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-228-0612			SR-SS-229-0006			SR-SS-229-0612			SR-SS-230-0006		
SDG: SL2689	LAB_ID	SL2689-002			SL2689-007			SL2689-009			SL2689-003		
FRACTION: M	SAMP_DATE	3/26/2018			3/26/2018			3/26/2018			3/26/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.2			85.3			86.7			76.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		20.8	J	D	14.7	J	D	13.3	J	D	752	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-230-0612			SR-SS-231-0006			SR-SS-231-0612			SR-SS-232-0006		
SDG: SL2689	LAB_ID	SL2689-004			SL2689-018			SL2689-020			SL2689-010		
FRACTION: M	SAMP_DATE	3/26/2018			3/27/2018			3/27/2018			3/26/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	80.5			81.5			82.4			83.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		121	J	D	362	J	D	93.8			40.6	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-232-0612			SR-SS-233-0006			SR-SS-233-0612			SR-SS-234-0006		
SDG: SL2689	LAB_ID	SL2689-012			SL2689-017			SL2689-019			SL2689-016		
FRACTION: M	SAMP_DATE	3/26/2018			3/27/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.1			84.7			85.6			85.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		69.4	J	D	213	J	D	56.2	J	D	208		

PROJ_NO: 08539	NSAMPLE	SR-SS-234-0612			SR-SS-235-0006			SR-SS-235-0612			SR-SS-236-0006		
SDG: SL2689	LAB_ID	SL2689-021			SL2689-024			SL2689-027			SL2689-029		
FRACTION: M	SAMP_DATE	3/27/2018			3/27/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.0			80.8			83.3			81.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		62.1			1140			194			360		

PROJ_NO: 08539	NSAMPLE	SR-SS-236-0612			SR-SS-237-0006			SR-SS-237-0612			SR-SS-238-0006		
SDG: SL2689	LAB_ID	SL2689-030			SL2689-026			SL2689-031			SL2689-011		
FRACTION: M	SAMP_DATE	3/27/2018			3/27/2018			3/27/2018			3/26/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	84.3			84.5			87.8			84.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		136			185			55.6			50.6	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-238-0612			SR-SS-239-0006			SR-SS-239-0612			SR-SS-240-0006		
SDG: SL2689	LAB_ID	SL2689-008			SL2689-023			SL2689-028			SL2689-022		
FRACTION: M	SAMP_DATE	3/26/2018			3/27/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.2			84.2			86.7			84.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		23.6	J	D	68.8			11.2			107		

PROJ_NO: 08539	NSAMPLE	SR-SS-240-0612			SR-SS-241-0006			SR-SS-241-0612			SR-SS-251-0006		
SDG: SL2689	LAB_ID	SL2689-025			SL2689-034			SL2689-038			SL2689-041		
FRACTION: M	SAMP_DATE	3/27/2018			3/28/2018			3/28/2018			3/28/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	87.0			80.0			83.8			89.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		17.7			28.9			14.3			7.87		

PROJ_NO: 08539	NSAMPLE	SR-SS-251-0612			SR-SS-253-0006			SR-SS-253-0612			SR-SS-256-0006		
SDG: SL2689	LAB_ID	SL2689-042			SL2689-033			SL2689-036			SL2689-035		
FRACTION: M	SAMP_DATE	3/28/2018			3/28/2018			3/28/2018			3/28/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.5			88.0			88.6			82.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		60.5			70.7			15.9			342		

PROJ_NO: 08539	NSAMPLE	SR-SS-256-0612		
SDG: SL2689	LAB_ID	SL2689-039		
FRACTION: M	SAMP_DATE	3/28/2018		
MEDIA: SOIL	QC_TYPE	NM		
	UNITS	MG/KG		
	PCT_SOLIDS	86.9		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
LEAD		125		

PROJ_NO: 08539	NSAMPLE	SR-DUP14-032618			SR-DUP15-032718			SR-DUP16-032818			SR-SB-246-1224		
SDG: SL2689	LAB_ID	SL2689-14			SL2689-32			SL2689-46			SL2689-45		
FRACTION: MISC	SAMP_DATE	3/26/2018			3/27/2018			3/28/2018			3/28/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	87.3			85.6			88.2			83.1		
	DUP_OF	SR-SS-227-0612			SR-SS-233-0612			SR-SS-253-0006					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND											8.93		
PERCENT FINE SAND											26.12		
PERCENT FINES											27.3		
PERCENT GRAVEL											0.07		
PERCENT MEDIUM SAND											37.58		
SIEVE 1"											100		
SIEVE 1/4"											100		
SIEVE 1-1/2"											100		
SIEVE 2"											100		
SIEVE 3"											100		
SIEVE 3/4"											100		
SIEVE NO. 004											99.93		
SIEVE NO. 010											91		
SIEVE NO. 020											68.75		
SIEVE NO. 040											53.42		
SIEVE NO. 060											42.93		
SIEVE NO. 080											37.13		
SIEVE NO. 100											33.78		
SIEVE NO. 200											27.3		
TOTAL SOLIDS		87			86			88			83		

PROJ_NO: 08539	NSAMPLE	SR-SB-253-1224			SR-SB-256-1224			SR-SS-227-0006			SR-SS-227-0612		
SDG: SL2689	LAB_ID	SL2689-37			SL2689-40			SL2689-1			SL2689-6		
FRACTION: MISC	SAMP_DATE	3/28/2018			3/28/2018			3/26/2018			3/26/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	91.5			86.9			84.9			87.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND								9.05			3.45		
PERCENT FINE SAND								35.16			43.64		
PERCENT FINES								15.77			17.62		
PERCENT GRAVEL								0.38			0		
PERCENT MEDIUM SAND								39.65			35.29		
SIEVE 1"								100			100		
SIEVE 1/4"								100			100		
SIEVE 1-1/2"								100			100		
SIEVE 2"								100			100		
SIEVE 3"								100			100		
SIEVE 3/4"								100			100		
SIEVE NO. 004								99.62			100		
SIEVE NO. 010								90.57			96.55		
SIEVE NO. 020								68.44			79.9		
SIEVE NO. 040								50.92			61.27		
SIEVE NO. 060								35.01			42.89		
SIEVE NO. 080								24.56			30.82		
SIEVE NO. 100								21.86			24.12		
SIEVE NO. 200								15.77			17.62		
TOTAL SOLIDS		91			87			85			87		

PROJ_NO: 08539	NSAMPLE	SR-SS-228-0006			SR-SS-228-0612			SR-SS-229-0006			SR-SS-229-0612		
SDG: SL2689	LAB_ID	SL2689-5			SL2689-2			SL2689-9			SL2689-7		
FRACTION: MISC	SAMP_DATE	3/26/2018			3/26/2018			3/26/2018			3/26/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	84.1			86.2			86.7			85.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		84			86			87			85		

PROJ_NO: 08539	NSAMPLE	SR-SS-230-0006			SR-SS-230-0612			SR-SS-231-0006			SR-SS-231-0612		
SDG: SL2689	LAB_ID	SL2689-3			SL2689-4			SL2689-18			SL2689-20		
FRACTION: MISC	SAMP_DATE	3/26/2018			3/26/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	76.6			80.5			81.5			82.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		76			80			81			82		

PROJ_NO: 08539	NSAMPLE	SR-SS-232-0006			SR-SS-232-0612			SR-SS-233-0006			SR-SS-233-0612		
SDG: SL2689	LAB_ID	SL2689-10			SL2689-12			SL2689-17			SL2689-19		
FRACTION: MISC	SAMP_DATE	3/26/2018			3/26/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	83.0			87.1			84.7			85.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		83			87			85			86		

PROJ_NO: 08539	NSAMPLE	SR-SS-234-0006			SR-SS-234-0612			SR-SS-235-0006			SR-SS-235-0612		
SDG: SL2689	LAB_ID	SL2689-16			SL2689-21			SL2689-24			SL2689-27		
FRACTION: MISC	SAMP_DATE	3/27/2018			3/27/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	85.1			87.0			80.8			83.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		85			87			81			83		

PROJ_NO: 08539	NSAMPLE	SR-SS-236-0006			SR-SS-236-0612			SR-SS-237-0006			SR-SS-237-0612		
SDG: SL2689	LAB_ID	SL2689-29			SL2689-30			SL2689-26			SL2689-31		
FRACTION: MISC	SAMP_DATE	3/27/2018			3/27/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	81.9			84.3			84.5			87.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		82			84			84			88		

PROJ_NO: 08539	NSAMPLE	SR-SS-238-0006			SR-SS-238-0612			SR-SS-239-0006			SR-SS-239-0612		
SDG: SL2689	LAB_ID	SL2689-11			SL2689-8			SL2689-23			SL2689-28		
FRACTION: MISC	SAMP_DATE	3/26/2018			3/26/2018			3/27/2018			3/27/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	84.9			85.2			84.2			86.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		85			85			84			87		

PROJ_NO: 08539	NSAMPLE	SR-SS-240-0006			SR-SS-240-0612			SR-SS-241-0006			SR-SS-241-0612		
SDG: SL2689	LAB_ID	SL2689-22			SL2689-25			SL2689-34			SL2689-38		
FRACTION: MISC	SAMP_DATE	3/27/2018			3/27/2018			3/28/2018			3/28/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	84.8			87.0			80.0			83.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		85			87			80			84		

PROJ_NO: 08539	NSAMPLE	SR-SS-246-0006			SR-SS-246-0612			SR-SS-251-0006			SR-SS-251-0612		
SDG: SL2689	LAB_ID	SL2689-43			SL2689-44			SL2689-41			SL2689-42		
FRACTION: MISC	SAMP_DATE	3/28/2018			3/28/2018			3/28/2018			3/28/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	79.7			84.0			89.6			85.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND		2.17			5.01								
PERCENT FINE SAND		38.46			32.33								
PERCENT FINES		32.73			30.69								
PERCENT GRAVEL		0			0.3								
PERCENT MEDIUM SAND		26.64			31.67								
SIEVE 1"		100			100								
SIEVE 1/4"		100			100								
SIEVE 1-1/2"		100			100								
SIEVE 2"		100			100								
SIEVE 3"		100			100								
SIEVE 3/4"		100			100								
SIEVE NO. 004		100			99.7								
SIEVE NO. 010		97.83			94.69								
SIEVE NO. 020		86.55			78.22								
SIEVE NO. 040		71.19			63.02								
SIEVE NO. 060		55.97			50.42								
SIEVE NO. 080		46.45			42.39								
SIEVE NO. 100		40.95			37.69								
SIEVE NO. 200		32.73			30.69								
TOTAL SOLIDS		80			84			90			85		

PROJ_NO: 08539	NSAMPLE	SR-SS-253-0006			SR-SS-253-0612			SR-SS-256-0006			SR-SS-256-0612		
SDG: SL2689	LAB_ID	SL2689-33			SL2689-36			SL2689-35			SL2689-39		
FRACTION: MISC	SAMP_DATE	3/28/2018			3/28/2018			3/28/2018			3/28/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	88.0			88.6			82.5			86.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		88			89			82			87		

TETRA TECH

INTERNAL CORRESPONDENCE

TO: **R. SOK** **DATE:** **MAY 24, 2018**

FROM: **TERRI L. SOLOMON** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC & INORGANIC DATA VALIDATION –SELECT PAHs/ LEAD/ GRAIN SIZE / LEAD SHOT COUNT**
NASA WALLOPS ISLAND
SAMPLE DELIVERY GROUP (SDG) SL3003

SAMPLES: 42/Soils/
Select PAHs

SR-DUP07-032218	SR-DUP08-032218	SR-DUP09-032218
SR-DUP10-032218	SR-SB-257-1224	SR-SB-258-1224
SR-SB-259-1224	SR-SB-260-1224	SR-SB-261-1224
SR-SB-262-1224	SR-SB-263-1224	SR-SS-257-0006
SR-SS-257-0612	SR-SS-258-0006	SR-SS-258-0612
SR-SS-259-0006	SR-SS-259-0612	SR-SS-260-0006
SR-SS-260-0612	SR-SS-261-0006	SR-SS-261-0612
SR-SS-262-0006	SR-SS-262-0612	SR-SS-263-0006
SR-SS-263-0612	SR-SS-264-0006	SR-SS-265-0006
SR-SS-266-0006	SR-SS-267-0006	SR-SS-268-0006
SR-SS-269-0006	SR-SS-270-0006	SR-SS-271-0006
SR-SS-272-0006	SR-SS-273-0006	SR-SS-274-0006
SR-SS-275-0006	SR-SS-275-0612	SR-SS-275-1224
SR-SS-276-0006	SR-SS-277-0006	SR-SS-278-0006

112/Soils/
Lead

SR-DUP01-031918	SR-DUP02-032018	SR-DUP03-032118
SR-DUP04-032118	SR-DUP05-032118	SR-DUP06-032218
SR-DUP11-032318	SR-DUP12-032318	SR-DUP13-032318
SR-SB-201-1224	SR-SB-202-1224	SR-SB-203-1224
SR-SB-216-1224	SR-SB-217-1224	SR-SB-218-1224
SR-SB-219-1224	SR-SB-220-1224	SR-SB-221-1224
SR-SB-221-1224 SIEVE 20	SR-SB-221-1224 SIEVE PAN	SR-SB-222-1224
SR-SB-223-1224	SR-SB-224-1224	SR-SB-225-1224
SR-SB-246-1224	SR-SB-250-1224	SR-SS-201-0006
SR-SS-201-0612	SR-SS-202-0006	SR-SS-202-0612
SR-SS-203-0006	SR-SS-203-0612	SR-SS-204-0006
SR-SS-204-0612	SR-SS-205-0006	SR-SS-205-0612
SR-SS-206-0006	SR-SS-206-0612	SR-SS-207-0006
SR-SS-207-0612	SR-SS-208-0006	SR-SS-208-0612
SR-SS-209-0006	SR-SS-209-0612	SR-SS-210-0006
SR-SS-210-0612	SR-SS-211-0006	SR-SS-211-0612
SR-SS-212-0006	SR-SS-212-0612	SR-SS-213-0006
SR-SS-213-0612	SR-SS-214-0006	SR-SS-214-0612
SR-SS-215-0006	SR-SS-215-0612	SR-SS-216-0006
SR-SS-216-0612	SR-SS-217-0006	SR-SS-217-0612
SR-SS-218-0006	SR-SS-218-0612	SR-SS-219-0006
SR-SS-219-0612	SR-SS-220-0006	SR-SS-220-0612
SR-SS-221-0006	SR-SS-221-006 SIEVE 20	SR-SS-221-006 SIEVE PAN
SR-SS-221-0612	SR-SS-221-0612 SIEVE 20	SR-SS-221-0612 SIEVE PAN
SR-SS-222-0006	SR-SS-222-0612	SR-SS-223-0006

SR-SS-223-0612	SR-SS-224-0006	SR-SS-224-0612
SR-SS-225-0006	SR-SS-225-0006 SIEVE 20	SR-SS-225-0006 SIEVE PAN
SR-SS-225-0612	SR-SS-225-0612 SIEVE 20	SR-SS-225-0612 SIEVE PAN
SR-SS-226-0006	SR-SS-226-0612	SR-SS-226-1224
SR-SS-242-0006	SR-SS-242-0612	SR-SS-243-0006
SR-SS-243-0612	SR-SS-243-1224	SR-SS-244-0006
SR-SS-244-0612	SR-SS-245-0006	SR-SS-245-0612
SR-SS-246-0006	SR-SS-246-0612	SR-SS-247-0006
SR-SS-247-0612	SR-SS-248-0006	SR-SS-248-0612
SR-SS-249-0006	SR-SS-249-0612	SR-SS-250-0006
SR-SS-250-0612	SR-SS-252-0006	SR-SS-252-0612
SR-SS-254-0006	SR-SS-254-0612	SR-SS-255-0006
SR-SS-255-0612		

2/Rinse Blanks/
Select PAHs, Lead

SR-RB01-032218	SR-RB02-032318

5/Soils/
Lead Shot Count

SR-SB-221-1224	SR-SS-221-0006	SR-SS-221-0612
SR-SS-225-0006	SR-SS-225-0612	

3/Soils/
Grain Size

SR-SB-225-1224	SR-SS-225-0006	SR-SS-225-0612

Overview

The sample set for NASA Wallops Island, SDG SL3003 consisted of one hundred fifty-four (154) soil samples and two (2) rinse blank samples. The samples were analyzed for select polycyclic aromatic hydrocarbons (PAHs) including benzo(a)anthracene, benzo(s)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene, lead, grain size and lead shot count as referenced above. The following field duplicate pairs were included in this SDG:

SR-SS-276-0006 / SR-DUP07-032218
SR-SS-267-0006 / SR-DUP08-032218
SR-SS-259-0006 / SR-DUP09-032218
SR-SS-260-0612 / SR-DUP10-032218
SR-SS-226-0006 / SR-DUP01-031918
SR-SS-224-0612 / SR-DUP02-032018
SR-SB-223-1224 / SR-DUP03-032118
SR-SB-222-1224 / SR-DUP04-032118
SR-SS-217-0006 / SR-DUP05-032118
SR-SS-203-0006 / SR-DUP06-032218
SR-SS-255-0612 / SR-DUP11-032318
SR-SB-246-1224 / SR-DUP12-032318
SR-SS-242-0006 / SR-DUP13-032318

The samples were collected by Tetra Tech on March 19, 20, 21, 22 and 23, 2018 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with SW-846 Methods 8270D SIM, 6020A and ASTM D422 analytical and reporting protocols.

The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, GC/MS tuning, initial/continuing calibrations, laboratory method/preparation blanks, Interference Check Sample (ICS), surrogate spike recoveries, laboratory control sample results, internal standard areas and recoveries, matrix spike / matrix spike duplicate results, ICP serial dilution results, field duplicate results, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

None.

Minor

- The PAH continuing calibration performed on instrument GCMS-N on 03/30/18 @ 9:45 had a percent difference (%D) for indeno(1,2,3-cd)pyrene which exceeded the 20% quality control limit. Samples SR-RB01-032218, SR-RB02-032318, SR-SS-258-0612, SR-SB-263-1224, SR-SS-264-0006, SR-SS-273-0006, SR-SS-274-0006, SR-SS-275-1224, SR-SS-265-0006, SR-SS-266-0006, SR-SS-267-006 and SR-SS-268-0006 were affected. The detected and non-detected results reported for indeno(1,2,3-cd)pyrene in the affected samples were qualified as estimated, (J) and (UJ), respectively.

- The PAH continuing calibration performed on instrument GCMS-N on 04/06/18 @ 10:13 had a %D for benzo(b)fluoranthene which exceeded the quality control limit. Sample SR-DUP09-032218 was affected. The detected result reported for benzo(b)fluoranthene in the affected sample was qualified as estimated, (J).

- The matrix spike duplicate (MSD) percent recoveries for benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene and benzo(a)pyrene was below the quality control limits for sample SR-SB-262-1224. The matrix spike (MS) percent recoveries were within quality control limits. The MS/MSD relative percent differences (RPDs) were outside the quality control limits. The detected results reported for the aforementioned compounds in the affected sample were qualified as estimated (J).

- The MS percent recoveries for benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene were above the quality control limits for sample SR-SB-263-1224. The MSD percent recoveries and RPDs were within quality control limits. The detected results reported for the aforementioned compounds in the affected sample were qualified as estimated (J).

- The MS/MSD percent recoveries for lead were below the quality control limits for sample SR-SB-218-1224. The post digestion spike recovery for lead was below the quality control limit. The detected results reported in preparation batch LC27IMS2 for lead were qualified as estimated biased low (J-) or estimated (J) as a result of conflicting noncompliances.

- The MSD percent recovery for lead was below the quality control limits for sample SR-SS-249-0612. The MS and post digestion spike recoveries for lead were within the quality control limit. The detected results reported in preparation batch LC29IMS1 for lead were qualified as estimated (J) as a result of conflicting noncompliances.

- The PAH internal standard recoveries for chrysene-d12 and perylene-d12 were above the quality control limits for sample SR-SS-257-0006. The detected results reported for the affected compounds were qualified as estimated biased low, (J-).

- Field duplicate imprecision (RPD > 50% or percent difference > 2X reporting limit) was noted for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene for sample pairs SR-SS-276-0006 / SR-DUP07-

032218 and SR-SS-259-0006 / SR-DUP09-032218. The detected results reported for the aforementioned compounds in the affected samples were qualified as estimated, (J).

- Field duplicate imprecision (RPD > 50%) was noted for lead for sample pairs SR-SB-223-1224 / SR-DUP03-032118 and SR-SS-255-0612 / SR-DUP11-032318. The detected results reported for lead in the affected samples were qualified as estimated, (J).

- Detected results reported below the Reporting Limit (RL) limit but above the Method Detection Limit (MDL) were qualified as estimated, (J).

Notes

It was noted that sample SR-SB-225-1224 was not listed on the chain of custody for lead.

The following samples were analyzed at a dilution for the PAH analyses:

Sample	Dilution
SR-SS-267-006	150X
SR-SS-268-0006	40X
SR-DUP07-032218	20X
SR-DUP08-032218	150X
SR-SS-274-0006	2X
SR-SS-277-0006	8X
SR-SS-278-0006	5X
SR-DUP09-032218	5X
SR-SS-258-0612	3X
SR-SS-261-0006	2X
SR-SS-275-0006	200X
SR-SS-275-0612	50X
SR-SS-276-0006	3X
SR-SS-257-0006	3X
SR-SS-258-0006	70X
SR-SS-259-0006	50X
SR-SS-259-0612	6X
SR-SS-260-0006	10X
SR-SS-260-0612	2X
SR-SS-262-0006	10X
SR-SS-265-0006	10X
SR-SS-266-0006	20X

All samples with the exception of SR-SS-202-0006, SR-SS-213-0006, SR-SS-213-0612, SR-DUP05-032118, SR-SS-216-0006 and SR-SS-217-0006 were analyzed at a 5X dilution for lead. Samples SR-SS-202-0006, SR-SS-213-0612, SR-DUP05-032118, SR-SS-216-0006 and SR-SS-217-0006 were analyzed at a 10X dilution for lead. Sample SR-SS-213-0006 was analyzed at a 200X dilution for lead.

The following analyte was detected in the laboratory instrument / preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Reporting Limit (RL) > or <
Lead(1)	0.029 mg/kg	< RL
Lead(2)	0.012 mg/kg	< RL
Lead(3)	0.021 mg/kg	< RL
Lead(4)	0.109 mg/kg	> RL

Lead[5]	0.056 mg/kg	< RL
Lead[6]	0.015 mg/kg	< RL

(1) Maximum concentration detected in a preparation blank affecting samples SR-SB-221-1224 SIEVE 20, SR-SB-221-1224 SIEVE PAN, SR-SS-221-0006 SIEVE 20, SR-SS-221-0006 SIEVE PAN, SR-SS-221-0612 SIEVE 20, SR-SS-221-0612 SIEVE PAN, SR-SS-225-0006 SIEVE 20, SR-SS-225-006 SIEVE PAN, SR-SS-225-0612 SIEVE 20, SR-SS-225-0612 SIEVE PAN.
(2) Maximum concentration detected in a preparation blank (batch LC27IMS2).
(3) Maximum concentration detected in a preparation blank (batch LC27IMS3).
(4) Maximum concentration detected in a preparation blank (batch LC28IMS1).
(5) Maximum concentration detected in a preparation blank (batch LC28IMS2).
(6) Maximum concentration present in a preparation blank (batch LC29IMS1).

No validation actions were warranted as all sample results were greater than the reporting limit. Samples in preparation batch LC28IMS1 received no validation qualifications as all sample results were > 10 preparation blank result.

All surrogate recoveries for the PAH analyses were 0% for samples SR-SS-267-0006, SR-SS-268-0006, SR-SS-275-0006, SR-SS-275-0612, SR-DUP07-032218, SR-DUP08-032218, SR-SS-258-0006, SR-SS-259-0006, SR-SS-260-0006, SR-SS-262-0006, SR-SS-265-0006 and SR-SS-266-0006. No validation actions were required as samples were analyzed at 10-200X dilutions.

Non-detected results were reported to the MDL.

Executive Summary

Laboratory Performance: Several CCV %Ds were noncompliant for the PAH fraction. MS/MSD and/or post digestion spike recoveries were noncompliant in the PAH and metals fraction. Internal standard recoveries were noncompliant in the PAH fraction.

Other Factors Affecting Data Quality: Results below the RL were estimated. Field duplicate imprecision was noted for several sample pairs.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Superfund Methods Review" (January 2017) and the "National Functional Guidelines for Inorganic Superfund Methods Data Review" (January 2017). The text of this report has been formulated to address only those areas affecting data quality.

Terri L Solomon

Tetra Tech, Inc.
Terri L. Solomon
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted method detection limit for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 08539	NSAMPLE	SR-RB01-032218			SR-RB02-032318		
SDG: SL3003	LAB_ID	SL2500-75			SL2500-148		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/23/2018		
MEDIA: WATER	QC_TYPE	NM			NM		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		0.046	U		0.047	U	
BENZO(A)PYRENE		0.066	U		0.067	U	
BENZO(B)FLUORANTHENE		0.089	U		0.091	U	
BENZO(K)FLUORANTHENE		0.049	U		0.05	U	
CHRYSENE		0.036	U		0.037	U	
DIBENZO(A,H)ANTHRACENE		0.07	U		0.071	U	
INDENO(1,2,3-CD)PYRENE		0.052	UJ	C	0.053	UJ	C

PROJ_NO: 08539	NSAMPLE	SR-DUP07-032218			SR-DUP08-032218			SR-DUP09-032218			SR-DUP10-032218		
SDG: SL3003	LAB_ID	SL2500-114DL			SL2500-115DL			SL2500-116REDL			SL2500-117RE		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	77.4			80.3			87.3			82.4		
	DUP_OF	SR-SS-276-0006			SR-SS-267-0006			SR-SS-259-0006			SR-SS-260-0612		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		9700	J	G	60000			1300	J	G	350		
BENZO(A)PYRENE		8300	J	G	49000			1500	J	G	420		
BENZO(B)FLUORANTHENE		12000	J	G	72000			2200	J	CG	600		
BENZO(K)FLUORANTHENE		3200	J	G	20000			760	J	G	200		
CHRYSENE		9800	J	G	61000			1700	J	G	440		
DIBENZO(A,H)ANTHRACENE		2000	J	G	12000			300	J	G	110		
INDENO(1,2,3-CD)PYRENE		5400	J	G	37000			950	J	G	390		

PROJ_NO: 08539	NSAMPLE	SR-SB-257-1224			SR-SB-258-1224			SR-SB-259-1224			SR-SB-260-1224		
SDG: SL3003	LAB_ID	SL2500-78			SL2500-81			SL2500-84			SL2500-87		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	87.2			86.5			88.4			86.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		30			190			33			25		
BENZO(A)PYRENE		35			180			40			30		
BENZO(B)FLUORANTHENE		52			240			56			43		
BENZO(K)FLUORANTHENE		14	J	P	92			14	J	P	10	J	P
CHRYSENE		36			220			38			27		
DIBENZO(A,H)ANTHRACENE		11	J	P	44			12	J	P	7.2	J	P
INDENO(1,2,3-CD)PYRENE		42			150			46			32		

PROJ_NO: 08539	NSAMPLE	SR-SB-261-1224			SR-SB-262-1224			SR-SB-263-1224			SR-SS-257-0006		
SDG: SL3003	LAB_ID	SL2500-90			SL2500-93			SL2500-96			SL2500-76DL		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	94.6			92.4			89.9			85.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		3.9	J	P	24	J	D	56			890	J-	N
BENZO(A)PYRENE		4.2	J	P	25	J	D	61			1000	J-	N
BENZO(B)FLUORANTHENE		6.1	J	P	40	J	D	85	J	D	1500	J-	N
BENZO(K)FLUORANTHENE		3.1	U		8.6	J	DP	29			470	J-	N
CHRYSENE		1.7	U		26	J	D	65			1100	J-	N
DIBENZO(A,H)ANTHRACENE		1.8	U		6.7	J	P	14	J	P	250	J-	N
INDENO(1,2,3-CD)PYRENE		4.2	J	P	22			58	J	CD	840	J-	N

PROJ_NO: 08539	NSAMPLE	SR-SS-257-0612			SR-SS-258-0006			SR-SS-258-0612			SR-SS-259-0006		
SDG: SL3003	LAB_ID	SL2500-77			SL2500-79DL2			SL2500-80DL2			SL2500-82DL2		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	88.5			83.8			85.5			81.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		17	J	P	22000			710			14000	J	G
BENZO(A)PYRENE		20	J	P	22000			770			17000	J	G
BENZO(B)FLUORANTHENE		29			31000			1100			25000	J	G
BENZO(K)FLUORANTHENE		5.7	J	P	13000			370			7800	J	G
CHRYSENE		19	J	P	27000			860			18000	J	G
DIBENZO(A,H)ANTHRACENE		4.4	J	P	5100			200			6000	J	G
INDENO(1,2,3-CD)PYRENE		23			18000			830	J	C	20000	J	G

PROJ_NO: 08539	NSAMPLE	SR-SS-259-0612			SR-SS-260-0006			SR-SS-260-0612			SR-SS-261-0006		
SDG: SL3003	LAB_ID	SL2500-83DL			SL2500-85DL			SL2500-86DL			SL2500-88DL		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	90.4			78.3			81.7			87.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		2000			3800			450			550		
BENZO(A)PYRENE		2200			3900			550			660		
BENZO(B)FLUORANTHENE		2900			5200			740			880		
BENZO(K)FLUORANTHENE		1200			2200			270			330		
CHRYSENE		2400			4400			550			660		
DIBENZO(A,H)ANTHRACENE		600			1000			160			180		
INDENO(1,2,3-CD)PYRENE		1900			3500			520			560		

PROJ_NO: 08539	NSAMPLE	SR-SS-261-0612			SR-SS-262-0006			SR-SS-262-0612			SR-SS-263-0006		
SDG: SL3003	LAB_ID	SL2500-89			SL2500-91DL			SL2500-92			SL2500-94		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	93.3			89.6			91.2			89.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		16	J	P	1500			69			6.2	J	P
BENZO(A)PYRENE		25			1700			77			6.5	J	P
BENZO(B)FLUORANTHENE		33			2400			110			11	J	P
BENZO(K)FLUORANTHENE		7.4	J	P	810			37			3.4	U	
CHRYSENE		18	J	P	1900			80			3	J	P
DIBENZO(A,H)ANTHRACENE		7.8	J	P	460			22			1.9	U	
INDENO(1,2,3-CD)PYRENE		30			1600			84			7	J	P

PROJ_NO: 08539	NSAMPLE	SR-SS-263-0612			SR-SS-264-0006			SR-SS-265-0006			SR-SS-266-0006		
SDG: SL3003	LAB_ID	SL2500-95			SL2500-97RA			SL2500-98DL			SL2500-99DL		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	90.5			84.5			77.4			82.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		98			290			1400			6000		
BENZO(A)PYRENE		83			300			1600			6100		
BENZO(B)FLUORANTHENE		120			430			2300			8600		
BENZO(K)FLUORANTHENE		39			140			720			2800		
CHRYSENE		110			370			1800			7300		
DIBENZO(A,H)ANTHRACENE		21	J	P	70			410			1500		
INDENO(1,2,3-CD)PYRENE		71			250	J	C	1400	J	C	5400	J	C

PROJ_NO: 08539	NSAMPLE	SR-SS-267-0006			SR-SS-268-0006			SR-SS-269-0006			SR-SS-270-0006		
SDG: SL3003	LAB_ID	SL2500-100DL			SL2500-101DL			SL2500-102			SL2500-103		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	80.3			81.0			82.4			87.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		38000			9600			42			200		
BENZO(A)PYRENE		40000			8300			67			240		
BENZO(B)FLUORANTHENE		52000			11000			91			350		
BENZO(K)FLUORANTHENE		23000			4400			28			110		
CHRYSENE		47000			11000			55			250		
DIBENZO(A,H)ANTHRACENE		11000			1900			19	J	P	60		
INDENO(1,2,3-CD)PYRENE		34000	J	C	6800	J	C	64			200		

PROJ_NO: 08539	NSAMPLE	SR-SS-271-0006			SR-SS-272-0006			SR-SS-273-0006			SR-SS-274-0006		
SDG: SL3003	LAB_ID	SL2500-104			SL2500-105RA			SL2500-106			SL2500-107DL		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	83.5			86.2			90.4			83.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		220			240			7	J	P	360		
BENZO(A)PYRENE		280			210			9.2	J	P	360		
BENZO(B)FLUORANTHENE		360			290			17	J	P	540		
BENZO(K)FLUORANTHENE		140			86			3.1	U		170		
CHRYSENE		270			250			3.7	J	P	440		
DIBENZO(A,H)ANTHRACENE		71			40			2	J	P	84		
INDENO(1,2,3-CD)PYRENE		210			160			5.4	J	CP	280	J	C

PROJ_NO: 08539	NSAMPLE	SR-SS-275-0006			SR-SS-275-0612			SR-SS-275-1224			SR-SS-276-0006		
SDG: SL3003	LAB_ID	SL2500-108DL			SL2500-109DL			SL2500-110			SL2500-111DL		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	77.9			82.6			85.5			77.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		58000			16000			58			810	J	G
BENZO(A)PYRENE		48000			14000			61			770	J	G
BENZO(B)FLUORANTHENE		70000			20000			85			1100	J	G
BENZO(K)FLUORANTHENE		18000			5500			26			290	J	G
CHRYSENE		58000			16000			63			840	J	G
DIBENZO(A,H)ANTHRACENE		12000			3000			16	J	P	200	J	G
INDENO(1,2,3-CD)PYRENE		38000			9300			60	J	C	640	J	G

PROJ_NO: 08539	NSAMPLE	SR-SS-277-0006			SR-SS-278-0006		
SDG: SL3003	LAB_ID	SL2500-112DL			SL2500-113DL		
FRACTION: PAH	SAMP_DATE	3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	73.9			70.4		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		3600			2100		
BENZO(A)PYRENE		2800			1800		
BENZO(B)FLUORANTHENE		4000			2600		
BENZO(K)FLUORANTHENE		1500			720		
CHRYSENE		3900			2200		
DIBENZO(A,H)ANTHRACENE		660			440		
INDENO(1,2,3-CD)PYRENE		2000			1300		

PROJ_NO: 08539	NSAMPLE	SR-RB01-032218			SR-RB02-032318		
SDG: SL3003	LAB_ID	SL2500-075			SL2500-148		
FRACTION: M	SAMP_DATE	3/22/2018			3/23/2018		
MEDIA: WATER	QC_TYPE	NM			NM		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		0.075	U		0.28	J	P

PROJ_NO: 08539	NSAMPLE	SR-DUP01-031918			SR-DUP02-032018			SR-DUP03-032118			SR-DUP04-032118		
SDG: SL3003	LAB_ID	SL2500-003			SL2500-017			SL2500-034			SL2500-035		
FRACTION: M	SAMP_DATE	3/19/2018			3/20/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	98.8			94.3			90.9			90.8		
	DUP_OF	SR-SS-226-0006			SR-SS-224-0612			SR-SB-223-1224			SR-SB-222-1224		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		8.09			2.3			5.79	J	DG	5.37	J-	D

PROJ_NO: 08539	NSAMPLE	SR-DUP05-032118			SR-DUP06-032218			SR-DUP11-032318			SR-DUP12-032318		
SDG: SL3003	LAB_ID	SL2500-036			SL2500-074			SL2500-129			SL2500-130		
FRACTION: M	SAMP_DATE	3/21/2018			3/22/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	76.6			67.8			87.9			82.4		
	DUP_OF	SR-SS-217-0006			SR-SS-203-0006			SR-SS-255-0612			SR-SB-246-1224		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		954	J-	D	411			105	J	G	11.1		

PROJ_NO: 08539	NSAMPLE	SR-DUP13-032318			SR-SB-201-1224			SR-SB-202-1224			SR-SB-203-1224		
SDG: SL3003	LAB_ID	SL2500-144			SL2500-043			SL2500-046			SL2500-049		
FRACTION: M	SAMP_DATE	3/23/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	75.9			83.2			74.3			81.4		
	DUP_OF	SR-SS-242-0006											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		81	J	D	17.6			140			13		

PROJ_NO: 08539	NSAMPLE	SR-SB-216-1224			SR-SB-217-1224			SR-SB-218-1224			SR-SB-219-1224		
SDG: SL3003	LAB_ID	SL2500-040			SL2500-039			SL2500-024			SL2500-025		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.8			79.4			81.2			81.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		11.2			25.4	J-	D	27.2	J-	D	22.1	J-	D

PROJ_NO: 08539	NSAMPLE	SR-SB-220-1224			SR-SB-221-1224			SR-SB-221-1224 SIEVE 20			SR-SB-221-1224 SIEVE PAN		
SDG: SL3003	LAB_ID	SL2500-038			SL2500-037			SL3003-009			SL3003-010		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.8			81.4			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		191	J-	D	18.8	J-	D	33.9			43.9		

PROJ_NO: 08539	NSAMPLE	SR-SB-222-1224			SR-SB-223-1224			SR-SB-224-1224			SR-SB-225-1224		
SDG: SL3003	LAB_ID	SL2500-023			SL2500-022			SL2500-018			SL2500-021		
FRACTION: M	SAMP_DATE	3/21/2018			3/21/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	91.1			88.2			94.7			89.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		4.64	J-	D	10.2	J	DG	2.87	J-	D	7.34	J-	D

PROJ_NO: 08539	NSAMPLE	SR-SB-246-1224			SR-SB-250-1224			SR-SS-201-0006			SR-SS-201-0612		
SDG: SL3003	LAB_ID	SL2500-128			SL2500-145			SL2500-041			SL2500-042		
FRACTION: M	SAMP_DATE	3/23/2018			3/23/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	81.7			78.9			74.6			80.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		10.4			18.2	J	D	602			846		

PROJ_NO: 08539	NSAMPLE	SR-SS-202-0006			SR-SS-202-0612			SR-SS-203-0006			SR-SS-203-0612		
SDG: SL3003	LAB_ID	SL2500-044			SL2500-045			SL2500-047			SL2500-048		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	62.8			81.7			67.0			78.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		2020			44.6			387			85.4		

PROJ_NO: 08539	NSAMPLE	SR-SS-204-0006			SR-SS-204-0612			SR-SS-205-0006			SR-SS-205-0612		
SDG: SL3003	LAB_ID	SL2500-050			SL2500-051			SL2500-052			SL2500-053		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	78.5			78.9			78.1			89.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		446			499			350			62		

PROJ_NO: 08539	NSAMPLE	SR-SS-206-0006			SR-SS-206-0612			SR-SS-207-0006			SR-SS-207-0612		
SDG: SL3003	LAB_ID	SL2500-054			SL2500-055			SL2500-056			SL2500-057		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	82.0			88.0			74.5			80.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		445			209			463			209		

PROJ_NO: 08539	NSAMPLE	SR-SS-208-0006			SR-SS-208-0612			SR-SS-209-0006			SR-SS-209-0612		
SDG: SL3003	LAB_ID	SL2500-058			SL2500-059			SL2500-060			SL2500-061		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	71.5			83.7			75.0			83.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		286			37.4			206			22.2		

PROJ_NO: 08539	NSAMPLE	SR-SS-210-0006			SR-SS-210-0612			SR-SS-211-0006			SR-SS-211-0612		
SDG: SL3003	LAB_ID	SL2500-062			SL2500-063			SL2500-064			SL2500-065		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	73.4			78.6			74.0			83.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		179			35.6			226			82.6		

PROJ_NO: 08539	NSAMPLE	SR-SS-212-0006			SR-SS-212-0612			SR-SS-213-0006			SR-SS-213-0612		
SDG: SL3003	LAB_ID	SL2500-066			SL2500-067			SL2500-068			SL2500-069		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	70.0			86.9			71.8			82.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		253			223			22200			694		

PROJ_NO: 08539	NSAMPLE	SR-SS-214-0006			SR-SS-214-0612			SR-SS-215-0006			SR-SS-215-0612		
SDG: SL3003	LAB_ID	SL2500-070			SL2500-071			SL2500-072			SL2500-073		
FRACTION: M	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.2			89.0			78.6			86.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		453			153			327			45.8		

PROJ_NO: 08539	NSAMPLE	SR-SS-216-0006			SR-SS-216-0612			SR-SS-217-0006			SR-SS-217-0612		
SDG: SL3003	LAB_ID	SL2500-031			SL2500-032			SL2500-030			SL2500-033		
FRACTION: M	SAMP_DATE	3/21/2018			3/21/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	82.4			84.7			76.1			84.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		823	J-	D	57.4	J-	D	893	J-	D	101	J-	D

PROJ_NO: 08539	NSAMPLE	SR-SS-218-0006			SR-SS-218-0612			SR-SS-219-0006			SR-SS-219-0612		
SDG: SL3003	LAB_ID	SL2500-013			SL2500-014			SL2500-015			SL2500-016		
FRACTION: M	SAMP_DATE	3/20/2018			3/20/2018			3/20/2018			3/20/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	70.7			77.4			80.6			81.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		530			158			850			169		

PROJ_NO: 08539	NSAMPLE	SR-SS-220-0006			SR-SS-220-0612			SR-SS-221-0006			SR-SS-221-006 SIEVE 20		
SDG: SL3003	LAB_ID	SL2500-028			SL2500-029			SL2500-026			SL3003-005		
FRACTION: M	SAMP_DATE	3/21/2018			3/21/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.2			83.2			84.7			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		196	J-	D	566	J-	D	245	J-	D	153		

PROJ_NO: 08539	NSAMPLE	SR-SS-221-006 SIEVE PAN			SR-SS-221-0612			SR-SS-221-0612 SIEVE 20			SR-SS-221-0612 SIEVE PAN		
SDG: SL3003	LAB_ID	SL3003-006			SL2500-027			SL3003-007			SL3003-008		
FRACTION: M	SAMP_DATE	3/21/2018			3/21/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	100.0			85.3			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		138			63.9	J-	D	728			45.8		

PROJ_NO: 08539	NSAMPLE	SR-SS-222-0006			SR-SS-222-0612			SR-SS-223-0006			SR-SS-223-0612		
SDG: SL3003	LAB_ID	SL2500-011			SL2500-012			SL2500-009			SL2500-010		
FRACTION: M	SAMP_DATE	3/20/2018			3/20/2018			3/20/2018			3/20/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.5			91.3			85.2			89.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		31.3			4.95			18.5			10.6		

PROJ_NO: 08539	NSAMPLE	SR-SS-224-0006			SR-SS-224-0612			SR-SS-225-0006			SR-SS-225-0006 SIEVE 20		
SDG: SL3003	LAB_ID	SL2500-007			SL2500-008			SL2500-005			SL3003-001		
FRACTION: M	SAMP_DATE	3/20/2018			3/20/2018			3/20/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	92.0			93.9			85.2			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		5.43			2.22			149			19.5		

PROJ_NO: 08539	NSAMPLE	SR-SS-225-0006 SIEVE PAN			SR-SS-225-0612			SR-SS-225-0612 SIEVE 20			SR-SS-225-0612 SIEVE PAN		
SDG: SL3003	LAB_ID	SL3003-002			SL2500-006			SL3003-003			SL3003-004		
FRACTION: M	SAMP_DATE	3/21/2018			3/20/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	100.0			87.5			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		12			153			139			55.1		

PROJ_NO: 08539	NSAMPLE	SR-SS-226-0006			SR-SS-226-0612			SR-SS-226-1224			SR-SS-242-0006		
SDG: SL3003	LAB_ID	SL2500-001			SL2500-002			SL2500-004			SL2500-140		
FRACTION: M	SAMP_DATE	3/19/2018			3/19/2018			3/20/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	99.0			92.9			89.4			74.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		7.95			24.6			12.6			94.7	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-242-0612			SR-SS-243-0006			SR-SS-243-0612			SR-SS-243-1224		
SDG: SL3003	LAB_ID	SL2500-141			SL2500-137			SL2500-138			SL2500-139		
FRACTION: M	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	81.6			79.1			84.1			87.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		10.9	J	D	28.9	J	D	4.68	J	D	5.28	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-244-0006			SR-SS-244-0612			SR-SS-245-0006			SR-SS-245-0612		
SDG: SL3003	LAB_ID	SL2500-131			SL2500-132			SL2500-124			SL2500-125		
FRACTION: M	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	73.1			80.0			74.5			80.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		55.2			124			82.8			22.9		

PROJ_NO: 08539	NSAMPLE	SR-SS-246-0006			SR-SS-246-0612			SR-SS-247-0006			SR-SS-247-0612		
SDG: SL3003	LAB_ID	SL2500-126			SL2500-127			SL2500-135			SL2500-136		
FRACTION: M	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	48.8			82.3			76.3			83.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		92.1			8.9			76	J	D	10.2	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-248-0006			SR-SS-248-0612			SR-SS-249-0006			SR-SS-249-0612		
SDG: SL3003	LAB_ID	SL2500-133			SL2500-134			SL2500-146			SL2500-147		
FRACTION: M	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	79.3			84.8			72.0			83.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		17.2			8.56	J	D	53.4	J	D	7.49	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-250-0006			SR-SS-250-0612			SR-SS-252-0006			SR-SS-252-0612		
SDG: SL3003	LAB_ID	SL2500-142			SL2500-143			SL2500-120			SL2500-121		
FRACTION: M	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	69.0			78.5			78.2			85.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		94.9	J	D	12.8	J	D	243			66.6		

PROJ_NO: 08539	NSAMPLE	SR-SS-254-0006			SR-SS-254-0612			SR-SS-255-0006			SR-SS-255-0612		
SDG: SL3003	LAB_ID	SL2500-122			SL2500-123			SL2500-118			SL2500-119		
FRACTION: M	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	75.3			82.9			83.1			88.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		508			158			129			176	J	G

PROJ_NO: 08539	NSAMPLE	SR-DUP01-031918			SR-DUP02-032018			SR-DUP03-032118			SR-DUP04-032118		
SDG: SL3003	LAB_ID	SL2500-3			SL2500-17			SL2500-34			SL2500-35		
FRACTION: MISC	SAMP_DATE	3/19/2018			3/20/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	98.8			94.3			90.9			90.8		
	DUP_OF	SR-SS-226-0006			SR-SS-224-0612			SR-SB-223-1224			SR-SB-222-1224		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		99			94			91			91		

PROJ_NO: 08539	NSAMPLE	SR-DUP05-032118			SR-DUP06-032218			SR-DUP07-032218			SR-DUP08-032218		
SDG: SL3003	LAB_ID	SL2500-36			SL2500-74			SL2500-114			SL2500-115		
FRACTION: MISC	SAMP_DATE	3/21/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	76.6			67.8			77.4			80.3		
	DUP_OF	SR-SS-217-0006			SR-SS-203-0006			SR-SS-276-0006			SR-SS-267-0006		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		77			68			77			80		

PROJ_NO: 08539	NSAMPLE	SR-DUP09-032218			SR-DUP10-032218			SR-DUP11-032318			SR-DUP12-032318		
SDG: SL3003	LAB_ID	SL2500-116			SL2500-117			SL2500-129			SL2500-130		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	87.3			82.4			87.9			82.4		
	DUP_OF	SR-SS-259-0006			SR-SS-260-0612			SR-SS-255-0612			SR-SB-246-1224		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		87			82			88			82		

PROJ_NO: 08539	NSAMPLE	SR-DUP13-032318			SR-SB-201-1224			SR-SB-202-1224			SR-SB-203-1224		
SDG: SL3003	LAB_ID	SL2500-144			SL2500-43			SL2500-46			SL2500-49		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	75.9			83.2			74.3			81.4		
	DUP_OF	SR-SS-242-0006											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		76			83			74			81		

PROJ_NO: 08539	NSAMPLE	SR-SB-216-1224			SR-SB-217-1224			SR-SB-218-1224			SR-SB-219-1224		
SDG: SL3003	LAB_ID	SL2500-40			SL2500-39			SL2500-24			SL2500-25		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	85.8			79.4			81.2			81.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		86			79			81			81		

PROJ_NO: 08539	NSAMPLE	SR-SB-220-1224			SR-SB-221-1224						SR-SB-222-1224		
SDG: SL3003	LAB_ID	SL2500-38			SL2500-37						SL2500-23		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018						3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM						NM		
	UNITS	%			%			PELLETS			%		
	PCT_SOLIDS	85.8			81.4			81.4			91.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT								0					
PELLET COUNT PERCENT					0								
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		86			81						91		

PROJ_NO: 08539	NSAMPLE	SR-SB-223-1224			SR-SB-224-1224			SR-SB-225-1224			SR-SB-246-1224		
SDG: SL3003	LAB_ID	SL2500-22			SL2500-18			SL2500-21			SL2500-128		
FRACTION: MISC	SAMP_DATE	3/21/2018			3/21/2018			3/21/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	88.2			94.7			89.6			81.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND								0.67					
PERCENT FINE SAND								65.33					
PERCENT FINES								12.11					
PERCENT GRAVEL								0					
PERCENT MEDIUM SAND								21.89					
SIEVE 1"								100					
SIEVE 1/4"								100					
SIEVE 1-1/2"								100					
SIEVE 2"								100					
SIEVE 3"								100					
SIEVE 3/4"								100					
SIEVE NO. 004								100					
SIEVE NO. 010								99.33					
SIEVE NO. 020								95.12					
SIEVE NO. 040								77.44					
SIEVE NO. 060								47.64					
SIEVE NO. 080								26.26					
SIEVE NO. 100								17.33					
SIEVE NO. 200								12.11					
TOTAL SOLIDS		88			95			90			82		

PROJ_NO: 08539	NSAMPLE	SR-SB-250-1224			SR-SB-257-1224			SR-SB-258-1224			SR-SB-259-1224		
SDG: SL3003	LAB_ID	SL2500-145			SL2500-78			SL2500-81			SL2500-84		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	78.9			87.2			86.5			88.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		79			87			86			88		

PROJ_NO: 08539	NSAMPLE	SR-SB-260-1224			SR-SB-261-1224			SR-SB-262-1224			SR-SB-263-1224		
SDG: SL3003	LAB_ID	SL2500-87			SL2500-90			SL2500-93			SL2500-96		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	86.5			94.6			92.4			89.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		86			94			92			90		

PROJ_NO: 08539	NSAMPLE	SR-SS-201-0006			SR-SS-201-0612			SR-SS-202-0006			SR-SS-202-0612		
SDG: SL3003	LAB_ID	SL2500-41			SL2500-42			SL2500-44			SL2500-45		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	74.6			80.4			62.8			81.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		75			80			63			82		

PROJ_NO: 08539	NSAMPLE	SR-SS-203-0006			SR-SS-203-0612			SR-SS-204-0006			SR-SS-204-0612		
SDG: SL3003	LAB_ID	SL2500-47			SL2500-48			SL2500-50			SL2500-51		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	67.0			78.4			78.5			78.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		67			78			78			79		

PROJ_NO: 08539	NSAMPLE	SR-SS-205-0006			SR-SS-205-0612			SR-SS-206-0006			SR-SS-206-0612		
SDG: SL3003	LAB_ID	SL2500-52			SL2500-53			SL2500-54			SL2500-55		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	78.1			89.1			82.0			88.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		78			89			82			88		

PROJ_NO: 08539	NSAMPLE	SR-SS-207-0006			SR-SS-207-0612			SR-SS-208-0006			SR-SS-208-0612		
SDG: SL3003	LAB_ID	SL2500-56			SL2500-57			SL2500-58			SL2500-59		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	74.5			80.7			71.5			83.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		74			81			72			84		

PROJ_NO: 08539	NSAMPLE	SR-SS-209-0006			SR-SS-209-0612			SR-SS-210-0006			SR-SS-210-0612		
SDG: SL3003	LAB_ID	SL2500-60			SL2500-61			SL2500-62			SL2500-63		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	75.0			83.2			73.4			78.6		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		75			83			73			78		

PROJ_NO: 08539	NSAMPLE	SR-SS-211-0006			SR-SS-211-0612			SR-SS-212-0006			SR-SS-212-0612		
SDG: SL3003	LAB_ID	SL2500-64			SL2500-65			SL2500-66			SL2500-67		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	74.0			83.6			70.0			86.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		74			84			70			87		

PROJ_NO: 08539	NSAMPLE	SR-SS-213-0006			SR-SS-213-0612			SR-SS-214-0006			SR-SS-214-0612		
SDG: SL3003	LAB_ID	SL2500-68			SL2500-69			SL2500-70			SL2500-71		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	71.8			82.4			85.2			89.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		72			82			85			89		

PROJ_NO: 08539	NSAMPLE	SR-SS-215-0006			SR-SS-215-0612			SR-SS-216-0006			SR-SS-216-0612		
SDG: SL3003	LAB_ID	SL2500-72			SL2500-73			SL2500-31			SL2500-32		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	78.6			86.6			82.4			84.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		79			86			82			85		

PROJ_NO: 08539	NSAMPLE	SR-SS-217-0006			SR-SS-217-0612			SR-SS-218-0006			SR-SS-218-0612		
SDG: SL3003	LAB_ID	SL2500-30			SL2500-33			SL2500-13			SL2500-14		
FRACTION: MISC	SAMP_DATE	3/21/2018			3/21/2018			3/20/2018			3/20/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	76.1			84.5			70.7			77.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		76			84			71			77		

PROJ_NO: 08539	NSAMPLE	SR-SS-219-0006			SR-SS-219-0612			SR-SS-220-0006			SR-SS-220-0612		
SDG: SL3003	LAB_ID	SL2500-15			SL2500-16			SL2500-28			SL2500-29		
FRACTION: MISC	SAMP_DATE	3/20/2018			3/20/2018			3/21/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	80.6			81.9			83.2			83.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		80			82			83			83		

PROJ_NO: 08539	NSAMPLE	SR-SS-221-0006						SR-SS-221-0612					
SDG: SL3003	LAB_ID	SL2500-26						SL2500-27					
FRACTION: MISC	SAMP_DATE	3/21/2018						3/21/2018					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			PELLETS			%			PELLETS		
	PCT_SOLIDS	84.7			84.7			85.3			85.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT					0						0		
PELLET COUNT PERCENT		0						0					
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		85						85					

PROJ_NO: 08539	NSAMPLE	SR-SS-222-0006			SR-SS-222-0612			SR-SS-223-0006			SR-SS-223-0612		
SDG: SL3003	LAB_ID	SL2500-11			SL2500-12			SL2500-9			SL2500-10		
FRACTION: MISC	SAMP_DATE	3/20/2018			3/20/2018			3/20/2018			3/20/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	85.5			91.3			85.2			89.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		85			91			85			89		

PROJ_NO: 08539	NSAMPLE	SR-SS-224-0006			SR-SS-224-0612			SR-SS-225-0006					
SDG: SL3003	LAB_ID	SL2500-7			SL2500-8			SL2500-19					
FRACTION: MISC	SAMP_DATE	3/20/2018			3/20/2018			3/20/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	92.0			93.9			85.2			85.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT											0		
PERCENT COARSE SAND											0.82		
PERCENT FINE SAND											67.94		
PERCENT FINES											12.42		
PERCENT GRAVEL											0		
PERCENT MEDIUM SAND											18.83		
SIEVE 1"											100		
SIEVE 1/4"											100		
SIEVE 1-1/2"											100		
SIEVE 2"											100		
SIEVE 3"											100		
SIEVE 3/4"											100		
SIEVE NO. 004											100		
SIEVE NO. 010											99.18		
SIEVE NO. 020											96.18		
SIEVE NO. 040											80.36		
SIEVE NO. 060											51.98		
SIEVE NO. 080											30.15		
SIEVE NO. 100											20.06		
SIEVE NO. 200											12.42		
TOTAL SOLIDS		92			94			85					

PROJ_NO: 08539	NSAMPLE	SR-SS-225-0006			SR-SS-225-0006-RE			SR-SS-225-0612					
SDG: SL3003	LAB_ID	SL2500-19			SL2500-19			SL2500-20					
FRACTION: MISC	SAMP_DATE	3/21/2018			3/21/2018			3/20/2018			3/21/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PELLETS			%			%			%		
	PCT_SOLIDS	85.8			85.8			87.5			91.2		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT		0											
PELLET COUNT PERCENT											0		
PERCENT COARSE SAND											0.6		
PERCENT FINE SAND											70.79		
PERCENT FINES											8.6		
PERCENT GRAVEL											0		
PERCENT MEDIUM SAND											20.01		
SIEVE 1"											100		
SIEVE 1/4"											100		
SIEVE 1-1/2"											100		
SIEVE 2"											100		
SIEVE 3"											100		
SIEVE 3/4"											100		
SIEVE NO. 004											100		
SIEVE NO. 010											99.4		
SIEVE NO. 020											95.94		
SIEVE NO. 040											79.39		
SIEVE NO. 060											42.83		
SIEVE NO. 080											22.07		
SIEVE NO. 100											12.82		
SIEVE NO. 200											8.6		
TOTAL SOLIDS					86			87					

PROJ_NO: 08539	NSAMPLE	SR-SS-225-0612			SR-SS-225-0612-RE			SR-SS-226-0006			SR-SS-226-0612		
SDG: SL3003	LAB_ID	SL2500-20			SL2500-20			SL2500-1			SL2500-2		
FRACTION: MISC	SAMP_DATE	3/21/2018			3/21/2018			3/19/2018			3/19/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PELLETS			%			%			%		
	PCT_SOLIDS	91.2			91.2			99.0			92.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT		0											
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS					91			99			93		

PROJ_NO: 08539	NSAMPLE	SR-SS-226-1224			SR-SS-242-0006			SR-SS-242-0612			SR-SS-243-0006		
SDG: SL3003	LAB_ID	SL2500-4			SL2500-140			SL2500-141			SL2500-137		
FRACTION: MISC	SAMP_DATE	3/20/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	89.4			74.0			81.6			79.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		89			74			82			79		

PROJ_NO: 08539	NSAMPLE	SR-SS-243-0612			SR-SS-243-1224			SR-SS-244-0006			SR-SS-244-0612		
SDG: SL3003	LAB_ID	SL2500-138			SL2500-139			SL2500-131			SL2500-132		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	84.1			87.6			73.1			80.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		84			88			73			80		

PROJ_NO: 08539	NSAMPLE	SR-SS-245-0006			SR-SS-245-0612			SR-SS-246-0006			SR-SS-246-0612		
SDG: SL3003	LAB_ID	SL2500-124			SL2500-125			SL2500-126			SL2500-127		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	74.5			80.2			48.8			82.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		74			80			49			82		

PROJ_NO: 08539	NSAMPLE	SR-SS-247-0006			SR-SS-247-0612			SR-SS-248-0006			SR-SS-248-0612		
SDG: SL3003	LAB_ID	SL2500-135			SL2500-136			SL2500-133			SL2500-134		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	76.3			83.1			79.3			84.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		76			83			79			85		

PROJ_NO: 08539	NSAMPLE	SR-SS-249-0006			SR-SS-249-0612			SR-SS-250-0006			SR-SS-250-0612		
SDG: SL3003	LAB_ID	SL2500-146			SL2500-147			SL2500-142			SL2500-143		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	72.0			83.8			69.0			78.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		72			84			69			78		

PROJ_NO: 08539	NSAMPLE	SR-SS-252-0006			SR-SS-252-0612			SR-SS-254-0006			SR-SS-254-0612		
SDG: SL3003	LAB_ID	SL2500-120			SL2500-121			SL2500-122			SL2500-123		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/23/2018			3/23/2018			3/23/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	78.2			85.4			75.3			82.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		78			85			75			83		

PROJ_NO: 08539	NSAMPLE	SR-SS-255-0006			SR-SS-255-0612			SR-SS-257-0006			SR-SS-257-0612		
SDG: SL3003	LAB_ID	SL2500-118			SL2500-119			SL2500-76			SL2500-77		
FRACTION: MISC	SAMP_DATE	3/23/2018			3/23/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	83.1			88.4			85.5			88.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		83			88			85			88		

PROJ_NO: 08539	NSAMPLE	SR-SS-258-0006			SR-SS-258-0612			SR-SS-259-0006			SR-SS-259-0612		
SDG: SL3003	LAB_ID	SL2500-79			SL2500-80			SL2500-82			SL2500-83		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	83.8			85.5			81.1			90.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		84			86			81			90		

PROJ_NO: 08539	NSAMPLE	SR-SS-260-0006			SR-SS-260-0612			SR-SS-261-0006			SR-SS-261-0612		
SDG: SL3003	LAB_ID	SL2500-85			SL2500-86			SL2500-88			SL2500-89		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	78.3			81.7			87.1			93.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		78			82			87			93		

PROJ_NO: 08539	NSAMPLE	SR-SS-262-0006			SR-SS-262-0612			SR-SS-263-0006			SR-SS-263-0612		
SDG: SL3003	LAB_ID	SL2500-91			SL2500-92			SL2500-94			SL2500-95		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	89.6			91.2			89.8			90.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		90			91			90			90		

PROJ_NO: 08539	NSAMPLE	SR-SS-264-0006			SR-SS-265-0006			SR-SS-266-0006			SR-SS-267-0006		
SDG: SL3003	LAB_ID	SL2500-97			SL2500-98			SL2500-99			SL2500-100		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	84.5			77.4			82.1			80.3		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		84			77			82			80		

PROJ_NO: 08539	NSAMPLE	SR-SS-268-0006			SR-SS-269-0006			SR-SS-270-0006			SR-SS-271-0006		
SDG: SL3003	LAB_ID	SL2500-101			SL2500-102			SL2500-103			SL2500-104		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	81.0			82.4			87.1			83.5		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		81			82			87			83		

PROJ_NO: 08539	NSAMPLE	SR-SS-272-0006			SR-SS-273-0006			SR-SS-274-0006			SR-SS-275-0006		
SDG: SL3003	LAB_ID	SL2500-105			SL2500-106			SL2500-107			SL2500-108		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	86.2			90.4			83.7			77.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		86			90			84			78		

PROJ_NO: 08539	NSAMPLE	SR-SS-275-0612			SR-SS-275-1224			SR-SS-276-0006			SR-SS-277-0006		
SDG: SL3003	LAB_ID	SL2500-109			SL2500-110			SL2500-111			SL2500-112		
FRACTION: MISC	SAMP_DATE	3/22/2018			3/22/2018			3/22/2018			3/22/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	%			%			%			%		
	PCT_SOLIDS	82.6			85.5			77.8			73.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PELLET COUNT													
PELLET COUNT PERCENT													
PERCENT COARSE SAND													
PERCENT FINE SAND													
PERCENT FINES													
PERCENT GRAVEL													
PERCENT MEDIUM SAND													
SIEVE 1"													
SIEVE 1/4"													
SIEVE 1-1/2"													
SIEVE 2"													
SIEVE 3"													
SIEVE 3/4"													
SIEVE NO. 004													
SIEVE NO. 010													
SIEVE NO. 020													
SIEVE NO. 040													
SIEVE NO. 060													
SIEVE NO. 080													
SIEVE NO. 100													
SIEVE NO. 200													
TOTAL SOLIDS		83			85			78			74		

PROJ_NO: 08539	NSAMPLE	SR-SS-278-0006		
SDG: SL3003	LAB_ID	SL2500-113		
FRACTION: MISC	SAMP_DATE	3/22/2018		
MEDIA: SOIL	QC_TYPE	NM		
	UNITS	%		
	PCT_SOLIDS	70.4		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
PELLET COUNT				
PELLET COUNT PERCENT				
PERCENT COARSE SAND				
PERCENT FINE SAND				
PERCENT FINES				
PERCENT GRAVEL				
PERCENT MEDIUM SAND				
SIEVE 1"				
SIEVE 1/4"				
SIEVE 1-1/2"				
SIEVE 2"				
SIEVE 3"				
SIEVE 3/4"				
SIEVE NO. 004				
SIEVE NO. 010				
SIEVE NO. 020				
SIEVE NO. 040				
SIEVE NO. 060				
SIEVE NO. 080				
SIEVE NO. 100				
SIEVE NO. 200				
TOTAL SOLIDS		70		

TETRA TECH **INTERNAL CORRESPONDENCE**

TO:	**R. SOK**	**DATE:**	**FEBRUARY 22, 2019**
FROM:	**J. KALINYAK**	**COPIES:**	**DV FILE**

SUBJECT: **DATA VALIDATION – PAH / LEAD**
FORMER SKEET RANGE NASA WFF
SAMPLE DELIVERY GROUP (SDG) – TL2691

SAMPLES: 2 / Aqueous - Lead

SR-EB01-20181218 SR-EB02-20181219

20 / Soil - Lead

SR-DUP01-20181217	SR-DUP02-20181218	SR-SS-301-0006
SR-SS-301-0612	SR-SS-302-0006	SR-SS-302-0612
SR-SS-303-0006	SR-SS-303-0612	SR-SS-304-0006
SR-SS-304-0612	SR-SS-305-0006	SR-SS-305-0612
SR-SS-306-0006	SR-SS-306-0612	SR-SS-307-0006
SR-SS-307-0612	SR-SS-311-0006	SR-SS-311-0612
SR-SS-312-0006	SR-SS-312-0612	

1 / Aqueous – PAH

SR-EB03-20181220

4 / Soil – PAH

SR-DUP03-20181220	SR-SS-325-0006	SR-SS-326-0006
SR-SS-327-0006		

Overview

The sample set for Former Skeet Range NASA WFF, SDG TL2691, consisted of twenty-four (24) soil samples and three (3) aqueous equipment rinse blank samples. Twenty (20) soil samples and two (2) aqueous equipment rinse blank samples were analyzed for the select total metal lead as listed above. Four (4) soil samples and one (1) aqueous equipment rinse blank sample were analyzed for Polynuclear Aromatic Hydrocarbons (PAH), as listed above. Three (3) field duplicate sample pairs were included in the sample delivery group (SDG): SR-DUP01-20181217 / SR-SS-312-0612, SR-SS-302-0612 / SR-DUP02-20181218, and SR-DUP03-20181220 / SR-SS-325-0006.

The samples were collected by Tetra Tech on December 17, 18, 19, and 20, 2018 and analyzed by Katahdin Analytical Services for all analyses. The analyses were conducted in accordance with EPA SW-846 Method 8270D SIM for select PAHs and Method 6020A for the select metal lead, analytical and reporting protocols.

The data contained in this SDG were validated at a Level 2B with regard to the following parameters: data completeness, holding times, blank results, blank spike/blank spike duplicate results, matrix spike (MS) / matrix spike duplicate (MSD) results, surrogate spike recoveries, internal standard recoveries, chromatographic resolution, ICP interference results, laboratory duplicate results, ICP serial dilution results, analyte identification, field duplicate precision, and detection limits. Areas of concern are listed below.

Major Problems

No major issues were identified.

Minor Problems

- For the lead analysis, the spiked sample SR-SS-301-0612 matrix spike (MS) and MS duplicate (MSD) percent recoveries (%Rs) for lead were greater than quality control (QC) limit. Additionally, the MS/MSD %R relative percent difference (RPD) was greater than the QC limits. A post digestion spike sample was analyzed with a %R within the QC limits for lead. As a result of the high MS and MSD %Rs, the sample detected results for lead were qualified estimated, (J). Additionally this qualification was applied to all SDG soil sample lead detected results.

- The continuing calibration verification (CCV) percent difference (%D) was greater than the 20% QC limit for benzo(b)fluoranthene for instrument GCMS-N on 01/23/2019 @ 10:27 affecting samples SR-SS-326-0006 and SR-SS-327-0006. The aforementioned sample detected benzo(b)-fluoranthene results were qualified estimated, (J).

- The initial calibration percent relative standard deviation (RSD) was greater than the 15% QC limit for dibenzo(a,h)anthracene affecting samples SR-SS-325-0006 and SR-DUP03-20181220. The aforementioned sample detected dibenzo(a,h)anthracene results were qualified estimated, (J).

- The initial calibration verification (ICV) %D for indeno(1,2,3-cd)pyrene was greater than the 20% QC limit for instrument GCMS-N on 01/24/2019 @ 15:15 affecting samples SR-SS-325-0006 and SR-DUP03-20181220. The aforementioned sample detected indeno(1,2,3-cd)pyrene results were qualified estimated, (J).

- For the PAH analysis, the spiked sample SR-SS-327-0006 MS %Rs were less than QC limits for the PAHs benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)-pyrene, and indeno(1,2,3-cd)pyrene. Additionally, the MS/MSD %R RPDs were greater than the QC limits. The sample aforementioned analyte results were qualified estimated, (J).

- Detected results reported below the reporting limit (RL) but above the method detection limit (MDL) were qualified as estimated, (J).

Notes

Sample analyte detected results were reported to the Method Detection Limit (MDL). Sample analyte non-detected results were reported to the Limit of Detection (LOD).

All soil and aqueous samples were analyzed diluted 5X for the metal lead.

Samples SR-DUP03-20181220 and SR-SS-325-0006 were diluted 3X for the PAH analysis.

Lead was detected in a continuing calibration blank (CCB) at 0.016 µg/l, <RL, on 01/14/2019 @ 23:35, affecting all aqueous SDG samples and sample SR-SS-311-0612. Lead was also detected in the preparation blank LL28IMW2 at 0.23 µg/l, <RL, affecting all aqueous SDG samples. No action was taken for the aqueous sample lead results as they were equipment rinse blank samples which do not get qualified for blank contamination. The soil sample SR-SS-311-0612 lead result was not qualified as it was >RL.

Lead was detected in a CCB at 0.0436 mg/kg, <RL, on 01/16/2019 @ 21:08, and in the preparation blank PBSMA03IMS2 at 0.023 mg/kg, <RL, affecting all soil SDG samples with the exception of sample SR-SS-311-0612. Lead was also detected in the preparation blank PBSMA04IMS1 at 0.036 mg/kg, <RL, affecting soil sample SR-SS-311-0612. No action was taken for the soil sample lead results as they were all >RL.

Lead was detected in both aqueous equipment rinse blank samples. Sample SR-EB01-20181218 was <RL and sample SR-EB02-20181219 was >RL. The equipment rinse blank samples were not used to evaluate the soil samples for lead contamination.

Benzo(a)anthracene was detected in the aqueous method blank sample WG243502-1 <RL affecting the equipment rinse blank sample SR-EB03-20181220. No action was taken as equipment rinse blank samples are not qualified for method blank contamination.

Benzo(a)anthracene was detected in the aqueous equipment rinse blank sample SR-EB03-20181220 <RL. The equipment rinse blank sample was not used to evaluate the soil samples for PAH contamination.

Benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene were detected in the method blank sample WG243556-1 at <RL affecting all soil PAH samples. No action was taken for the soil sample benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene results as they were all >RL.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Sample soil PAH results were qualified for CCV %D, ICV %D, and initial calibration RSD QC limit exceedances.

Other Factors Affecting Data Quality: Detected results reported below the quantitation limit but above the method detection limit were qualified as estimated, (J). Soil sample lead results were qualified for MS/MSD %R QC limit exceedances. Soil sample PAH results were qualified for MS %R QC limit exceedances.

The data for these analyses were reviewed with reference to the USEPA National Functional Guidelines for Superfund Organic Methods Data Review (January 2017) and the USEPA National Functional Guidelines for Inorganic Superfund Data Review (January 2017).

Tetra Tech
Joseph Kalinyak
Data Validator/Environmental Scientist

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's r < 0.995
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 08539	NSAMPLE	SR-EB03-20181220		
SDG: TL2691	LAB_ID	TL2691-27		
FRACTION: PAH	SAMP_DATE	12/20/2018		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	UG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		0.047	J	P
BENZO(A)PYRENE		0.097	U	
BENZO(B)FLUORANTHENE		0.097	U	
BENZO(K)FLUORANTHENE		0.097	U	
CHRYSENE		0.097	U	
DIBENZO(A,H)ANTHRACENE		0.097	U	
INDENO(1,2,3-CD)PYRENE		0.097	U	

PROJ_NO: 08539	NSAMPLE	SR-DUP03-20181220			SR-SS-325-0006			SR-SS-326-0006			SR-SS-327-0006		
SDG: TL2691	LAB_ID	TL2691-26DL			TL2691-25DL			TL2691-24			TL2691-23		
FRACTION: PAH	SAMP_DATE	12/20/2018			12/20/2018			12/20/2018			12/20/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	80.5			81.7			82.3			83.5		
	DUP_OF	SR-SS-325-0006											
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
BENZO(A)ANTHRACENE		890			1100			38			53	J	D
BENZO(A)PYRENE		1000			1000			39			63	J	D
BENZO(B)FLUORANTHENE		1400			1500			66	J	C	94	J	CD
BENZO(K)FLUORANTHENE		520			600			18	J	P	27	J	D
CHRYSENE		1100			1200			45			70	J	D
DIBENZO(A,H)ANTHRACENE		260	J	C	220	J	C	21	J	P	26		
INDENO(1,2,3-CD)PYRENE		740	J	C	860	J	C	56			100	J	D

PROJ_NO: 08539	NSAMPLE	SR-EB01-20181218			SR-EB02-20181219		
SDG: TL2691	LAB_ID	TL2691-006			TL2691-022		
FRACTION: M	SAMP_DATE	12/18/2018			12/19/2018		
MEDIA: WATER	QC_TYPE	NM			NM		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		0.809	J	P	1.86		

PROJ_NO: 08539	NSAMPLE	SR-DUP01-20181217			SR-DUP02-20181218			SR-SS-301-0006			SR-SS-301-0612		
SDG: TL2691	LAB_ID	TL2691-002			TL2691-011			TL2691-007			TL2691-008		
FRACTION: M	SAMP_DATE	12/17/2018			12/19/2018			12/19/2018			12/19/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	86.4			89.0			86.7			89.9		
	DUP_OF	SR-SS-312-0612			SR-SS-302-0612								
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		20.3	J	D	92.2	J	D	165	J	D	14.2	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-302-0006			SR-SS-302-0612			SR-SS-303-0006			SR-SS-303-0612		
SDG: TL2691	LAB_ID	TL2691-009			TL2691-010			TL2691-012			TL2691-013		
FRACTION: M	SAMP_DATE	12/19/2018			12/19/2018			12/19/2018			12/19/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	83.1			89.5			80.9			89.8		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		174	J	D	99.5	J	D	360	J	D	50.6	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-304-0006			SR-SS-304-0612			SR-SS-305-0006			SR-SS-305-0612		
SDG: TL2691	LAB_ID	TL2691-014			TL2691-015			TL2691-016			TL2691-017		
FRACTION: M	SAMP_DATE	12/19/2018			12/19/2018			12/19/2018			12/19/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	85.5			91.3			78.9			88.7		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		264	J	D	70.4	J	D	350	J	D	156	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-306-0006			SR-SS-306-0612			SR-SS-307-0006			SR-SS-307-0612		
SDG: TL2691	LAB_ID	TL2691-018			TL2691-019			TL2691-020			TL2691-021		
FRACTION: M	SAMP_DATE	12/19/2018			12/19/2018			12/19/2018			12/19/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	88.3			92.2			88.2			89.9		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		162	J	D	48.1	J	D	142	J	D	384	J	D

PROJ_NO: 08539	NSAMPLE	SR-SS-311-0006			SR-SS-311-0612			SR-SS-312-0006			SR-SS-312-0612		
SDG: TL2691	LAB_ID	TL2691-005			TL2691-004			TL2691-003			TL2691-001		
FRACTION: M	SAMP_DATE	12/18/2018			12/18/2018			12/17/2018			12/17/2018		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	80.5			81.6			83.6			86.1		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		93.8	J	D	93.5	J	D	105	J	D	21.7	J	D

Appendix H
Support Information for Human Health Risk Evaluation

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PROUCL INPUT AND OUTPUT FILES

PROUCL DATA - SOUTHERN RANGE AREA SURFACE SOIL

Samples	BENZO(A)ANTHRACENE	d_BENZO(A)ANTHRACENE	BENZO(A)PYRENE	d_BENZO(A)PYRENE	BENZO(B)FLUORANTHENE	d_BENZO(B)FLUORANTHENE	BENZO(K)FLUORANTHENE	d_BENZO(K)FLUORANTHENE
SR-SS-001-000.5-20071019	9500	1	14000	1	21000	1	9000	1
SR-SS-002-000.5-20071019	890	1	990	1	1500	1	740	1
SR-SS-003-000.5-20071019	800	1	780	1	1100	1	560	1
SR-SS-004-000.5-20071022	15	1	15	1	20	1	12	1
SR-SS-007-000.5-20071022-AVG	8850	1	8950	1	12000	1	5850	1
SR-SS-008-000.5-20071022	24000	1	28000	1	39000	1	21000	1
SR-SS-009-000.5-20071022	19000	1	17000	1	22000	1	12000	1
SR-SS-010-000.5-20071022	22	1	23	1	34	1	18	1
SR-SS-011-000.5-20071018	6.5	1	7.2	1	8.3	1	5	1
SR-SS-013-000.5-20071022	1200	1	1400	1	1900	1	920	1
SR-SS-014-000.5-20071022	1600	1	1900	1	3000	1	1400	1
SR-SS-015-000.5-20071022	96	1	110	1	160	1	74	1
SR-SS-016-000.5-20071022	1500	1	1500	1	1200	1	1600	1
SR-SS-017-000.5-20071022	6.3	1	8	1	9.9	1	5.4	1
SR-SS-019-000.5-20071024	980	1	1300	1	2200	1	330	1
SR-SS-020-000.5-20071024-AVG	9700	1	10250	1	12000	1	7250	1
SR-SS-021-000.5-20071025	2600	1	2400	1	2600	1	1400	1
SR-SS-022-000.5-20071025	37	1	35	1	59	1	18	1
SR-SS-023-000.5-20071025	4.9	1	4.6	1	22	0	22	0
SR-SS-024-000.5-20071025	4.7	1	4.7	1	23	0	23	0
SR-SS-025-000.5-20071024	2400	1	3500	1	5200	1	1700	1
SR-SS-026-000.5-20071024	10000	1	12000	1	19000	1	5700	1
SR-SS-027-000.5-20071024	950	1	810	1	1300	1	540	1
SR-SS-028-000.5-20071024	18	1	18	1	20	1	16	1
SR-SS-029-000.5-20071024	3600	1	3500	1	3000	1	2700	1
SR-SS-030-000.5-20071024	5	1	23	0	6.8	1	4.5	1
SR-SS-031-000.5-20071024	440	1	290	1	460	1	280	1
SR-SS-032-000.5-20071024	360	1	330	1	330	1	240	1
SR-SS-033-000.5-20071025	24000	1	22000	1	19000	1	14000	1
SR-SS-034-000.5-20071024	1200	1	1200	1	1200	1	760	1
SR-SS-035-000.5-20071025	60	1	65	1	120	1	47	1
SR-SS-036-000.5-20071018	9.4	1	8.6	1	9.9	1	6	1
SR-SS-040-000.5-20071106	4.2	1	4.8	1	7.4	1	4.2	1
SR-SS-041-000.5-20071106-AVG	11.35	1	10.85	1	16	1	9.25	1
SR-SS-042-000.5-20071106	3.5	1	4.4	1	24	0	24	0
SR-SS-043-000.5-20071106	5.2	1	6.6	1	10	1	5.4	1
SR-SS-045-000.5-20071106	9.6	1	14	1	14	1	9.6	1
SR-SS-047-000.5-20071106	46	1	40	1	49	1	27	1
SR-SS-049-000.5-20071106	13	1	13	1	14	1	9.3	1
SR-SS-050-000.5-20071107	35	1	31	1	28	1	20	1
SR-SS-051-000.5-20071107	310	1	240	1	230	1	160	1
SR-SS-053-000.5-20071107	54	1	46	1	45	1	33	1
SR-SS-054-000.5-20071107	540	1	450	1	410	1	300	1
SR-SS-055-000.5-20071107	4.8	1	6.1	1	5.8	1	5.1	1
SR-SS-056-000.5-20071107	3.1	1	3.7	1	4.9	1	3.6	1
SR-SS-257-0006	890	1	1000	1	1500	1	470	1
SR-SS-258-0006	22000	1	22000	1	31000	1	13000	1
SR-SS-259-0006-AVG	7650	1	9250	1	13600	1	4280	1
SR-SS-260-0006	3800	1	3900	1	5200	1	2200	1
SR-SS-261-0006	550	1	660	1	880	1	330	1
SR-SS-262-0006	1500	1	1700	1	2400	1	810	1
SR-SS-263-0006	6.2	1	6.5	1	11	1	3.4	0
SR-SS-264-0006	290	1	300	1	430	1	140	1
SR-SS-265-0006	1400	1	1600	1	2300	1	720	1
SR-SS-266-0006	6000	1	6100	1	8600	1	2800	1
SR-SS-267-0006-AVG	49000	1	44500	1	62000	1	21500	1
SR-SS-268-0006	9600	1	8300	1	11000	1	4400	1
SR-SS-269-0006	42	1	67	1	91	1	28	1
SR-SS-270-0006	200	1	240	1	350	1	110	1
SR-SS-271-0006	220	1	280	1	360	1	140	1
SR-SS-272-0006	240	1	210	1	290	1	86	1
SR-SS-273-0006	7	1	9.2	1	17	1	3.1	0
SR-SS-274-0006	360	1	360	1	540	1	170	1
SR-SS-275-0006	58000	1	48000	1	70000	1	18000	1

PROUCL DATA - SOUTHERN RANGE AREA SURFACE SOIL

Samples	BENZO(A)ANTHRACENE	d_BENZO(A)ANTHRACENE	BENZO(A)PYRENE	d_BENZO(A)PYRENE	BENZO(B)FLUORANTHENE	d_BENZO(B)FLUORANTHENE	BENZO(K)FLUORANTHENE	d_BENZO(K)FLUORANTHENE
SR-SS-276-0006-AVG	5255	1	4535	1	6550	1	1745	1
SR-SS-277-0006	3600	1	2800	1	4000	1	1500	1
SR-SS-278-0006	2100	1	1800	1	2600	1	720	1
SR-SS-325-0006-AVG	995	1	1000	1	1450	1	560	1
SR-SS-326-0006	38	1	39	1	66	1	18	1
SR-SS-327-0006	53	1	63	1	94	1	27	1

PROUCL DATA - SOUTHERN RANGE AREA SURFACE SOIL

Samples	DIBENZO(A,H)ANTHRACENE	d_DIBENZO(A,H)ANTHRACENE	INDENO(1,2,3-CD)PYRENE	d_INDENO(1,2,3-CD)PYRENE
SR-SS-001-000.5-20071019	4700	1	11000	1
SR-SS-002-000.5-20071019	270	1	830	1
SR-SS-003-000.5-20071019	250	1	670	1
SR-SS-004-000.5-20071022	12	1	14	1
SR-SS-007-000.5-20071022-AVG	3550	1	8000	1
SR-SS-008-000.5-20071022	11000	1	27000	1
SR-SS-009-000.5-20071022	6400	1	14000	1
SR-SS-010-000.5-20071022	14	1	25	1
SR-SS-011-000.5-20071018	21	0	5.8	1
SR-SS-013-000.5-20071022	570	1	1300	1
SR-SS-014-000.5-20071022	740	1	1400	1
SR-SS-015-000.5-20071022	46	1	95	1
SR-SS-016-000.5-20071022	350	1	950	1
SR-SS-017-000.5-20071022	8.6	1	9	1
SR-SS-019-000.5-20071024	94	1	810	1
SR-SS-020-000.5-20071024-AVG	2450	1	6350	1
SR-SS-021-000.5-20071025	1100	1	1900	1
SR-SS-022-000.5-20071025	17	1	67	1
SR-SS-023-000.5-20071025	22	0	22	0
SR-SS-024-000.5-20071025	23	0	23	0
SR-SS-025-000.5-20071024	340	1	2300	1
SR-SS-026-000.5-20071024	2000	1	7200	1
SR-SS-027-000.5-20071024	320	1	490	1
SR-SS-028-000.5-20071024	8.5	1	16	1
SR-SS-029-000.5-20071024	320	1	2200	1
SR-SS-030-000.5-20071024	23	0	23	0
SR-SS-031-000.5-20071024	150	1	270	1
SR-SS-032-000.5-20071024	110	1	200	1
SR-SS-033-000.5-20071025	9500	1	16000	1
SR-SS-034-000.5-20071024	160	1	800	1
SR-SS-035-000.5-20071025	13	1	44	1
SR-SS-036-000.5-20071018	21	0	6.9	1
SR-SS-040-000.5-20071106	24	0	24	0
SR-SS-041-000.5-20071106-AVG	24	0	10.3	1
SR-SS-042-000.5-20071106	24	0	24	0
SR-SS-043-000.5-20071106	23	0	6	1
SR-SS-045-000.5-20071106	25	0	12	1
SR-SS-047-000.5-20071106	19	1	33	1
SR-SS-049-000.5-20071106	25	0	9.6	1
SR-SS-050-000.5-20071107	17	1	28	1
SR-SS-051-000.5-20071107	98	1	170	1
SR-SS-053-000.5-20071107	20	1	37	1
SR-SS-054-000.5-20071107	180	1	310	1
SR-SS-055-000.5-20071107	23	0	8.3	1
SR-SS-056-000.5-20071107	24	0	24	0
SR-SS-257-0006	250	1	840	1
SR-SS-258-0006	5100	1	18000	1
SR-SS-259-0006-AVG	3150	1	10475	1
SR-SS-260-0006	1000	1	3500	1
SR-SS-261-0006	180	1	560	1
SR-SS-262-0006	460	1	1600	1
SR-SS-263-0006	1.9	0	7	1
SR-SS-264-0006	70	1	250	1
SR-SS-265-0006	410	1	1400	1
SR-SS-266-0006	1500	1	5400	1
SR-SS-267-0006-AVG	11500	1	35500	1
SR-SS-268-0006	1900	1	6800	1
SR-SS-269-0006	19	1	64	1
SR-SS-270-0006	60	1	200	1
SR-SS-271-0006	71	1	210	1
SR-SS-272-0006	40	1	160	1
SR-SS-273-0006	2	1	5.4	1
SR-SS-274-0006	84	1	280	1
SR-SS-275-0006	12000	1	38000	1

PROUCL DATA - SOUTHERN RANGE AREA SURFACE SOIL

Samples	DIBENZO(A,H)ANTHRACENE	d_DIBENZO(A,H)ANTHRACENE	INDENO(1,2,3-CD)PYRENE	d_INDENO(1,2,3-CD)PYRENE
SR-SS-276-0006-AVG	1100	1	3020	1
SR-SS-277-0006	660	1	2000	1
SR-SS-278-0006	440	1	1300	1
SR-SS-325-0006-AVG	240	1	800	1
SR-SS-326-0006	21	1	56	1
SR-SS-327-0006	26	1	100	1

PROUCL DATA - SOUTHERN RANGE AREA SUBSURFACE SOIL

Samples	BENZO(A)ANTHRACENE	d_BENZO(A)ANTHRACENE	BENZO(A)PYRENE	d_BENZO(A)PYRENE	BENZO(B)FLUORANTHENE	d_BENZO(B)FLUORANTHENE	DIBENZO(A,H)ANTHRACENE	d_DIBENZO(A,H)ANTHRACENE
SR-SB-257-1224	30	1	35	1	52	1	11	1
SR-SS-257-0612	17	1	20	1	29	1	4.4	1
SR-SB-258-1224	190	1	180	1	240	1	44	1
SR-SS-258-0612	710	1	770	1	1100	1	200	1
SR-SB-259-1224	33	1	40	1	56	1	12	1
SR-SS-259-0612	2000	1	2200	1	2900	1	600	1
SR-SB-260-1224	25	1	30	1	43	1	7.2	1
SR-SS-260-0612-AVG	400	1	485	1	670	1	135	1
SR-SB-261-1224	3.9	1	4.2	1	6.1	1	1.8	0
SR-SS-261-0612	16	1	25	1	33	1	7.8	1
SR-SB-262-1224	24	1	25	1	40	1	6.7	1
SR-SS-262-0612	69	1	77	1	110	1	22	1
SR-SB-263-1224	56	1	61	1	85	1	14	1
SR-SS-263-0612	98	1	83	1	120	1	21	1
SR-SS-275-0612	16000	1	14000	1	20000	1	3000	1
SR-SS-275-1224	58	1	61	1	85	1	16	1

PROUCL DATA - SOUTHERN RANGE AREA SUBSURFACE SOIL

Samples	INDENO(1,2,3-CD)PYRENE	d_INDENO(1,2,3-CD)PYRENE
SR-SB-257-1224	42	1
SR-SS-257-0612	23	1
SR-SB-258-1224	150	1
SR-SS-258-0612	830	1
SR-SB-259-1224	46	1
SR-SS-259-0612	1900	1
SR-SB-260-1224	32	1
SR-SS-260-0612-AVG	455	1
SR-SB-261-1224	4.2	1
SR-SS-261-0612	30	1
SR-SB-262-1224	22	1
SR-SS-262-0612	84	1
SR-SB-263-1224	58	1
SR-SS-263-0612	71	1
SR-SS-275-0612	9300	1
SR-SS-275-1224	60	1

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.1.002 5/6/2019 11:15:18 AM
From File	ProUCL Data-Surface Soil.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BENZO(A)ANTHRACENE

General Statistics

Total Number of Observations	70	Number of Distinct Observations	64
		Number of Missing Observations	31
Minimum	3.1	Mean	4267
Maximum	58000	Median	400
SD	10173	Std. Error of Mean	1216
Coefficient of Variation	2.384	Skewness	3.776

Normal GOF Test

Shapiro Wilk Test Statistic	0.481	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.338	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.106	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6294	95% Adjusted-CLT UCL (Chen-1995)	6853
		95% Modified-t UCL (Johnson-1978)	6386

Gamma GOF Test

A-D Test Statistic	2.021	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.884	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.131	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.262	k star (bias corrected MLE)	0.26
Theta hat (MLE)	16303	Theta star (bias corrected MLE)	16409
nu hat (MLE)	36.64	nu star (bias corrected)	36.41
MLE Mean (bias corrected)	4267	MLE Sd (bias corrected)	8368
		Approximate Chi Square Value (0.05)	23.6
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	23.38

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6584	95% Adjusted Gamma UCL (use when n<50)	6645

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	3.2694E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0957	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.106	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.131	Mean of logged Data	5.665
Maximum of Logged Data	10.97	SD of logged Data	2.875

Assuming Lognormal Distribution

95% H-UCL	57540	90% Chebyshev (MVUE) UCL	38225
95% Chebyshev (MVUE) UCL	49275	97.5% Chebyshev (MVUE) UCL	64613
99% Chebyshev (MVUE) UCL	94740		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs			
95% CLT UCL	6267	95% Jackknife UCL	6294
95% Standard Bootstrap UCL	6298	95% Bootstrap-t UCL	7420
95% Hall's Bootstrap UCL	8589	95% Percentile Bootstrap UCL	6327
95% BCA Bootstrap UCL	7143		
90% Chebyshev(Mean, Sd) UCL	7915	95% Chebyshev(Mean, Sd) UCL	9567
97.5% Chebyshev(Mean, Sd) UCL	11860	99% Chebyshev(Mean, Sd) UCL	16365

Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	9567		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BENZO(A)PYRENE

General Statistics			
Total Number of Observations	70	Number of Distinct Observations	65
		Number of Missing Observations	31
Number of Detects	69	Number of Non-Detects	1
Number of Distinct Detects	65	Number of Distinct Non-Detects	1
Minimum Detect	3.7	Minimum Non-Detect	23
Maximum Detect	48000	Maximum Non-Detect	23
Variance Detects	86846203	Percent Non-Detects	1.429%
Mean Detects	4232	SD Detects	9319
Median Detects	360	CV Detects	2.202
Skewness Detects	3.272	Kurtosis Detects	11.5
Mean of Logged Detects	5.766	SD of Logged Detects	2.821

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.519	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.325	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.107	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	4171	KM Standard Error of Mean	1108
KM SD	9199	95% KM (BCA) UCL	6036
95% KM (t) UCL	6018	95% KM (Percentile Bootstrap) UCL	6130
95% KM (z) UCL	5993	95% KM Bootstrap t UCL	6819
90% KM Chebyshev UCL	7494	95% KM Chebyshev UCL	8999
97.5% KM Chebyshev UCL	11088	99% KM Chebyshev UCL	15191

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.879	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.88	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.117	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.271	k star (bias corrected MLE)	0.269
Theta hat (MLE)	15604	Theta star (bias corrected MLE)	15727
nu hat (MLE)	37.43	nu star (bias corrected)	37.13
Mean (detects)	4232		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	4171
Maximum	48000	Median	345
SD	9265	CV	2.221
k hat (MLE)	0.26	k star (bias corrected MLE)	0.258
Theta hat (MLE)	16063	Theta star (bias corrected MLE)	16163
nu hat (MLE)	36.36	nu star (bias corrected)	36.13
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (36.13, α)	23.37	Adjusted Chi Square Value (36.13, β)	23.16
95% Gamma Approximate UCL (use when n>=50)	6448	95% Gamma Adjusted UCL (use when n<50)	6508
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4171	SD (KM)	9199
Variance (KM)	84616033	SE of Mean (KM)	1108
k hat (KM)	0.206	k star (KM)	0.206
nu hat (KM)	28.79	nu star (KM)	28.89
theta hat (KM)	20285	theta star (KM)	20215
80% gamma percentile (KM)	5585	90% gamma percentile (KM)	12616
95% gamma percentile (KM)	21317	99% gamma percentile (KM)	45151
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (28.89, α)	17.62	Adjusted Chi Square Value (28.89, β)	17.44
95% Gamma Approximate KM-UCL (use when n>=50)	6839	95% Gamma Adjusted KM-UCL (use when n<50)	6911
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.925	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	3.9948E-4	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0927	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.107	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4171	Mean in Log Scale	5.718
SD in Original Scale	9265	SD in Log Scale	2.828
95% t UCL (assumes normality of ROS data)	6018	95% Percentile Bootstrap UCL	6103
95% BCA Bootstrap UCL	6379	95% Bootstrap t UCL	6927
95% H-UCL (Log ROS)	50769		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	5.712	KM Geo Mean	302.6
KM SD (logged)	2.816	95% Critical H Value (KM-Log)	3.263
KM Standard Error of Mean (logged)	0.339	95% H-UCL (KM -Log)	48171
KM SD (logged)	2.816	95% Critical H Value (KM-Log)	3.263
KM Standard Error of Mean (logged)	0.339		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4171	Mean in Log Scale	5.718
SD in Original Scale	9265	SD in Log Scale	2.828
95% t UCL (Assumes normality)	6018	95% H-Stat UCL	50775
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	8999		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

BENZO(B)FLUORANTHENE

General Statistics			
Total Number of Observations	70	Number of Distinct Observations	60
		Number of Missing Observations	31
Number of Detects	67	Number of Non-Detects	3
Number of Distinct Detects	57	Number of Distinct Non-Detects	3
Minimum Detect	4.9	Minimum Non-Detect	22
Maximum Detect	70000	Maximum Non-Detect	24
Variance Detects	1.725E+8	Percent Non-Detects	4.286%
Mean Detects	5904	SD Detects	13133
Median Detects	540	CV Detects	2.224
Skewness Detects	3.429	Kurtosis Detects	12.81
Mean of Logged Detects	6.173	SD of Logged Detects	2.771

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.513	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.334	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	5652	KM Standard Error of Mean	1542
KM SD	12808	95% KM (BCA) UCL	8231
95% KM (t) UCL	8224	95% KM (Percentile Bootstrap) UCL	8458
95% KM (z) UCL	8189	95% KM Bootstrap t UCL	9646
90% KM Chebyshev UCL	10279	95% KM Chebyshev UCL	12375
97.5% KM Chebyshev UCL	15284	99% KM Chebyshev UCL	20999

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.717	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.876	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.121	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.119	Detected Data Not Gamma Distributed at 5% Significance Level
Detected Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.278	k star (bias corrected MLE)	0.276
Theta hat (MLE)	21230	Theta star (bias corrected MLE)	21423
nu hat (MLE)	37.27	nu star (bias corrected)	36.93
Mean (detects)	5904		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	5651
Maximum	70000	Median	445
SD	12901	CV	2.283
k hat (MLE)	0.244	k star (bias corrected MLE)	0.243
Theta hat (MLE)	23202	Theta star (bias corrected MLE)	23290
nu hat (MLE)	34.1	nu star (bias corrected)	33.97
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (33.97, α)	21.64	Adjusted Chi Square Value (33.97, β)	21.44
95% Gamma Approximate UCL (use when n>=50)	8871	95% Gamma Adjusted UCL (use when n<50)	8957

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5652	SD (KM)	12808
Variance (KM)	1.640E+8	SE of Mean (KM)	1542
k hat (KM)	0.195	k star (KM)	0.196
nu hat (KM)	27.26	nu star (KM)	27.43
theta hat (KM)	29025	theta star (KM)	28851
80% gamma percentile (KM)	7366	90% gamma percentile (KM)	17091
95% gamma percentile (KM)	29279	99% gamma percentile (KM)	62947

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (27.43, α)	16.48	Adjusted Chi Square Value (27.43, β)	16.3
95% Gamma Approximate KM-UCL (use when n>=50)	9405	95% Gamma Adjusted KM-UCL (use when n<50)	9508
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.932	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0.00144	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0981	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.108	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	5652	Mean in Log Scale	6.026
SD in Original Scale	12901	SD in Log Scale	2.799
95% t UCL (assumes normality of ROS data)	8223	95% Percentile Bootstrap UCL	8361
95% BCA Bootstrap UCL	8973	95% Bootstrap t UCL	9670
95% H-UCL (Log ROS)	61954		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	6.01	KM Geo Mean	407.6
KM SD (logged)	2.8	95% Critical H Value (KM-Log)	3.24
KM Standard Error of Mean (logged)	0.337	95% H-UCL (KM -Log)	61281
KM SD (logged)	2.8	95% Critical H Value (KM-Log)	3.24
KM Standard Error of Mean (logged)	0.337		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	5652	Mean in Log Scale	6.013
SD in Original Scale	12901	SD in Log Scale	2.815
95% t UCL (Assumes normality)	8223	95% H-Stat UCL	64934
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	12375		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
BENZO(K)FLUORANTHENE			
General Statistics			
Total Number of Observations	70	Number of Distinct Observations	61
		Number of Missing Observations	31
Number of Detects	65	Number of Non-Detects	5
Number of Distinct Detects	56	Number of Distinct Non-Detects	5
Minimum Detect	3.6	Minimum Non-Detect	3.1
Maximum Detect	21500	Maximum Non-Detect	24
Variance Detects	25123142	Percent Non-Detects	7.143%
Mean Detects	2500	SD Detects	5012
Median Detects	330	CV Detects	2.005
Skewness Detects	2.607	Kurtosis Detects	6.283
Mean of Logged Detects	5.513	SD of Logged Detects	2.616
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.558	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.329	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.11	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			

PROUCL OUTPUT - SOUTHERN RANGE AREA SURFACE SOIL

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	2322	KM Standard Error of Mean	582.5
KM SD	4836	95% KM (BCA) UCL	3373
95% KM (t) UCL	3293	95% KM (Percentile Bootstrap) UCL	3285
95% KM (z) UCL	3280	95% KM Bootstrap t UCL	3557
90% KM Chebyshev UCL	4070	95% KM Chebyshev UCL	4861
97.5% KM Chebyshev UCL	5960	99% KM Chebyshev UCL	8117
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.756	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.865	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.119	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.12	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.299	k star (bias corrected MLE)	0.295
Theta hat (MLE)	8373	Theta star (bias corrected MLE)	8473
nu hat (MLE)	38.82	nu star (bias corrected)	38.36
Mean (detects)	2500		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	2322
Maximum	21500	Median	260
SD	4871	CV	2.098
k hat (MLE)	0.241	k star (bias corrected MLE)	0.241
Theta hat (MLE)	9620	Theta star (bias corrected MLE)	9652
nu hat (MLE)	33.79	nu star (bias corrected)	33.67
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (33.67, α)	21.4	Adjusted Chi Square Value (33.67, β)	21.2
95% Gamma Approximate UCL (use when n>=50)	3653	95% Gamma Adjusted UCL (use when n<50)	3688
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	2322	SD (KM)	4836
Variance (KM)	23382110	SE of Mean (KM)	582.5
k hat (KM)	0.231	k star (KM)	0.23
nu hat (KM)	32.29	nu star (KM)	32.24
theta hat (KM)	10069	theta star (KM)	10085
80% gamma percentile (KM)	3268	90% gamma percentile (KM)	7003
95% gamma percentile (KM)	11513	99% gamma percentile (KM)	23661
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (32.24, α)	20.26	Adjusted Chi Square Value (32.24, β)	20.06
95% Gamma Approximate KM-UCL (use when n>=50)	3695	95% Gamma Adjusted KM-UCL (use when n<50)	3732
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.93	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0.00131	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.105	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.11	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	2322	Mean in Log Scale	5.187
SD in Original Scale	4870	SD in Log Scale	2.817
95% t UCL (assumes normality of ROS data)	3293	95% Percentile Bootstrap UCL	3305
95% BCA Bootstrap UCL	3468	95% Bootstrap t UCL	3617
95% H-UCL (Log ROS)	28603		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	5.238	KM Geo Mean	188.4
KM SD (logged)	2.696	95% Critical H Value (KM-Log)	3.101
KM Standard Error of Mean (logged)	0.325	95% H-UCL (KM -Log)	19514
KM SD (logged)	2.696	95% Critical H Value (KM-Log)	3.101
KM Standard Error of Mean (logged)	0.325		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2322	Mean in Log Scale	5.238
SD in Original Scale	4870	SD in Log Scale	2.723
95% t UCL (Assumes normality)	3293	95% H-Stat UCL	21424

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	3695		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

DIBENZO(A,H)ANTHRACENE

General Statistics

Total Number of Observations	70	Number of Distinct Observations	55
		Number of Missing Observations	31
Number of Detects	56	Number of Non-Detects	14
Number of Distinct Detects	50	Number of Distinct Non-Detects	6
Minimum Detect	2	Minimum Non-Detect	1.9
Maximum Detect	12000	Maximum Non-Detect	25
Variance Detects	8941204	Percent Non-Detects	20%
Mean Detects	1520	SD Detects	2990
Median Detects	250	CV Detects	1.967
Skewness Detects	2.547	Kurtosis Detects	5.737
Mean of Logged Detects	5.46	SD of Logged Detects	2.172

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.556	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.118	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1218	KM Standard Error of Mean	327.8
KM SD	2718	95% KM (BCA) UCL	1868
95% KM (t) UCL	1765	95% KM (Percentile Bootstrap) UCL	1753
95% KM (z) UCL	1758	95% KM Bootstrap t UCL	1984
90% KM Chebyshev UCL	2202	95% KM Chebyshev UCL	2647
97.5% KM Chebyshev UCL	3266	99% KM Chebyshev UCL	4480

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	1.969	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.849	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.168	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.128	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.359	k star (bias corrected MLE)	0.352
Theta hat (MLE)	4235	Theta star (bias corrected MLE)	4323
nu hat (MLE)	40.2	nu star (bias corrected)	39.38
Mean (detects)	1520		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	1216
Maximum	12000	Median	104
SD	2739	CV	2.253
k hat (MLE)	0.201	k star (bias corrected MLE)	0.202
Theta hat (MLE)	6045	Theta star (bias corrected MLE)	6018
nu hat (MLE)	28.16	nu star (bias corrected)	28.28
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (28.28, α)	17.15	Adjusted Chi Square Value (28.28, β)	16.97
95% Gamma Approximate UCL (use when n>=50)	2005	95% Gamma Adjusted UCL (use when n<50)	2027

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1218	SD (KM)	2718
Variance (KM)	7388844	SE of Mean (KM)	327.8
k hat (KM)	0.201	k star (KM)	0.202
nu hat (KM)	28.12	nu star (KM)	28.25
theta hat (KM)	6065	theta star (KM)	6037
80% gamma percentile (KM)	1613	90% gamma percentile (KM)	3685
95% gamma percentile (KM)	6263	99% gamma percentile (KM)	13350

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (28.25, α)	17.12	Adjusted Chi Square Value (28.25, β)	16.94
95% Gamma Approximate KM-UCL (use when n>=50)	2010	95% Gamma Adjusted KM-UCL (use when n<50)	2032

Lognormal GOF Test on Detected Observations Only		
Shapiro Wilk Approximate Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.192	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0813	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.118	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1218	Mean in Log Scale	4.799
SD in Original Scale	2738	SD in Log Scale	2.404
95% t UCL (assumes normality of ROS data)	1764	95% Percentile Bootstrap UCL	1793
95% BCA Bootstrap UCL	1938	95% Bootstrap t UCL	1941
95% H-UCL (Log ROS)	5166		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	4.816	KM Geo Mean	123.5
KM SD (logged)	2.349	95% Critical H Value (KM-Log)	2.993
KM Standard Error of Mean (logged)	0.289	95% H-UCL (KM -Log)	4549
KM SD (logged)	2.349	95% Critical H Value (KM-Log)	2.993
KM Standard Error of Mean (logged)	0.289		

DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1218	Mean in Log Scale	4.823
SD in Original Scale	2738	SD in Log Scale	2.344
95% t UCL (Assumes normality)	1764	95% H-Stat UCL	4516
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use			
KM H-UCL	4549		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

INDENO(1,2,3-CD)PYRENE

General Statistics			
Total Number of Observations	70	Number of Distinct Observations	63
		Number of Missing Observations	31
Number of Detects	64	Number of Non-Detects	6
Number of Distinct Detects	60	Number of Distinct Non-Detects	3
Minimum Detect	5.4	Minimum Non-Detect	22
Maximum Detect	38000	Maximum Non-Detect	24
Variance Detects	61311328	Percent Non-Detects	8.571%
Mean Detects	3674	SD Detects	7830
Median Detects	525	CV Detects	2.132
Skewness Detects	3.087	Kurtosis Detects	9.851
Mean of Logged Detects	5.919	SD of Logged Detects	2.578

Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.531	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.335	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.111	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	3359	KM Standard Error of Mean	903.4
KM SD	7499	95% KM (BCA) UCL	4946
95% KM (t) UCL	4866	95% KM (Percentile Bootstrap) UCL	4921
95% KM (z) UCL	4845	95% KM Bootstrap t UCL	5399
90% KM Chebyshev UCL	6070	95% KM Chebyshev UCL	7297
97.5% KM Chebyshev UCL	9001	99% KM Chebyshev UCL	12348

Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.677	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.864	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.122	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.121	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.301	k star (bias corrected MLE)	0.297
Theta hat (MLE)	12207	Theta star (bias corrected MLE)	12359
nu hat (MLE)	38.52	nu star (bias corrected)	38.05
Mean (detects)	3674		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3359
Maximum	38000	Median	275
SD	7553	CV	2.249
k hat (MLE)	0.232	k star (bias corrected MLE)	0.231
Theta hat (MLE)	14494	Theta star (bias corrected MLE)	14519
nu hat (MLE)	32.44	nu star (bias corrected)	32.38
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (32.38, α)	20.38	Adjusted Chi Square Value (32.38, β)	20.18
95% Gamma Approximate UCL (use when n>=50)	5338	95% Gamma Adjusted UCL (use when n<50)	5391

PROUCL OUTPUT - SOUTHERN RANGE AREA SURFACE SOIL

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3359	SD (KM)	7499
Variance (KM)	56232449	SE of Mean (KM)	903.4
k hat (KM)	0.201	k star (KM)	0.202
nu hat (KM)	28.1	nu star (KM)	28.23
theta hat (KM)	16739	theta star (KM)	16662
80% gamma percentile (KM)	4445	90% gamma percentile (KM)	10161
95% gamma percentile (KM)	17273	99% gamma percentile (KM)	36829
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (28.23, α)	17.1	Adjusted Chi Square Value (28.23, β)	16.92
95% Gamma Approximate KM-UCL (use when n>=50)	5544	95% Gamma Adjusted KM-UCL (use when n<50)	5604
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.94	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0.00621	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0856	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.111	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3360	Mean in Log Scale	5.615
SD in Original Scale	7553	SD in Log Scale	2.664
95% t UCL (assumes normality of ROS data)	4865	95% Percentile Bootstrap UCL	4978
95% BCA Bootstrap UCL	5447	95% Bootstrap t UCL	5519
95% H-UCL (Log ROS)	25511		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	5.596	KM Geo Mean	269.4
KM SD (logged)	2.664	95% Critical H Value (KM-Log)	3.065
KM Standard Error of Mean (logged)	0.321	95% H-UCL (KM -Log)	25059
KM SD (logged)	2.664	95% Critical H Value (KM-Log)	3.065
KM Standard Error of Mean (logged)	0.321		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3360	Mean in Log Scale	5.622
SD in Original Scale	7553	SD in Log Scale	2.65
95% t UCL (Assumes normality)	4865	95% H-Stat UCL	24475
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	7297		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.1.002 5/6/2019 11:42:39 AM
From File	ProUCL Data-Subsurface Soil.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BENZO(A)ANTHRACENE

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	3.9	Mean	1233
Maximum	16000	Median	57
SD	3970	Std. Error of Mean	992.5
Coefficient of Variation	3.219	Skewness	3.897

Normal GOF Test

Shapiro Wilk Test Statistic	0.344	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.427	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2973	95% Adjusted-CLT UCL (Chen-1995)	3899
		95% Modified-t UCL (Johnson-1978)	3134

Gamma GOF Test

A-D Test Statistic	2.076	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.852	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.296	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.235	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.27	k star (bias corrected MLE)	0.261
Theta hat (MLE)	4572	Theta star (bias corrected MLE)	4728
nu hat (MLE)	8.63	nu star (bias corrected)	8.345
MLE Mean (bias corrected)	1233	MLE Sd (bias corrected)	2415
		Approximate Chi Square Value (0.05)	2.937
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	2.583

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3504	95% Adjusted Gamma UCL (use when n<50)	3984

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.213	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.361	Mean of logged Data	4.516
Maximum of Logged Data	9.68	SD of logged Data	2.085

Assuming Lognormal Distribution

95% H-UCL	9730	90% Chebyshev (MVUE) UCL	1635
95% Chebyshev (MVUE) UCL	2113	97.5% Chebyshev (MVUE) UCL	2778
99% Chebyshev (MVUE) UCL	4082		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2866	95% Jackknife UCL	2973
95% Standard Bootstrap UCL	2818	95% Bootstrap-t UCL	27205
95% Hall's Bootstrap UCL	20327	95% Percentile Bootstrap UCL	3189
95% BCA Bootstrap UCL	4327		
90% Chebyshev(Mean, Sd) UCL	4211	95% Chebyshev(Mean, Sd) UCL	5559
97.5% Chebyshev(Mean, Sd) UCL	7431	99% Chebyshev(Mean, Sd) UCL	11108
Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	11108		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
BENZO(A)PYRENE			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	4.2	Mean	1131
Maximum	14000	Median	61
SD	3476	Std. Error of Mean	869
Coefficient of Variation	3.074	Skewness	3.84
Normal GOF Test			
Shapiro Wilk Test Statistic	0.362	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.416	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2654	95% Adjusted-CLT UCL (Chen-1995)	3452
		95% Modified-t UCL (Johnson-1978)	2794
Gamma GOF Test			
A-D Test Statistic	2.056	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.844	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.322	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.234	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.287	k star (bias corrected MLE)	0.275
Theta hat (MLE)	3941	Theta star (bias corrected MLE)	4116
nu hat (MLE)	9.182	nu star (bias corrected)	8.794
MLE Mean (bias corrected)	1131	MLE Sd (bias corrected)	2157
		Approximate Chi Square Value (0.05)	3.203
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	2.83
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	3105	95% Adjusted Gamma UCL (use when n<50)	3514
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.225	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.213	Data Not Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	1.435	Mean of logged Data	4.61
Maximum of Logged Data	9.547	SD of logged Data	2.024

Assuming Lognormal Distribution			
95% H-UCL	8252	90% Chebyshev (MVUE) UCL	1600
95% Chebyshev (MVUE) UCL	2063	97.5% Chebyshev (MVUE) UCL	2706
99% Chebyshev (MVUE) UCL	3970		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs			
95% CLT UCL	2560	95% Jackknife UCL	2654
95% Standard Bootstrap UCL	2555	95% Bootstrap-t UCL	18015
95% Hall's Bootstrap UCL	14620	95% Percentile Bootstrap UCL	2797
95% BCA Bootstrap UCL	3831		
90% Chebyshev(Mean, Sd) UCL	3738	95% Chebyshev(Mean, Sd) UCL	4919
97.5% Chebyshev(Mean, Sd) UCL	6558	99% Chebyshev(Mean, Sd) UCL	9778

Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	9778		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BENZO(B)FLUORANTHENE

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	6.1	Mean	1598
Maximum	20000	Median	85
SD	4962	Std. Error of Mean	1240
Coefficient of Variation	3.105	Skewness	3.86

Normal GOF Test		
Shapiro Wilk Test Statistic	0.357	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.415	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3773	95% Adjusted-CLT UCL (Chen-1995)	4918
		95% Modified-t UCL (Johnson-1978)	3972

Gamma GOF Test		
A-D Test Statistic	2.089	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.844	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.32	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.234	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics			
k hat (MLE)	0.287	k star (bias corrected MLE)	0.275
Theta hat (MLE)	5564	Theta star (bias corrected MLE)	5810
nu hat (MLE)	9.191	nu star (bias corrected)	8.801
MLE Mean (bias corrected)	1598	MLE Sd (bias corrected)	3047
		Approximate Chi Square Value (0.05)	3.207
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	2.834

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	4385	95% Adjusted Gamma UCL (use when n<50)	4963

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.221	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Lognormal at 5% Significance Level
Data appear Approximate Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	1.808	Mean of logged Data	4.959
Maximum of Logged Data	9.903	SD of logged Data	2.009

Assuming Lognormal Distribution			
95% H-UCL	10984	90% Chebyshev (MVUE) UCL	2203
95% Chebyshev (MVUE) UCL	2840	97.5% Chebyshev (MVUE) UCL	3723
99% Chebyshev (MVUE) UCL	5459		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs			
95% CLT UCL	3638	95% Jackknife UCL	3773
95% Standard Bootstrap UCL	3590	95% Bootstrap-t UCL	25797
95% Hall's Bootstrap UCL	20689	95% Percentile Bootstrap UCL	3995
95% BCA Bootstrap UCL	5343		
90% Chebyshev(Mean, Sd) UCL	5320	95% Chebyshev(Mean, Sd) UCL	7005
97.5% Chebyshev(Mean, Sd) UCL	9345	99% Chebyshev(Mean, Sd) UCL	13941

Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	13941		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

INDENO(1,2,3-CD)PYRENE

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	4.2	Mean	819.2
Maximum	9300	Median	59
SD	2314	Std. Error of Mean	578.5
Coefficient of Variation	2.824	Skewness	3.726

Normal GOF Test		
Shapiro Wilk Test Statistic	0.394	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level
Data Not Normal at 5% Significance Level		

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1833	95% Adjusted-CLT UCL (Chen-1995)	2346
		95% Modified-t UCL (Johnson-1978)	1923

Gamma GOF Test		
A-D Test Statistic	1.904	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.833	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.318	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.232	Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.322	k star (bias corrected MLE)	0.303
Theta hat (MLE)	2543	Theta star (bias corrected MLE)	2700
nu hat (MLE)	10.31	nu star (bias corrected)	9.71
MLE Mean (bias corrected)	819.2	MLE Sd (bias corrected)	1487
		Approximate Chi Square Value (0.05)	3.761
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	3.35
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	2115	95% Adjusted Gamma UCL (use when n<50)	2374
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.221	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.213	Data Not Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.435	Mean of logged Data	4.593
Maximum of Logged Data	9.138	SD of logged Data	1.923
Assuming Lognormal Distribution			
95% H-UCL	5366	90% Chebyshev (MVUE) UCL	1300
95% Chebyshev (MVUE) UCL	1670	97.5% Chebyshev (MVUE) UCL	2183
99% Chebyshev (MVUE) UCL	3192		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1771	95% Jackknife UCL	1833
95% Standard Bootstrap UCL	1737	95% Bootstrap-t UCL	9066
95% Hall's Bootstrap UCL	7074	95% Percentile Bootstrap UCL	1956
95% BCA Bootstrap UCL	2692		
90% Chebyshev(Mean, Sd) UCL	2555	95% Chebyshev(Mean, Sd) UCL	3341
97.5% Chebyshev(Mean, Sd) UCL	4432	99% Chebyshev(Mean, Sd) UCL	6575
Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	6575		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.1.002 5/6/2019 11:43:17 AM
From File	ProUCL Data-Subsurface Soil.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

DIBENZO(A,H)ANTHRACENE

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	15	Number of Non-Detects	1
Number of Distinct Detects	15	Number of Distinct Non-Detects	1
Minimum Detect	4.4	Minimum Non-Detect	1.8
Maximum Detect	3000	Maximum Non-Detect	1.8
Variance Detects	592908	Percent Non-Detects	6.25%
Mean Detects	273.4	SD Detects	770
Median Detects	16	CV Detects	2.816
Skewness Detects	3.631	Kurtosis Detects	13.53
Mean of Logged Detects	3.482	SD of Logged Detects	1.869

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.398	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.405	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	256.4	KM Standard Error of Mean	187.2
KM SD	723.3	95% KM (BCA) UCL	611.1
95% KM (t) UCL	584.5	95% KM (Percentile Bootstrap) UCL	615
95% KM (z) UCL	564.3	95% KM Bootstrap t UCL	3782
90% KM Chebyshev UCL	817.9	95% KM Chebyshev UCL	1072
97.5% KM Chebyshev UCL	1425	99% KM Chebyshev UCL	2119

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.984	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.831	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.323	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.239	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.32	k star (bias corrected MLE)	0.301
Theta hat (MLE)	853.2	Theta star (bias corrected MLE)	908.9
nu hat (MLE)	9.614	nu star (bias corrected)	9.024
Mean (detects)	273.4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	256.3
Maximum	3000	Median	15
SD	747	CV	2.914
k hat (MLE)	0.273	k star (bias corrected MLE)	0.263
Theta hat (MLE)	940.4	Theta star (bias corrected MLE)	974.1
nu hat (MLE)	8.722	nu star (bias corrected)	8.42
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (8.42, α)	2.981	Adjusted Chi Square Value (8.42, β)	2.624
95% Gamma Approximate UCL (use when n>=50)	724.1	95% Gamma Adjusted UCL (use when n<50)	822.5

PROUCL OUTPUT - SOUTHERN RANGE AREA SUBSURFACE SOIL

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	256.4	SD (KM)	723.3
Variance (KM)	523117	SE of Mean (KM)	187.2
k hat (KM)	0.126	k star (KM)	0.144
nu hat (KM)	4.022	nu star (KM)	4.602
theta hat (KM)	2040	theta star (KM)	1783
80% gamma percentile (KM)	269.3	90% gamma percentile (KM)	755.6
95% gamma percentile (KM)	1423	99% gamma percentile (KM)	3376
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.60, α)	0.973	Adjusted Chi Square Value (4.60, β)	0.801
95% Gamma Approximate KM-UCL (use when n>=50)	1213	95% Gamma Adjusted KM-UCL (use when n<50)	1474
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.856	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	256.3	Mean in Log Scale	3.209
SD in Original Scale	747	SD in Log Scale	2.111
95% t UCL (assumes normality of ROS data)	583.7	95% Percentile Bootstrap UCL	610.9
95% BCA Bootstrap UCL	824.1	95% Bootstrap t UCL	3325
95% H-UCL (Log ROS)	2951		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	3.301	KM Geo Mean	27.15
KM SD (logged)	1.884	95% Critical H Value (KM-Log)	4.25
KM Standard Error of Mean (logged)	0.487	95% H-UCL (KM -Log)	1265
KM SD (logged)	1.884	95% Critical H Value (KM-Log)	4.25
KM Standard Error of Mean (logged)	0.487		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	256.4	Mean in Log Scale	3.258
SD in Original Scale	747	SD in Log Scale	2.016
95% t UCL (Assumes normality)	583.8	95% H-Stat UCL	2068
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
975% KM (Chebyshev) UCL	1425		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

LEAD MODELING RESULTS

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LEAD MODEL FOR WINDOWS Version 1.1

==========
Model Version: 1.1 Build11
User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: Northern Range Area – Surface Soil
Run Mode: Site Risk Assessment

Maternal Data
Recommended mother's lead concentration at birth = 0.6 ug Pb/dL.
Soil/Dust Data
Average concentration of lead in surface soil at Northern Range Area = 1,107 mg/kg.
==========

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 784.900 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	1107.000	784.900
1-2	1107.000	784.900
2-3	1107.000	784.900
3-4	1107.000	784.900
4-5	1107.000	784.900
5-6	1107.000	784.900
6-7	1107.000	784.900

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

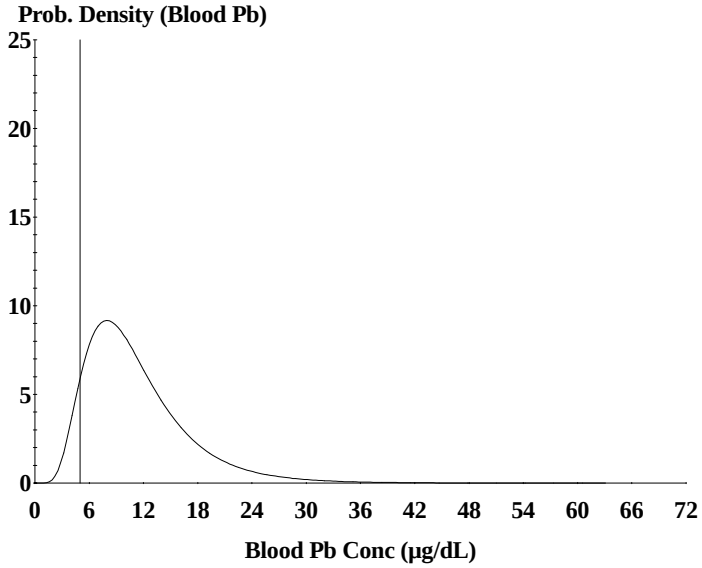
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 0.600 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	0.894	0.000	0.316
1-2	0.034	0.745	0.000	0.760
2-3	0.062	0.837	0.000	0.818
3-4	0.067	0.826	0.000	0.859
4-5	0.067	0.843	0.000	0.952
5-6	0.093	0.909	0.000	1.029
6-7	0.093	0.999	0.000	1.062

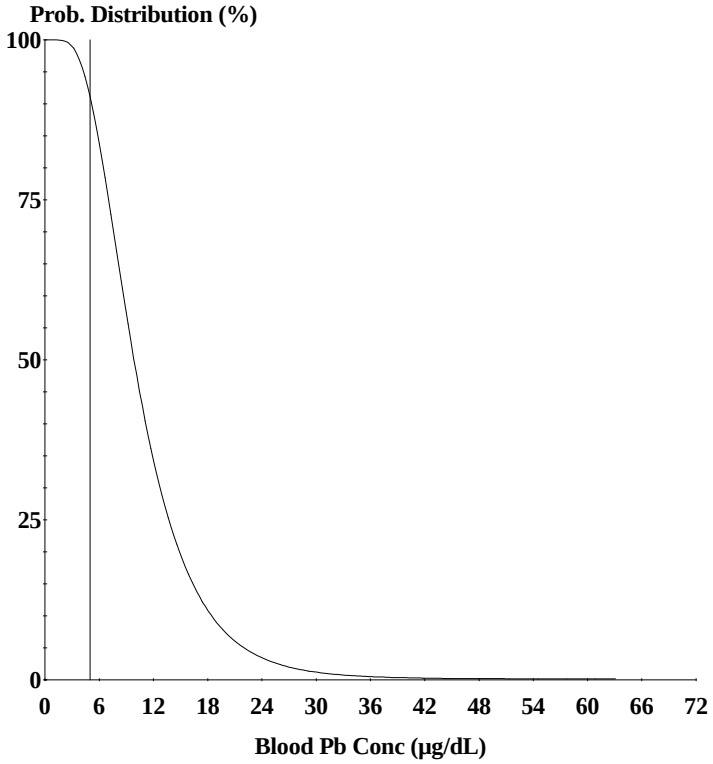
Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	18.758	19.990	10.5
1-2	28.636	30.176	12.2
2-3	29.607	31.324	11.5
3-4	30.503	32.254	11.1
4-5	24.131	25.993	9.2
5-6	22.276	24.308	7.7
6-7	21.332	23.486	6.8



Cutoff = 5.000 µg/dl
Geo Mean = 10.319
GSD = 1.600
% Above = 93.841
% Below = 6.159

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Northern Area - Surface Soil



Cutoff = 5.000 µg/dl
Geo Mean = 10.319
GSD = 1.600
% Above = 93.841

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Northern Area - Surface Soil

LEAD MODEL FOR WINDOWS Version 1.1

==========
Model Version: 1.1 Build11
User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: Northern Range Area - Subsurface Soil
Run Mode: Site Risk Assessment

Maternal Data
Recommended mother's lead concentration at birth = 0.6 ug Pb/dL.
Soil/Dust Data
Average concentration of lead in subsurface soil at Northern Range Area = 170 mg/kg.
==========

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: Northern Range Area - Subsurface Soil
Run Mode: Site Risk Assessment

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 129.000 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	170.000	129.000
1-2	170.000	129.000
2-3	170.000	129.000
3-4	170.000	129.000
4-5	170.000	129.000
5-6	170.000	129.000
6-7	170.000	129.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

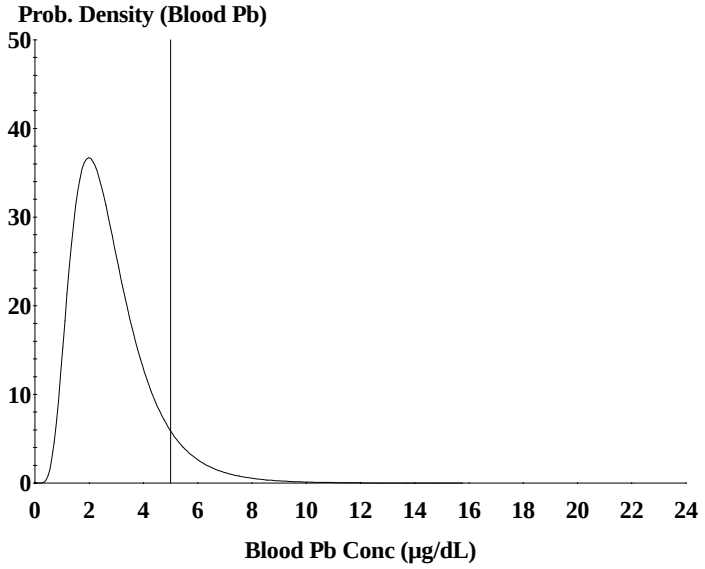
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 0.600 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.068	0.000	0.378
1-2	0.034	0.918	0.000	0.937
2-3	0.062	1.006	0.000	0.983
3-4	0.067	0.972	0.000	1.010
4-5	0.067	0.942	0.000	1.063
5-6	0.093	0.996	0.000	1.127
6-7	0.093	1.081	0.000	1.150

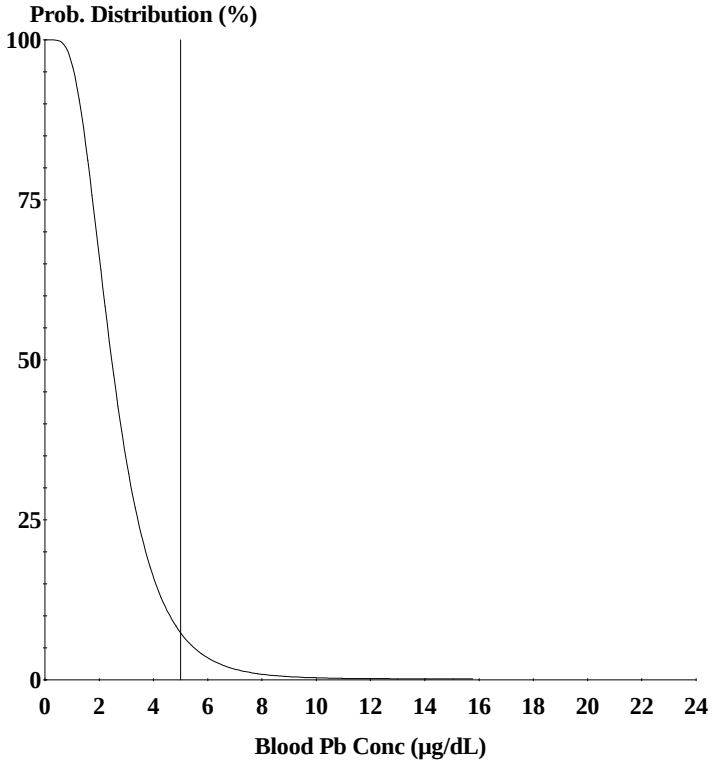
Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	3.552	5.019	2.7
1-2	5.594	7.483	3.1
2-3	5.642	7.693	2.9
3-4	5.688	7.736	2.7
4-5	4.274	6.346	2.3
5-6	3.867	6.083	1.9
6-7	3.663	5.987	1.7



Cutoff = 5.000 µg/dl
Geo Mean = 2.579
GSD = 1.600
% Above = 7.947
% Below = 92.053

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Subsurface Soil



Cutoff = 5.000 µg/dl
Geo Mean = 2.579
GSD = 1.600
% Above = 7.947

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Subsurface Soil

LEAD MODEL FOR WINDOWS Version 1.1

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: Southern Range Area - Surface Soil
Run Mode: Site Risk Assessment

Maternal Data
Recommended mother's lead concentration at birth = 0.6 ug Pb/dL.
Soil/Dust Data
Average concentration of lead in surface soil at Southern Range Area = 190 mg/kg.

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: Southern Range Area - Surface Soil
Run Mode: Site Risk Assessment

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 143.000 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	190.000	143.000
1-2	190.000	143.000
2-3	190.000	143.000
3-4	190.000	143.000
4-5	190.000	143.000
5-6	190.000	143.000
6-7	190.000	143.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

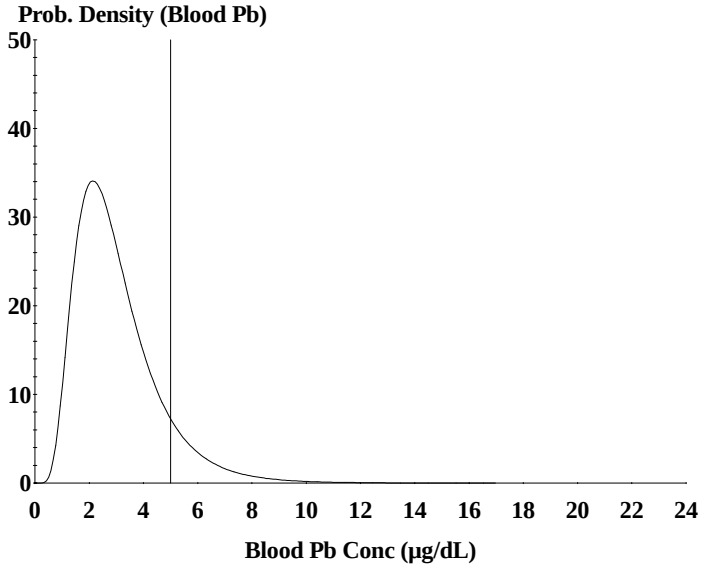
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 0.600 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.063	0.000	0.376
1-2	0.034	0.913	0.000	0.932
2-3	0.062	1.002	0.000	0.978
3-4	0.067	0.968	0.000	1.006
4-5	0.067	0.940	0.000	1.060
5-6	0.093	0.994	0.000	1.125
6-7	0.093	1.079	0.000	1.147

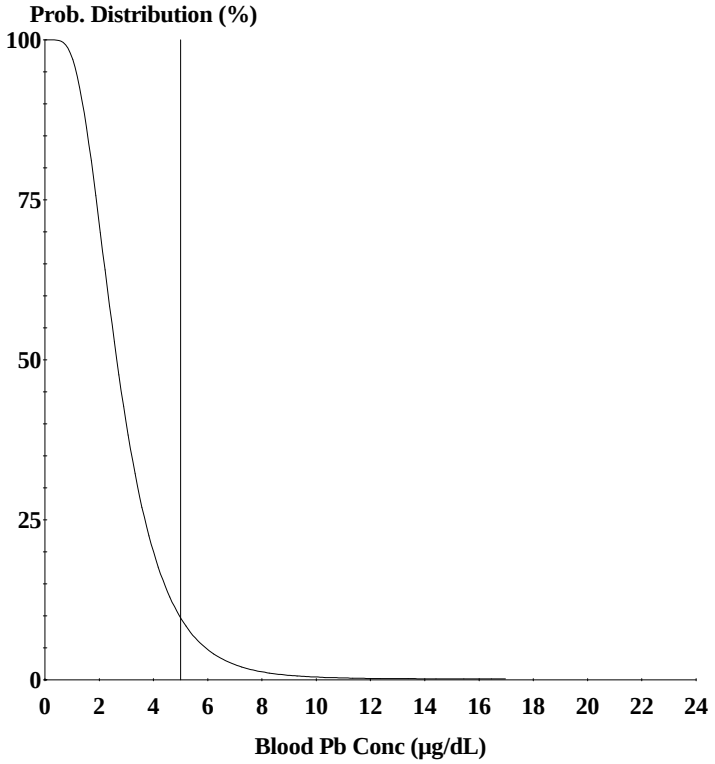
Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	3.937	5.397	2.9
1-2	6.195	8.075	3.3
2-3	6.253	8.294	3.1
3-4	6.307	8.347	2.9
4-5	4.746	6.813	2.4
5-6	4.296	6.508	2.1
6-7	4.070	6.391	1.8



Cutoff = 5.000 µg/dl
Geo Mean = 2.776
GSD = 1.600
% Above = 10.530
% Below = 89.470

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Surface Soil



Cutoff = 5.000 µg/dl
Geo Mean = 2.776
GSD = 1.600
% Above = 10.530

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Surface Soil

LEAD MODEL FOR WINDOWS Version 1.1

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: Southern Range Area - Subsurface Soil
Run Mode: Site Risk Assessment

Maternal Data
Recommended mother's lead concentration at birth = 0.6 ug Pb/dL.
Soil/Dust Data
Average concentration of lead in subsurface soil at Southern Range Area = 84.2 mg/kg.

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: Southern Range Area - Subsurface Soil
Run Mode: Site Risk Assessment

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 68.940 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	84.200	68.940
1-2	84.200	68.940
2-3	84.200	68.940
3-4	84.200	68.940
4-5	84.200	68.940
5-6	84.200	68.940
6-7	84.200	68.940

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

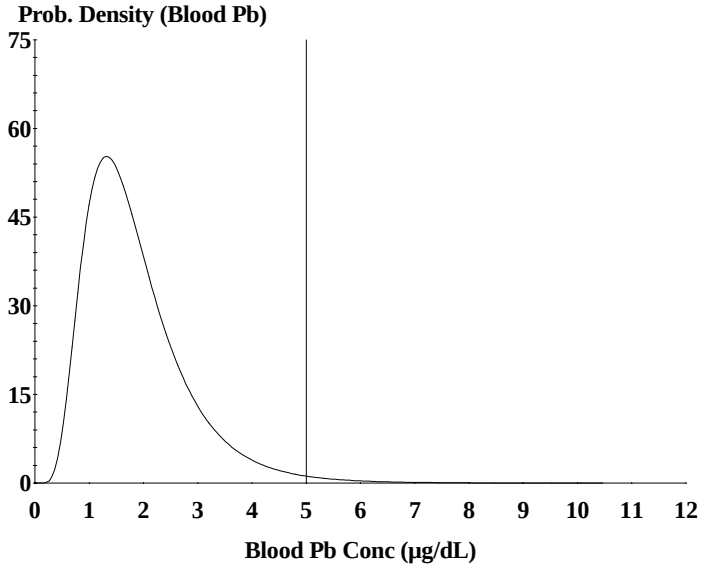
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 0.600 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.088	0.000	0.385
1-2	0.034	0.939	0.000	0.959
2-3	0.062	1.026	0.000	1.002
3-4	0.067	0.988	0.000	1.027
4-5	0.067	0.953	0.000	1.075
5-6	0.093	1.005	0.000	1.137
6-7	0.093	1.090	0.000	1.159

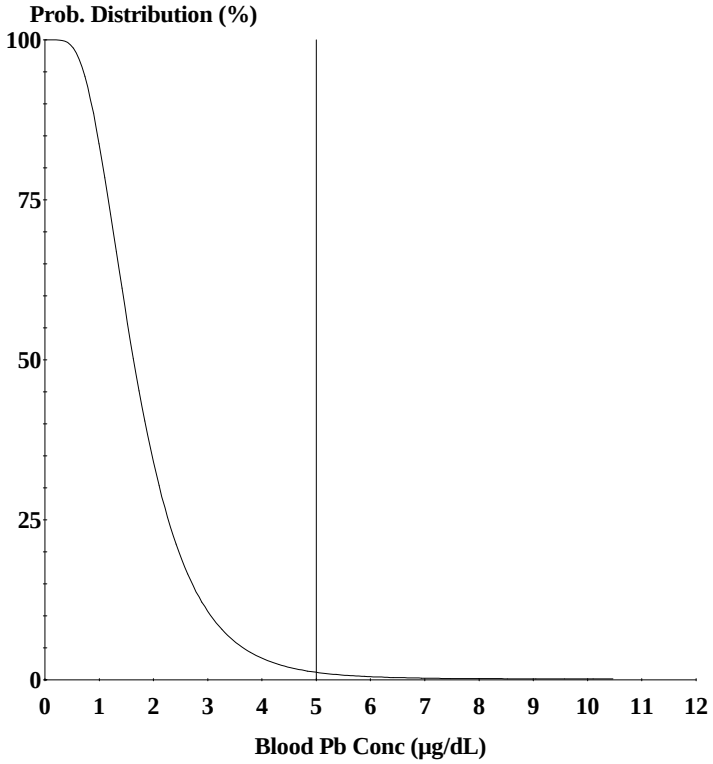
Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	1.861	3.356	1.8
1-2	2.943	4.876	2.0
2-3	2.959	5.049	1.9
3-4	2.975	5.057	1.8
4-5	2.222	4.316	1.5
5-6	2.006	4.241	1.3
6-7	1.898	4.240	1.2



Cutoff = 5.000 µg/dl
Geo Mean = 1.713
GSD = 1.600
% Above = 1.131
% Below = 98.869

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Subsurface Soil



Cutoff = 5.000 µg/dl
Geo Mean = 1.713
GSD = 1.600
% Above = 1.131

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Subsurface Soil

LEAD MODEL FOR WINDOWS Version 1.1

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: High Tower Area - Surface Soil
Run Mode: Site Risk Assessment

Maternal Data
Recommended mother's lead concentration at birth = 0.6 ug Pb/dL.
Soil/Dust Data
Average concentration of lead in High Tower Area surface soil = 117 mg/kg.

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: High Tower Area - Surface Soil
Run Mode: Site Risk Assessment

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 91.900 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	117.000	91.900
1-2	117.000	91.900
2-3	117.000	91.900
3-4	117.000	91.900
4-5	117.000	91.900
5-6	117.000	91.900
6-7	117.000	91.900

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

****** Maternal Contribution: Infant Model ******

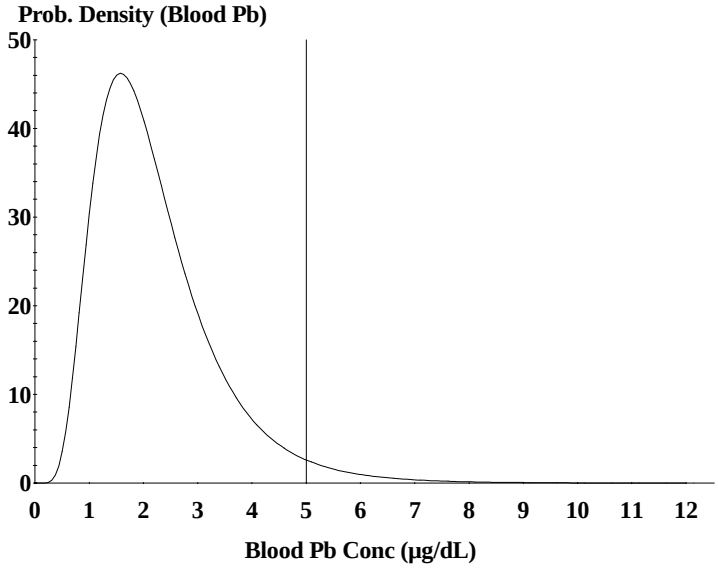
Maternal Blood Concentration: 0.600 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.080	0.000	0.382
1-2	0.034	0.931	0.000	0.950
2-3	0.062	1.019	0.000	0.995
3-4	0.067	0.982	0.000	1.020
4-5	0.067	0.949	0.000	1.070
5-6	0.093	1.001	0.000	1.133
6-7	0.093	1.087	0.000	1.155

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	2.515	3.999	2.2
1-2	3.971	5.887	2.4
2-3	3.997	6.072	2.3
3-4	4.023	6.092	2.1
4-5	3.012	5.098	1.8
5-6	2.722	4.949	1.6
6-7	2.576	4.911	1.4

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: High Tower Area - Surface Soil
Run Mode: Site Risk Assessment

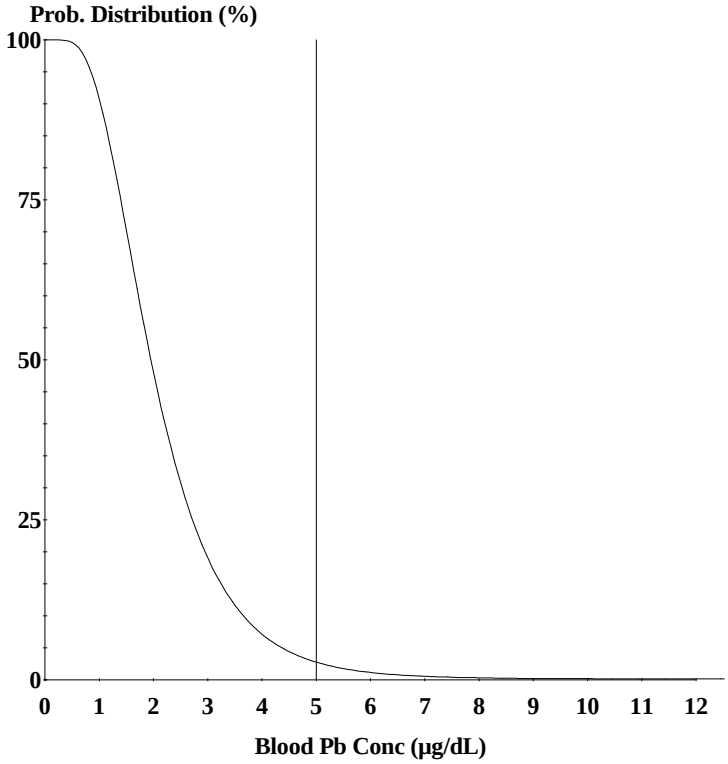


Cutoff = 5.000 µg/dl
Geo Mean = 2.048
GSD = 1.600
% Above = 2.876
% Below = 97.124

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Surface Soil

User Name: Tetra Tech, Inc.
Date: 05/06/2019
Site Name: NASA Wallops Island
Operable Unit: High Tower Area - Surface Soil
Run Mode: Site Risk Assessment



Cutoff = 5.000 µg/dl
Geo Mean = 2.048
GSD = 1.600
% Above = 2.876

Age Range = User Designated: Ages 12 - 72 months

Run Mode = Site Risk Assessment
Comment = Surface Soil

ADULT LEAD MODEL RESULTS

SITE NAME: NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA
LOCATION: NORTHERN RANGE AREA - SURFACE SOIL
RECEPTOR: INDUSTRIAL WORKERS
MEDIA: SURFACE SOIL
DATE: MAY 6, 2019

Calculations of Blood Lead Concentrations (PbBs) and Risk in Nonresidential Areas

U.S. EPA Technical Review Workgroup for Lead
Version date 06/14/2017

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014
PbS	Soil lead concentration	µg/g or ppm	1,107
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	µg/dL	0.6
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	2.2
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	5.2
PbB_t	Target PbB level of concern (e.g., 2-8 ug/dL)	µg/dL	**5.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB exceeds target PbB, assuming lognormal distribution**	**%**	**5.70%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

SITE NAME: NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA
LOCATION: NORTHERN RANGE AREA - SUBSURFACE SOIL
RECEPTOR: INDUSTRIAL WORKERS
MEDIA: SUBSURFACE SOIL
DATE: MAY 6, 2019

Calculations of Blood Lead Concentrations (PbBs) and Risk in Nonresidential Areas

U.S. EPA Technical Review Workgroup for Lead
Version date 06/14/2017

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014
PbS	Soil lead concentration	µg/g or ppm	170
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	µg/dL	0.6
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	0.8
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	2.0
PbB_t	Target PbB level of concern (e.g., 2-8 ug/dL)	µg/dL	**5.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB exceeds target PbB, assuming lognormal distribution**	**%**	**0.07%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

SITE NAME: NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA
LOCATION: SOUTHERN RANGE AREA - SURFACE SOIL
RECEPTOR: INDUSTRIAL WORKERS
MEDIA: SURFACE SOIL
DATE: MAY 6, 2019

Calculations of Blood Lead Concentrations (PbBs) and Risk in Nonresidential Areas

U.S. EPA Technical Review Workgroup for Lead
Version date 06/14/2017

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014
PbS	Soil lead concentration	µg/g or ppm	190
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	µg/dL	0.6
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	0.9
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	2.1
PbB_t	Target PbB level of concern (e.g., 2-8 ug/dL)	µg/dL	**5.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB exceeds target PbB, assuming lognormal distribution**	**%**	**0.08%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

SITE NAME: NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA
LOCATION: SOUTHERN RANGE AREA - SUBSURFACE SOIL
RECEPTOR: INDUSTRIAL WORKERS
MEDIA: SUBSURFACE SOIL
DATE: MAY 6, 2019

Calculations of Blood Lead Concentrations (PbBs) and Risk in Nonresidential Areas

U.S. EPA Technical Review Workgroup for Lead
Version date 06/14/2017

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014
PbS	Soil lead concentration	µg/g or ppm	84.2
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	µg/dL	0.6
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	0.7
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	1.7
PbB_t	Target PbB level of concern (e.g., 2-8 ug/dL)	µg/dL	**5.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB exceeds target PbB, assuming lognormal distribution**	**%**	**0.03%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

SITE NAME: NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA
LOCATION: HIGH TOWER AREA - SURFACE SOIL
RECEPTOR: INDUSTRIAL WORKERS
MEDIA: SURFACE SOIL
DATE: MAY 6, 2019

Calculations of Blood Lead Concentrations (PbBs) and Risk in Nonresidential Areas

U.S. EPA Technical Review Workgroup for Lead
Version date 06/14/2017

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014
PbS	Soil lead concentration	µg/g or ppm	117
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	µg/dL	0.6
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	0.9
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	2.2
PbB_t	Target PbB level of concern (e.g., 2-8 ug/dL)	µg/dL	**5.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB exceeds target PbB, assuming lognormal distribution**	**%**	**0.12%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

RISK RATIO TABLES

TABLE 1
SUMMARY OF CANCER RISKS AND HAZARD INDICES - RESIDENTIAL EXPOSURES TO SURFACE SOIL
MAIN BASE RANGE COMPLEX - SOUTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Index (HI)		
	Exposure Point Concentration[1] (mg/kg)	Residential RSL[2] (mg/kg)	Estimated ILCR	Primary Target Organ	Residential RSL[2] (mg/kg)	Estimated HI
Benzo(a)anthracene	9.57	1.1	9E-06	NA	NA	-
Benzo(a)pyrene	9.00	0.11	8E-05	Developmental, Immune, Reproductive	18	0.5
Benzo(b)fluoranthene	12.4	1.1	1E-05	NA	NA	-
Benzo(k)fluoranthene	3.70	11	3E-07	NA	NA	-
Dibenzo(a,h)anthracene	4.55	0.11	4E-05	NA	NA	-
Indeno(1,2,3-cd)pyrene	7.30	1.1	7E-06	NA	NA	-
Lead[3]	190	NA	-	-	200	-
		Total Cancer Risk	**2E-04**		**Total HI**	**0.5**

ILCRs and HIs were calculated using a simple risk ratio technique which divides the exposure point concentration by the RSL for residential exposure to soil multiplying by the target risk level. For example the ILCR for benzo(a)pyrene was calculated by 9.00/0.11 x 1E-06 = 8E-05. The HI for benzo(a)pyrene was calculated by 9.00/18 x 1 = 0.5.
HI - hazard index
ILCR - incremental lifetime cancer risk
mg/kg = milligrams per kilogram
NA - Not applicable
RSL - regional screening level
USEPA - United States Environmental Protection Agency

1 - Exposure point concentration is the 95% UCL calculated by ProUCL Version 5.1.002.
2 - USEPA Regional Screening Level (RSL) Table, November 2018. The noncarcinogenic values correspond to a target hazard quotient of 1. Carcinogenic values represent an incremental cancer risk of 1E-06.
3 - Lead risks are evaluated separately using EPA's IEUBK model.

TABLE 2
SUMMARY OF CANCER RISKS AND HAZARD INDICES - RESIDENTIAL EXPOSURES TO SUBSURFACE SOIL
MAIN BASE RANGE COMPLEX - SOUTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Index (HI)		
	Exposure Point Concentration[1] (mg/kg)	Residential RSL[2] (mg/kg)	Estimated ILCR	Primary Target Organ	Residential RSL[2] (mg/kg)	Estimated HI
Benzo(a)anthracene	11.1	1.1	1E-05	Cancer	NA	-
Benzo(a)pyrene	9.78	0.11	9E-05	Developmental, Immune, Reproductive	18	0.5
Benzo(b)fluoranthene	13.9	1.1	1E-05	Cancer	NA	-
Dibenzo(a,h)anthracene	1.43	0.11	1E-05	Cancer	NA	-
Indeno(1,2,3-cd)pyrene	6.58	1.1	6E-06	Cancer	NA	-
Lead[3]	84.2	NA	-	-	200	-
		Total Cancer Risk	**1E-04**		**Total HI**	**0.5**

ILCRs and HIs were calculated using a simple risk ratio technique which divides the exposure point concentration by the RSL for residential exposure to soil multiplying by the target risk level. For example the ILCR for benzo(a)pyrene was calculated by 9.78/0.11 x 1E-06 = 9E-05. The HI for benzo(a)pyrene was calculated by 9.78/18 x 1 = 0.5.
HI - hazard index
ILCR - incremental lifetime cancer risk
mg/kg = milligrams per kilogram
NA - Not applicable
RSL - regional screening level
USEPA - United States Environmental Protection Agency

1 - Exposure point concentration is the 95% UCL calculated by ProUCL Version 5.1.002.
2 - USEPA Regional Screening Level (RSL) Table, November 2018. The noncarcinogenic values correspond to a target hazard quotient of 1. Carcinogenic values represent an incremental cancer risk of 1E-06.
3 - Lead risks are evaluated separately using EPA's IEUBK model.

TABLE 3
SUMMARY OF CANCER RISKS AND HAZARD INDICES - INDUSTRIAL EXPOSURES TO SURFACE SOIL
MAIN BASE RANGE COMPLEX - SOUTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Index (HI)		
	Exposure Point Concentration[1] (mg/kg)	Industrial RSL[2] (mg/kg)	Estimated ILCR	Primary Target Organ	Industrial RSL[2] (mg/kg)	Estimated HI
Benzo(a)anthracene	9.57	21	5E-07	Cancer	NA	-
Benzo(a)pyrene	9.00	2.1	4E-06	Developmental, Immune, Reproductive	220	0.04
Benzo(b)fluoranthene	12.4	21	6E-07	Cancer	NA	-
Benzo(k)fluoranthene	3.70	210	2E-08	Cancer	NA	-
Dibenzo(a,h)anthracene	4.55	2.1	2E-06	Cancer	NA	-
Indeno(1,2,3-cd)pyrene	7.30	21	3E-07	Cancer	NA	-
Lead[3]	190	NA	-	-	800	-
		Total Cancer Risk	**8E-06**		**Total HI**	**0.04**

ILCRs and HIs were calculated using a simple risk ratio technique which divides the exposure point concentration by the RSL for industrial exposure to soil multiplying by the target risk level. For example the ILCR for benzo(a)pyrene was calculated by 9.00/2.1 x 1E-06 = 4E-06. The HI for benzo(a)pyrene was calculated by 9.00/220 x 1 = 0.04.
HI - hazard index
ILCR - incremental lifetime cancer risk
mg/kg = milligrams per kilogram
NA - Not applicable
RSL - regional screening level
USEPA - United States Environmental Protection Agency

1 - Exposure point concentration is the 95% UCL calculated by ProUCL Version 5.1.002.
2 - USEPA Regional Screening Level (RSL) Table, November 2018. The noncarcinogenic values correspond to a target hazard quotient of 1. Carcinogenic values represent an incremental cancer risk of 1E-06.
3 - Lead risks are evaluated separately using EPA's adult lead methodology.

TABLE 4
SUMMARY OF CANCER RISKS AND HAZARD INDICES - INDUSTRIAL EXPOSURES TO SUBSURFACE SOIL
MAIN BASE RANGE COMPLEX - SOUTHERN RANGE AREA
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Index (HI)		
	Exposure Point Concentration[1] (mg/kg)	Industrial RSL[2] (mg/kg)	Estimated ILCR	Primary Target Organ	Industrial RSL[2] (mg/kg)	Estimated HI
Benzo(a)anthracene	11.1	21	5E-07	Cancer	NA	-
Benzo(a)pyrene	9.78	2.1	5E-06	Developmental, Immune, Reproductive	220	0.04
Benzo(b)fluoranthene	13.9	21	7E-07	Cancer	NA	-
Dibenzo(a,h)anthracene	1.43	2.1	7E-07	Cancer	NA	-
Indeno(1,2,3-cd)pyrene	6.58	21	3E-07	Cancer	NA	-
Lead[3]	84.2	NA	-	-	800	-
		Total Cancer Risk	**7E-06**		**Total HI**	**0.04**

ILCRs and HIs were calculated using a simple risk ratio technique which divides the exposure point concentration by the RSL for industrial exposure to soil multiplying by the target risk level. For example the ILCR for benzo(a)pyrene was calculated by 9.78/2.1 x 1E-06 = 5E-06. The HI for benzo(a)pyrene was calculated by 9.78/220 x 1 = 0.04.
HI - hazard index
ILCR - incremental lifetime cancer risk
mg/kg = milligrams per kilogram
NA - Not applicable
RSL - regional screening level
USEPA - United States Environmental Protection Agency

1 - Exposure point concentration is the 95% UCL calculated by ProUCL Version 5.1.002.
2 - USEPA Regional Screening Level (RSL) Table, November 2018. The noncarcinogenic values correspond to a target hazard quotient of 1. Carcinogenic values represent an incremental cancer risk of 1E-06.
3 - Lead risks are evaluated separately using EPA's adult lead methodology.

Appendix I
Support Information for ERA

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ECOLOGICAL SCREENING VALUES

Ecological Screening Levels for Surface Soil

Parameter	CAS Number	Plants		Invertebrates		Birds		Mammals	
		Value	Source	Value	Source	Value	Source	Value	Source
Polycyclic Aromatic Hydrocarbons (mg/kg)									
2-Methylnaphthalene	91-57-6	NC	None	29	Eco SSL	NC	None	100	Eco SSL
Acenaphthene	83-32-9	0.25	LANL	29	Eco SSL	NC	None	100	Eco SSL
Anthracene	120-12-7	6.8	LANL	29	Eco SSL	NC	None	100	Eco SSL
Benzo(a)anthracene	56-55-3	18	LANL	18	Eco SSL	0.73	LANL	1.1	Eco SSL
Benzo(a)pyrene	50-32-8	NC	None	18	Eco SSL	NC	None	1.1	Eco SSL
Benzo(b)fluoranthene	205-99-2	18	LANL	18	Eco SSL	NC	None	1.1	Eco SSL
Benzo(g,h,i)perylene	191-24-2	NC	None	18	Eco SSL	NC	None	1.1	Eco SSL
Benzo(k)fluoranthene	207-08-9	NC	None	18	Eco SSL	NC	None	1.1	Eco SSL
Chrysene	218-01-9	NC	None	18	Eco SSL	NC	None	1.1	Eco SSL
Dibenzo(a,h)anthracene	53-70-3	NC	None	18	Eco SSL	NC	None	1.1	Eco SSL
Fluoranthene	206-44-0	NC	None	29	Eco SSL	NC	None	100	Eco SSL
Fluorene	86-73-7	NC	None	29	Eco SSL	NC	None	100	Eco SSL
Indeno(1,2,3-cd)pyrene	193-39-5	NC	None	18	Eco SSL	NC	None	1.1	Eco SSL
Naphthalene	91-20-3	1	LANL	29	Eco SSL	3.4	LANL	100	Eco SSL
Phenanthrene	85-01-8	NC	None	29	Eco SSL	NC	None	100	Eco SSL
Pyrene	129-00-0	NC	None	18	Eco SSL	33	LANL	1.1	Eco SSL
Metals (mg/kg)									
Lead	7439-92-1	120	Eco SSL	1700	Eco SSL	11	Eco SSL	56	Eco SSL

Soil Screening Level Sources in the Order of Preference:

Eco SSL - USEPA Ecological Soil Screening Levels (2005);
LANL - Los Alamos National Laboratory ecological screening values (2017);
ORNL - Oak Ridge National Laboratory surface water benchmarks, secondary chronic values (Efroymson et al., 1997a, 1997b);
R4 - USEPA Region 4 screening levels (2018);
R5 - USEPA Region 5 Ecological Screening Level (2003).

NC - No Criteria

Ecological Screening Levels for Sediment

Parameter	CAS Number	Sediment Invertebrates	
		Value	Source
Polycyclic Aromatic Hydrocarbons (mg/kg)			
Benzo(a)anthracene	56-55-3	0.0748	R3 BTAG SD
Benzo(a)pyrene	50-32-8	0.0888	R3 BTAG SD
Benzo(b)fluoranthene	205-99-2	0.027	R3 BTAG SD FW
Benzo(g,h,i)perylene	191-24-2	0.31	R4
Benzo(k)fluoranthene	207-08-9	0.24	R3 BTAG SD FW
Chrysene	218-01-9	0.108	R3 BTAG SD
Dibenzo(a,h)anthracene	53-70-3	0.00622	R3 BTAG SD
Fluoranthene	206-44-0	0.113	R3 BTAG SD
Indeno(1,2,3-cd)pyrene	193-39-5	0.34	R4
Phenanthrene	85-01-8	0.0867	R3 BTAG SD
Total PAHs	-	2.9	R3 BTAG SD
Metals (mg/kg)			
Lead	7439-92-1	30.2	R3 BTAG SD

Sediment Screening Level Sources in the Order of Preference:

R3 BTAG SD - USEPA Region 3 Ecological Marine Sediment Screening Benchmarks (2006);

R4 - USEPA Region 4 screening levels, marine sediment (2018);

R3 BTAG SD FW - USEPA Region 3 Ecological Freshwater Sediment Screening Benchmarks (2006).

LIST OF SAMPLES

Northern Range Area			High Tower Area	
Surface Soils	**Low-Lying Soils Evaluated as Surface Sediment**	**Subsurface Soils**	**Surface Soils**	**Subsurface Soils**
SR-SS-006-000.5-20071019	SR-SS-006-000.5-20071019	SR-SB-201-1224	SR-SS-005-000.5-20071018	SR-SB-246-1224-20180323
SR-SS-012-000.5-20071018	SR-SS-012-000.5-20071018	SR-SB-202-1224	SR-SS-241-0006	SR-SB-246-1224-20180323-AVG
SR-SS-037-000.5-20071019	SR-SS-037-000.5-20071019	SR-SB-203-1224	SR-SS-242-0006	SR-SB-246-1224-20180323-D
SR-SS-038-000.5-20071019	SR-SS-038-000.5-20071019	SR-SS-201-0612	SR-SS-242-0006-AVG	SR-SB-250-1224
SR-SS-039-000.5-20071019	SR-SS-039-000.5-20071019	SR-SS-202-0612	SR-SS-242-0006-D	SR-SB-253-1224
SR-SS-100-000.5	SR-SS-100-000.5	SR-SS-203-0612	SR-SS-243-0006	SR-SB-256-1224
SR-SS-100-000.5-AVG	SR-SS-100-000.5-AVG	SR-SS-204-0612	SR-SS-244-0006	SR-SS-241-0612
SR-SS-100-000.5-D	SR-SS-100-000.5-D	SR-SS-205-0612	SR-SS-245-0006	SR-SS-242-0612
SR-SS-102-000.5	SR-SS-102-000.5	SR-SS-206-0612	SR-SS-246-0006-20180323	SR-SS-243-0612
SR-SS-103-000.5	SR-SS-103-000.5	SR-SS-207-0612	SR-SS-247-0006	SR-SS-243-1224
SR-SS-104-000.5	SR-SS-104-000.5	SR-SS-208-0612	SR-SS-248-0006	SR-SS-244-0612
SR-SS-105-000.5	SR-SS-105-000.5	SR-SS-209-0612	SR-SS-249-0006	SR-SS-245-0612
SR-SS-106-000.5	SR-SS-106-000.5	SR-SS-210-0612	SR-SS-250-0006	SR-SS-246-0612-20180323
SR-SS-107-000.5	SR-SS-107-000.5	SR-SS-211-0612	SR-SS-251-0006	SR-SS-247-0612
SR-SS-108-000.5	SR-SS-108-000.5	SR-SS-212-0612	SR-SS-252-0006	SR-SS-248-0612
SR-SS-201-0006	SR-SS-201-0006	SR-SS-213-0612	SR-SS-253-0006	SR-SS-249-0612
SR-SS-202-0006	SR-SS-202-0006	SR-SS-214-0612	SR-SS-253-0006-AVG	SR-SS-250-0612
SR-SS-203-0006	SR-SS-203-0006	SR-SS-215-0612	SR-SS-253-0006-D	SR-SS-251-0612
SR-SS-203-0006-AVG	SR-SS-203-0006-AVG	SR-SS-301-0612	SR-SS-254-0006	SR-SS-252-0612
SR-SS-203-0006-D	SR-SS-203-0006-D	SR-SS-302-0612	SR-SS-255-0006	SR-SS-253-0612
SR-SS-204-0006	SR-SS-204-0006	SR-SS-302-0612-AVG	SR-SS-256-0006	SR-SS-254-0612
SR-SS-205-0006	SR-SS-205-0006	SR-SS-302-0612-D		SR-SS-255-0612
SR-SS-206-0006	SR-SS-206-0006	SR-SS-303-0612		SR-SS-255-0612-AVG
SR-SS-207-0006	SR-SS-207-0006	SR-SS-304-0612		SR-SS-255-0612-D
SR-SS-208-0006	SR-SS-208-0006	SR-SS-305-0612		SR-SS-256-0612
SR-SS-209-0006	SR-SS-209-0006	SR-SS-306-0612		
SR-SS-210-0006	SR-SS-210-0006	SR-SS-307-0612		
SR-SS-211-0006	SR-SS-211-0006			
SR-SS-212-0006	SR-SS-212-0006			
SR-SS-213-0006	SR-SS-213-0006			
SR-SS-214-0006	SR-SS-214-0006			
SR-SS-215-0006	SR-SS-215-0006			
SR-SS-301-0006				
SR-SS-302-0006				
SR-SS-303-0006				
SR-SS-304-0006				
SR-SS-305-0006				
SR-SS-306-0006				
SR-SS-307-0006				

Southern Range Area				
Surface Soils			Subsurface Soils	
SR-SS-001-000.5-20071019	SR-SS-049-000.5-20071106	SR-SS-259-0006-D	SR-SB-216-1224	SR-SS-228-0612
SR-SS-002-000.5-20071019	SR-SS-050-000.5-20071107	SR-SS-260-0006	SR-SB-217-1224	SR-SS-229-0612
SR-SS-003-000.5-20071019	SR-SS-051-000.5-20071107	SR-SS-261-0006	SR-SB-218-1224	SR-SS-230-0612
SR-SS-004-000.5-20071022	SR-SS-053-000.5-20071107	SR-SS-262-0006	SR-SB-219-1224	SR-SS-231-0612
SR-SS-007-000.5-20071022	SR-SS-054-000.5-20071107	SR-SS-263-0006	SR-SB-220-1224	SR-SS-232-0612
SR-SS-007-000.5-20071022-AVG	SR-SS-055-000.5-20071107	SR-SS-264-0006	SR-SB-221-1224	SR-SS-233-0612
SR-SS-007-000.5-20071022-D	SR-SS-056-000.5-20071107	SR-SS-265-0006	SR-SB-221-1224 SIEVE 20	SR-SS-233-0612-AVG
SR-SS-008-000.5-20071022	SR-SS-216-0006	SR-SS-266-0006	SR-SB-221-1224 SIEVE PAN	SR-SS-233-0612-D
SR-SS-009-000.5-20071022	SR-SS-217-0006	SR-SS-267-0006	SR-SB-222-1224	SR-SS-234-0612
SR-SS-010-000.5-20071022	SR-SS-217-0006-AVG	SR-SS-267-0006-AVG	SR-SB-222-1224-AVG	SR-SS-235-0612
SR-SS-011-000.5-20071018	SR-SS-217-0006-D	SR-SS-267-0006-D	SR-SB-222-1224-D	SR-SS-236-0612
SR-SS-013-000.5-20071022	SR-SS-218-0006	SR-SS-268-0006	SR-SB-223-1224	SR-SS-237-0612
SR-SS-014-000.5-20071022	SR-SS-219-0006	SR-SS-269-0006	SR-SB-223-1224-AVG	SR-SS-238-0612
SR-SS-015-000.5-20071022	SR-SS-220-0006	SR-SS-270-0006	SR-SB-223-1224-D	SR-SS-239-0612
SR-SS-016-000.5-20071022	SR-SS-221-0006	SR-SS-271-0006	SR-SB-224-1224	SR-SS-240-0612
SR-SS-017-000.5-20071022	SR-SS-221-006 SIEVE 20	SR-SS-272-0006	SR-SB-225-1224	SR-SS-257-0612
SR-SS-019-000.5-20071024	SR-SS-221-006 SIEVE PAN	SR-SS-273-0006	SR-SB-257-1224	SR-SS-258-0612
SR-SS-020-000.5-20071024	SR-SS-222-0006	SR-SS-274-0006	SR-SB-258-1224	SR-SS-259-0612
SR-SS-020-000.5-20071024-AVG	SR-SS-223-0006	SR-SS-275-0006	SR-SB-259-1224	SR-SS-260-0612
SR-SS-020-000.5-20071024-D	SR-SS-224-0006	SR-SS-276-0006	SR-SB-260-1224	SR-SS-260-0612-AVG
SR-SS-021-000.5-20071025	SR-SS-225-0006 SIEVE 20	SR-SS-276-0006-AVG	SR-SB-261-1224	SR-SS-260-0612-D
SR-SS-022-000.5-20071025	SR-SS-225-0006 SIEVE PAN	SR-SS-276-0006-D	SR-SB-262-1224	SR-SS-261-0612
SR-SS-023-000.5-20071025	SR-SS-225-0006-20180320	SR-SS-277-0006	SR-SB-263-1224	SR-SS-262-0612
SR-SS-024-000.5-20071025	SR-SS-226-0006	SR-SS-278-0006	SR-SS-216-0612	SR-SS-263-0612
SR-SS-025-000.5-20071024	SR-SS-226-0006-AVG	SR-SS-311-0006	SR-SS-217-0612	SR-SS-275-0612
SR-SS-026-000.5-20071024	SR-SS-226-0006-D	SR-SS-312-0006	SR-SS-218-0612	SR-SS-275-1224
SR-SS-027-000.5-20071024	SR-SS-227-0006	SR-SS-325-0006	SR-SS-219-0612	SR-SS-311-0612
SR-SS-028-000.5-20071024	SR-SS-228-0006	SR-SS-325-0006-AVG	SR-SS-220-0612	SR-SS-312-0612
SR-SS-029-000.5-20071024	SR-SS-229-0006	SR-SS-325-0006-D	SR-SS-221-0612	SR-SS-312-0612-AVG
SR-SS-030-000.5-20071024	SR-SS-230-0006	SR-SS-326-0006	SR-SS-221-0612 SIEVE 20	SR-SS-312-0612-D
SR-SS-031-000.5-20071024	SR-SS-231-0006	SR-SS-327-0006	SR-SS-221-0612 SIEVE PAN	
SR-SS-032-000.5-20071024	SR-SS-232-0006		SR-SS-222-0612	
SR-SS-033-000.5-20071025	SR-SS-233-0006		SR-SS-223-0612	
SR-SS-034-000.5-20071024	SR-SS-234-0006		SR-SS-224-0612	
SR-SS-035-000.5-20071025	SR-SS-235-0006		SR-SS-224-0612-AVG	
SR-SS-036-000.5-20071018	SR-SS-236-0006		SR-SS-224-0612-D	
SR-SS-040-000.5-20071106	SR-SS-237-0006		SR-SS-225-0612 SIEVE 20	
SR-SS-041-000.5-20071106	SR-SS-238-0006		SR-SS-225-0612 SIEVE PAN	
SR-SS-041-000.5-20071106-AVG	SR-SS-239-0006		SR-SS-225-0612-20180320	
SR-SS-041-000.5-20071106-D	SR-SS-240-0006		SR-SS-226-0612	
SR-SS-042-000.5-20071106	SR-SS-257-0006		SR-SS-226-1224	
SR-SS-043-000.5-20071106	SR-SS-258-0006		SR-SS-227-0612	
SR-SS-045-000.5-20071106	SR-SS-259-0006		SR-SS-227-0612-AVG	
SR-SS-047-000.5-20071106	SR-SS-259-0006-AVG		SR-SS-227-0612-D	

TOXICITY REFERENCE VALUES

TOXICITY REFERENCE VALUES

Parameter	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatiles				
Acenaphthene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Phenanthrene	65.6	356	2	20
Pyrene	0.615	38.4	2	20
Inorganics				
Lead	4.7	186.4	1.63	44.60

The sources of these NOAELS and LOAELS are presented in the table titled "Sources and Endpoints for NOAELS and LOAELS for Terrestrial Wildlife" in this appendix.

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE

Parameters	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Semivolatiles							
7,12-Dimethylbenz(a)anthracene	20	LOAEL	systemic	chronic	nestling/starlings	Trust et al., 1994	
7,12-Dimethylbenz(a)anthracene	2	NOAEL	systemic	chronic	nestling/starlings	Trust et al., 1994	
High Molecular Weight PAHs	38.4	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
High Molecular Weight PAHs	0.615	NOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Low Molecular Weight PAHs	356	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Low Molecular Weight PAHs	65.6	NOAEL	reproduction & growth	chronic	mammals	USEPA, 2007	
Inorganics							
Lead	44.6	LOAEL	reproduction & growth	chronic	birds	USEPA, 2005	
Lead	186.4	LOAEL	reproduction & growth	chronic	mammals	USEPA, 2005	
Lead	1.63	NOAEL	reproduction & growth	chronic	chicken	USEPA, 2005	
Lead	4.7	NOAEL	reproduction & growth	chronic	rat	USEPA, 2005	

Notes:

NOAEL = No Observed Adverse Effects Level

LOAEL = Lowest Observed Adverse Effects Level

The NOAELS and LOAELS for the following PAHs are based on the Low Molecular Weight PAH values: acenapthylene, acenaphthene, anthracene, fluoranthene, fluorene, phenanthrene.

The NOAELS and LOAELS for the following PAHs are based on the High Molecular Weight PAH values: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, indeno(1,2,3-c,d)pyrene, and pyrene.

The NOAELS and LOAELS for the PAHs for birds were based on 7,12-dimethylbenz(a)anthracene.

The LOAELs used for lead was calculated as the geometric mean of growth and reproduction data from the Ecological Soil Screening Levels (U.S. EPA, 2005).

References for the NOAELS and LOAELs are presented on the following pages.

Trust, K.A., A. Fairbrother, and M.J. Hooper. 1994. Effects of 7,12-Dimethylbenz(a)anthracene on Immune Function and Mixed-Function Oxygenase Activity in the European Starling. Environ. Tox. And Chem., Vol. 13, No. 5, pp. 821-830.

USEPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level for Lead, Interim Final. Office of Emergency and Remedial Response. OSWER Directive 9285.7-70. March.

U.S. EPA, 2007. Ecological Soil Screening Level for PAHs, Interim Final. Office of Emergency and Remedial Response. OSWER Directive 9285.7-78. June.

EXPOSURE ASSUMPTIONS FOR FOOD CHAIN MODEL

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL

Species/Exposure Inputs	Conservative Inputs		Average Inputs	
	Values	Units	Values	Units
Bobwhite Quail				
Body Weight = BW	1.540E-01	kg	1.751E-01	kg
Food Ingestion Rate = If	1.628E-02	kg/day	1.361E-02	kg/day
Soil Ingestion Rate = Is	2.263E-03	kg/day	8.304E-04	kg/day
Home Range = HR	Assume 100% on site		1.880E+01	acres
Meadow Vole				
Body Weight = BW	1.700E-02	kg	3.580E-02	kg
Food Ingestion Rate = If	1.878E-03	kg/day	1.744E-03	kg/day
Soil Ingestion Rate = Is	6.010E-05	kg/day	2.093E-05	kg/day
Home Range = HR	Assume 100% on site		6.590E-02	acres
American Robin				
Body Weight = BW	7.73E-02	kg	8.04E-02	kg
Food Ingestion Rate = If	1.25E-02	kg/day	1.19E-02	kg/day
Soil Ingestion Rate - Is	2.046E-03	kg/day	7.601E-04	kg/day
Home Range = HR	Assume 100% on site		6.095E-01	acres
Short-Tailed Shrew				
Body Weight = BW	1.500E-02	kg	1.610E-02	kg
Food Ingestion Rate = If	1.600E-03	kg/day	1.433E-03	kg/day
Soil Ingestion Rate - Is	4.801E-05	kg/day	1.289E-05	kg/day
Home Range = HR	Assume 100% on site		9.699E-01	acres

Notes:

The soil/sediment ingestion rates were calculated by multiplying the food ingestion rates by the following incidental soil/sediment ingestion rates:

Species	Conservative	Average	Source
Bobwhite quail	13.90%	6.10%	1, 2
Meadow Vole	3.20%	1.20%	1
American Robin	16.40%	6.40%	1,3
Short-tailed Shrew	3%	0.90%	1

1 - USEPA (U.S. Environmental Protection Agency), 2007. Attachment 4-1. Ecological Soil Screening Level Guidance, Office of Emergency and Remedial Response. February.

2 - Based on the mourning dove.

3 - Based on the American woodcock

DRY WEIGHT DERIVATION OF BODY WEIGHT, FOOD INTAKE, AND WATER INTAKE FACTORS FOR TERRESTRIAL FOOD CHAIN MODELS

Data from EPA (1993)				Derivation of Factors for Modeling		
Species/Factor	**Age/Sex/ Cond./Seas.**	**Value**	**Study Average**	**Calculation of Values**		**Notes**
American Robin						
Body Weight (g)	A B	77.3	77.3	Minimum Value	0.0773 kg	
				Maximum Value	0.0862 kg	
	A M nonbreeding	86.2		Overall Study Average	0.0804 kg	
	A F nonbreeding	83.6	84.9			
	A M breeding	77.4				
	A F breeding	80.6	79			
Food Ingestion Rate (g/g-day)	B B free-living	0.89		*For Eating Mostly Fruit*		
				Conservative value:	0.0281 kg/day	Maximum ingestion rate * Average Body weight * 0.23[1]
	- B free-living	1.52				
				Average value	0.0223 kg/day	Average ingestion rate * Average Body weight * 0.23[1]
						[1] - 0.23 = percent solids in fruit to convert to a dry weight ingestion rate
	Overall Study Average		1.21			
				Based on Metabolic Scaling		
					0.01247 kg/day	Used maximum body weight in below equation
					0.01188 kg/day	Used average body weight in below equation
						Food ingestion rates were calculated from Nagy et al., (1999) for insectivores as follows: $FI = (9.7*BW(g)^{0.705})/18kJ/g/1000$
Short-Tailed Shrew						
Body Weight (g)	A B	15	15	Minimum Value	0.0150 kg	
				Maximum Value	0.01921 kg	
	M summer	19.21	17.27	Overall Study Average	0.01613 kg	
	F summer	17.4				
	M fall	16.87				
	M fall	15.58				
Food Ingestion Rate (g/g-day)	A B	0.49		Conservative value:	0.0016 kg/day	Maximum ingestion rate * Average Body weight * 0.16[1]
	A B	0.62		Average value	0.00143 kg/day	Average ingestion rate * Average Body weight * 0.16[1]
	Overall Study Average		0.555			[1] - 0.16 = percent solids in earthworms to convert to a dry weight ingestion rate

DRY WEIGHT DERIVATION OF BODY WEIGHT, FOOD INTAKE, AND WATER INTAKE FACTORS FOR TERRESTRIAL FOOD CHAIN MODELS

Data from EPA (1993)				Derivation of Factors for Modeling		
Species/Factor	**Age/Sex/ Cond./Seas.**	**Value**	**Study Average**	**Calculation of Values**		**Notes**
Meadow Vole						
Body Weight (g)	A M summer	40	36.7	Minimum Value	0.017 kg	
	A F summer	33.4		Maximum Value	0.052 kg	
				Overall Study Average	0.0358 kg	
	A M spring	52.4	48.0			
	A F spring	43.5				
	A B spring	26	21.2			
	A B summer	24.3				
	A B fall	17				
	A B winter	17.5				
	A M	35.5	37.3			
	A F	39				
Food Ingestion Rate (g/g-day)		0.3	0.33	Conservative value:	0.001878 kg/day	Maximum ingestion rate * Average Body weight * 0.15 [(1)]
		0.35				
				Average value	0.001744 kg/day	Average ingestion rate * Average Body weight * 0.15[(1)]
						[(1)] - 0.15 = percent solids in plant foilage to convert to a dry weight ingestion rate
Northern Bobwhite Quail						
Body Weight (g)	A B fall	189.9	191	Minimum Value	0.154 kg	
	A B winter	193.9		Maximum Value	0.194 kg	
	A B spring	190		Overall Study Average	0.1751 kg	
	A M winter	181	177			
	A M summer	163				
	A F winter	183				
	A F summer	180				
	A M winter	161	157			
	A M summer	154				
	A F winter	157				
	A F summer	157				
Food Ingestion Rate (g/g-day)	A B winter	0.093	0.078	Conservative value:	0.01628 kg/day	Maximum ingestion rate * Average Body weight
	A B spring	0.067				
	A B summer	0.079		Average value	0.01361 kg/day	Average ingestion rate * Average Body weight
	A B fall	0.072				
						Dry weight to wet weight conversion factor not needed because food items on a dry weight basis in the wildlife exposure factors handbook.

Notes:
A = Adult
F = Female, M = Male, B = Both
BW = Body Weight

BIOACCUMULATION FACTORS

BIOACCUMULATION FACTORS

Chemical	Plant Bioaccumulation Factors			Earthworm Bioaccumulation Factors		
	Conservative	Average	Source	Conservative	Average	Source
Semivolatiles						
ACENAPHTHENE	EXP(-0.8556*LN(C)-5.562)		USEPA, 2007	1.47		USEPA, 2007
ANTHRACENE	EXP(0.7784*LN(C)-0.9887)		USEPA, 2007	2.42		USEPA, 2007
BENZO(A)ANTHRACENE	EXP(0.5944*LN(C)-2.7078)		USEPA, 2007	1.59		USEPA, 2007
BENZO(A)PYRENE	EXP(0.975*LN(C)-2.0615)		USEPA, 2007	1.33		USEPA, 2007
BENZO(B)FLUORANTHENE	0.31		USEPA, 2007	2.6		USEPA, 2007
BENZO(G,H,I)PERYLENE	EXP(1.1829*LN(C)-0.9313)		USEPA, 2007	2.94		USEPA, 2007
BENZO(K)FLUORANTHENE	EXP(0.8595*LN(C)-2.1579)		USEPA, 2007	2.6		USEPA, 2007
CHRYSENE	EXP(0.5944*LN(C)-2.7078)		USEPA, 2007	2.29		USEPA, 2007
DIBENZO(A,H)ANTHRACENE	0.13		USEPA, 2007	2.31		USEPA, 2007
FLUORANTHENE	0.5		USEPA, 2007	3.04		USEPA, 2007
FLUORENE	EXP(-0.8556*LN(C)-5.562)		USEPA, 2007	9.57		USEPA, 2007
INDENO(1,2,3-CD)PYRENE	0.11		USEPA, 2007	2.86		USEPA, 2007
PYRENE	0.72		USEPA, 2007	1.75		USEPA, 2007
Metals						
LEAD	EXP(0.561*LN(C)-1.328)		USEPA, 2007	EXP(0.807*LN(C)-0.218)		USEPA, 2007

Notes:

Regresssion equations are used for determining the BAF when available.

Sources:

USEPA, 2007. Guidance for Developing Ecological Soil Screening Level, Attachment 4-1, Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. Office of Solid Waste and Emergency and Response. OSWER Directive 9285.7-55. April.

FOOD CHAIN MODEL

CHEMICAL CONCENTRATIONS IN SURFACE SOIL AND TISSUE

Chemical	Soil Concentrations (mg/kg)				Earthworm Bioaccumulation Factors		Earthworm Concentrations (mg/kg)		Plant Bioaccumulation Factors		Plant Concentrations (mg/kg)	
	Maximum Detection	Average All	Average of Positive Detections	Average [1]	Conservative	Average	Maximum Detection	Average	Conservative	Average	Maximum Detection	Average
Northern Range Area												
Lead												
Lead - Surface Soil	2.22E+04	1.11E+03	1.11E+03	1.11E+03	Regression equation from Eco SSL		2.59E+03	2.30E+02	Regression equation from Eco SSL		7.27E+01	1.35E+01
Lead - Subsurface Soil	8.46E+02	1.70E+02	1.70E+02	1.70E+02	Regression equation from Eco SSL		1.85E+02	5.06E+01	Regression equation from Eco SSL		1.16E+01	4.72E+00
Polycyclic Aromatic Hydrocarbons - Surface Soil												
Benzo(a)pyrene	1.30E-02	1.85E-02	1.06E-02	1.06E-02	1.33	1.33	1.73E-02	1.41E-02	Regression equation from Eco SSL		1.84E-03	1.51E-03
Benzo(b)fluoranthene	2.20E-02	2.17E-02	1.46E-02	2.17E-02	2.6	2.6	5.72E-02	5.64E-02	0.31	0.31	6.82E-03	6.73E-03
Benzo(g,h,i)perylene	1.10E-02	1.67E-02	8.40E-03	8.40E-03	2.94	2.94	3.23E-02	2.47E-02	Regression equation from Eco SSL		1.90E-03	1.38E-03
Benzo(k)fluoranthene	1.10E-02	1.62E-02	7.75E-03	7.75E-03	2.6	2.6	2.86E-02	2.02E-02	Regression equation from Eco SSL		2.40E-03	1.77E-03
Chrysene	1.80E-02	1.19E-02	1.19E-02	1.19E-02	2.29	2.29	4.12E-02	2.73E-02	Regression equation from Eco SSL		6.12E-03	4.80E-03
Dibenzo(a,h)anthracene	9.40E-03	1.84E-02	9.40E-03	9.40E-03	2.31	2.31	2.17E-02	2.17E-02	0.13	0.13	1.22E-03	1.22E-03
Fluoranthene	2.50E-02	1.43E-02	1.43E-02	1.43E-02	3.04	3.04	7.60E-02	4.34E-02	0.5	0.5	1.25E-02	7.14E-03
Indeno(1,2,3-cd)pyrene	1.10E-02	1.73E-02	9.18E-03	9.18E-03	2.86	2.86	3.15E-02	2.62E-02	0.11	0.11	1.21E-03	1.01E-03
Southern Range Area												
Lead												
Lead - Surface Soil	1.14E+03	1.90E+02	1.90E+02	1.90E+02	Regression equation from Eco SSL		2.36E+02	5.56E+01	Regression equation from Eco SSL		1.37E+01	5.03E+00
Lead - Subsurface Soil	7.28E+02	8.42E+01	8.42E+01	8.42E+01	Regression equation from Eco SSL		1.64E+02	2.88E+01	Regression equation from Eco SSL		1.07E+01	3.19E+00
Polycyclic Aromatic Hydrocarbons - Surface Soil												
Acenaphthene	6.70E-01	7.07E-02	1.18E-01	7.07E-02	1.47	1.47	9.85E-01	1.04E-01	Regression equation from Eco SSL		5.41E-03	3.70E-02
Anthracene	2.80E+00	3.34E-01	5.50E-01	3.34E-01	2.42	2.42	6.78E+00	8.09E-01	Regression equation from Eco SSL		8.29E-01	1.59E-01
Benzo(a)anthracene	6.00E+01	4.27E+00	4.27E+00	4.27E+00	1.59	1.59	9.54E+01	6.78E+00	Regression equation from Eco SSL		7.60E-01	1.58E-01
Benzo(a)pyrene	4.90E+01	4.17E+00	4.23E+00	4.17E+00	1.33	1.33	6.52E+01	5.55E+00	Regression equation from Eco SSL		5.66E+00	5.12E-01
Benzo(b)fluoranthene	7.20E+01	5.65E+00	5.90E+00	5.65E+00	2.6	2.6	1.87E+02	1.47E+01	0.31	0.31	2.23E+01	1.75E+00
Benzo(g,h,i)perylene	2.40E+01	2.09E+00	2.35E+00	2.09E+00	2.94	2.94	7.06E+01	6.14E+00	Regression equation from Eco SSL		1.69E+01	9.42E-01
Benzo(k)fluoranthene	2.30E+01	2.32E+00	2.50E+00	2.32E+00	2.6	2.6	5.98E+01	6.04E+00	Regression equation from Eco SSL		1.71E+00	2.38E-01
Chrysene	6.10E+01	4.43E+00	4.77E+00	4.43E+00	2.29	2.29	1.40E+02	1.02E+01	Regression equation from Eco SSL		7.68E-01	1.62E-01
Dibenzo(a,h)anthracene	1.20E+01	1.22E+00	1.52E+00	1.22E+00	2.31	2.31	2.77E+01	2.81E+00	0.13	0.13	1.56E+00	1.58E-01
Fluoranthene	3.60E+01	3.82E+00	3.82E+00	3.82E+00	3.04	3.04	1.09E+02	1.16E+01	0.5	0.5	1.80E+01	1.91E+00
Fluorene	3.80E-01	4.03E-02	7.04E-02	4.03E-02	9.57	9.57	3.64E+00	3.85E-01	Regression equation from Eco SSL		8.79E-03	6.00E-02
Indeno(1,2,3-cd)pyrene	3.80E+01	3.36E+00	3.67E+00	3.36E+00	2.86	2.86	1.09E+02	9.61E+00	0.11	0.11	4.18E+00	3.70E-01
Pyrene	3.00E+01	2.93E+00	4.24E+00	2.93E+00	1.75	1.75	5.25E+01	5.12E+00	0.72	0.72	2.16E+01	2.11E+00
Polycyclic Aromatic Hydrocarbons - Subsurface Soil												
Benzo(a)anthracene	1.60E+01	1.23E+00	1.23E+00	1.23E+00	1.59	1.59	2.54E+01	1.96E+00	Regression equation from Eco SSL		3.47E-01	7.55E-02
Benzo(a)pyrene	1.40E+01	1.13E+00	1.13E+00	1.13E+00	1.33	1.33	1.86E+01	1.50E+00	Regression equation from Eco SSL		1.67E+00	1.43E-01
Benzo(b)fluoranthene	2.00E+01	1.60E+00	1.60E+00	1.60E+00	2.6	2.6	5.20E+01	4.15E+00	0.31	0.31	6.20E+00	4.95E-01
Benzo(k)fluoranthene	5.50E+00	4.74E-01	5.06E-01	4.74E-01	2.6	2.6	1.43E+01	1.23E+00	Regression equation from Eco SSL		5.00E-01	6.09E-02
Chrysene	1.60E+01	1.28E+00	1.36E+00	1.28E+00	2.29	2.29	3.66E+01	2.93E+00	Regression equation from Eco SSL		3.47E-01	7.72E-02
Dibenzo(a,h)anthracene	3.00E+00	2.56E-01	2.73E-01	2.56E-01	2.31	2.31	6.93E+00	5.92E-01	0.13	0.13	3.90E-01	3.33E-02
Indeno(1,2,3-cd)pyrene	9.30E+00	8.19E-01	8.19E-01	8.19E-01	2.86	2.86	2.66E+01	2.34E+00	0.11	0.11	1.02E+00	9.01E-02
High Tower Range Area												
Lead												
Lead - Surface Soil	5.08E+02	1.17E+02	1.17E+02	1.17E+02	Regression equation from Eco SSL		1.23E+02	3.75E+01	Regression equation from Eco SSL		8.73E+00	3.83E+00
Lead - Subsurface Soil	1.76E+02	4.01E+01	4.01E+01	4.01E+01	Regression equation from Eco SSL		5.22E+01	1.58E+01	Regression equation from Eco SSL		4.82E+00	2.10E+00
Polycyclic Aromatic Hydrocarbons - Surface Soil												
Anthracene	3.60E-03	3.60E-03	3.60E-03	3.60E-03	2.42	2.42	8.71E-03	8.71E-03	Regression equation from Eco SSL		4.66E-03	4.66E-03
Benzo(a)pyrene	2.00E-02	2.00E-02	2.00E-02	2.00E-02	1.33	1.33	2.66E-02	2.66E-02	Regression equation from Eco SSL		2.81E-03	2.81E-03
Benzo(b)fluoranthene	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.6	2.6	5.20E-02	5.20E-02	0.31	0.31	6.20E-03	6.20E-03
Benzo(g,h,i)perylene	1.40E-02	1.40E-02	1.40E-02	1.40E-02	2.94	2.94	4.12E-02	4.12E-02	Regression equation from Eco SSL		2.53E-03	2.53E-03
Benzo(k)fluoranthene	1.30E-02	1.30E-02	1.30E-02	1.30E-02	2.6	2.6	3.38E-02	3.38E-02	Regression equation from Eco SSL		2.77E-03	2.77E-03
Chrysene	2.00E-02	2.00E-02	2.00E-02	2.00E-02	2.29	2.29	4.58E-02	4.58E-02	Regression equation from Eco SSL		6.52E-03	6.52E-03
Fluoranthene	3.10E-02	3.10E-02	3.10E-02	3.10E-02	3.04	3.04	9.42E-02	9.42E-02	0.5	0.5	1.55E-02	1.55E-02
Indeno(1,2,3-cd)pyrene	1.60E-02	1.60E-02	1.60E-02	1.60E-02	2.86	2.86	4.58E-02	4.58E-02	0.11	0.11	1.76E-03	1.76E-03

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Max Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	(mg/kg/d) from: Soil	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	LOAEL
Northern Range Area									
Lead									
Lead - Surface Soil	2.22E+04	7.27E+01	7.85E+01	8.03E+00	8.65E+01	4.70E+00	1.86E+02	1.8E+01	4.6E-01
Lead - Subsurface Soil	8.46E+02	1.16E+01	2.99E+00	1.28E+00	4.28E+00	4.70E+00	1.86E+02	9.1E-01	2.3E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.30E-02	1.84E-03	4.60E-05	2.04E-04	2.50E-04	4.70E+00	1.86E+02	5.3E-05	1.3E-06
Benzo(b)fluoranthene	2.20E-02	6.82E-03	7.78E-05	7.53E-04	8.31E-04	4.70E+00	1.86E+02	1.8E-04	4.5E-06
Benzo(g,h,i)perylene	1.10E-02	1.90E-03	3.89E-05	2.10E-04	2.49E-04	6.15E-01	3.84E+01	4.0E-04	6.5E-06
Benzo(k)fluoranthene	1.10E-02	2.40E-03	3.89E-05	2.65E-04	3.04E-04	6.15E-01	3.84E+01	4.9E-04	7.9E-06
Chrysene	1.80E-02	6.12E-03	6.36E-05	6.76E-04	7.40E-04	6.15E-01	3.84E+01	1.2E-03	1.9E-05
Dibenzo(a,h)anthracene	9.40E-03	1.22E-03	3.32E-05	1.35E-04	1.68E-04	6.15E-01	3.84E+01	2.7E-04	4.4E-06
Fluoranthene	2.50E-02	1.25E-02	8.84E-05	1.38E-03	1.47E-03	6.56E+01	3.56E+02	2.2E-05	4.1E-06
Indeno(1,2,3-cd)pyrene	1.10E-02	1.21E-03	3.89E-05	1.34E-04	1.73E-04	6.15E-01	3.84E+01	2.8E-04	4.5E-06
Southern Range Area									
Lead									
Lead - Surface Soil	1.14E+03	1.37E+01	4.03E+00	1.52E+00	5.55E+00	4.70E+00	1.86E+02	1.2E+00	3.0E-02
Lead - Subsurface Soil	7.28E+02	1.07E+01	2.57E+00	1.18E+00	3.75E+00	4.70E+00	1.86E+02	8.0E-01	2.0E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	6.70E-01	5.41E-03	2.37E-03	5.98E-04	2.97E-03	4.70E+00	1.86E+02	6.3E-04	1.6E-05
Anthracene	2.80E+00	8.29E-01	9.90E-03	9.16E-02	1.02E-01	6.56E+01	3.56E+02	1.5E-03	2.9E-04
Benzo(a)anthracene	6.00E+01	7.60E-01	2.12E-01	8.40E-02	2.96E-01	6.15E-01	3.84E+01	4.8E-01	7.7E-03
Benzo(a)pyrene	4.90E+01	5.66E+00	1.73E-01	6.25E-01	7.98E-01	6.15E-01	3.84E+01	1.3E+00	2.1E-02
Benzo(b)fluoranthene	7.20E+01	2.23E+01	2.55E-01	2.47E+00	2.72E+00	6.15E-01	3.84E+01	4.4E+00	7.1E-02
Benzo(g,h,i)perylene	2.40E+01	1.69E+01	8.48E-02	1.87E+00	1.95E+00	6.15E-01	3.84E+01	3.2E+00	5.1E-02
Benzo(k)fluoranthene	2.30E+01	1.71E+00	8.13E-02	1.89E-01	2.70E-01	6.15E-01	3.84E+01	4.4E-01	7.0E-03
Chrysene	6.10E+01	7.68E-01	2.16E-01	8.48E-02	3.00E-01	6.15E-01	3.84E+01	4.9E-01	7.8E-03
Dibenzo(a,h)anthracene	1.20E+01	1.56E+00	4.24E-02	1.72E-01	2.15E-01	6.15E-01	3.84E+01	3.5E-01	5.6E-03
Fluoranthene	3.60E+01	1.80E+01	1.27E-01	1.99E+00	2.12E+00	6.56E+01	3.56E+02	3.2E-02	5.9E-03
Fluorene	3.80E-01	8.79E-03	1.34E-03	9.71E-04	2.31E-03	6.56E+01	3.56E+02	3.5E-05	6.5E-06
Indeno(1,2,3-cd)pyrene	3.80E+01	4.18E+00	1.34E-01	4.62E-01	5.96E-01	6.15E-01	3.84E+01	9.7E-01	1.6E-02
Pyrene	3.00E+01	2.16E+01	1.06E-01	2.39E+00	2.49E+00	6.15E-01	3.84E+01	4.1E+00	6.5E-02
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.60E+01	3.47E-01	5.66E-02	3.83E-02	9.49E-02	6.15E-01	3.84E+01	1.5E-01	2.5E-03
Benzo(a)pyrene	1.40E+01	1.67E+00	4.95E-02	1.84E-01	2.34E-01	6.15E-01	3.84E+01	3.8E-01	6.1E-03
Benzo(b)fluoranthene	2.00E+01	6.20E+00	7.07E-02	6.85E-01	7.56E-01	6.15E-01	3.84E+01	1.2E+00	2.0E-02
Benzo(k)fluoranthene	5.50E+00	5.00E-01	1.94E-02	5.53E-02	7.47E-02	6.15E-01	3.84E+01	1.2E-01	1.9E-03
Chrysene	1.60E+01	3.47E-01	5.66E-02	3.83E-02	9.49E-02	6.15E-01	3.84E+01	1.5E-01	2.5E-03
Dibenzo(a,h)anthracene	3.00E+00	3.90E-01	1.06E-02	4.31E-02	5.37E-02	6.15E-01	3.84E+01	8.7E-02	1.4E-03
Indeno(1,2,3-cd)pyrene	9.30E+00	1.02E+00	3.29E-02	1.13E-01	1.46E-01	6.15E-01	3.84E+01	2.4E-01	3.8E-03
High Tower Range Area									
Lead									
Lead - Surface Soil	5.08E+02	8.73E+00	1.80E+00	9.65E-01	2.76E+00	4.70E+00	1.86E+02	5.9E-01	1.5E-02
Lead - Subsurface Soil	1.76E+02	4.82E+00	6.22E-01	5.32E-01	1.15E+00	4.70E+00	1.86E+02	2.5E-01	6.2E-03
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	4.66E-03	1.27E-05	5.15E-04	5.28E-04	6.56E+01	3.56E+02	8.0E-06	1.5E-06
Benzo(a)pyrene	2.00E-02	2.81E-03	7.07E-05	3.10E-04	3.81E-04	6.15E-01	3.84E+01	6.2E-04	9.9E-06
Benzo(b)fluoranthene	2.00E-02	6.20E-03	7.07E-05	6.85E-04	7.56E-04	6.15E-01	3.84E+01	1.2E-03	2.0E-05
Benzo(g,h,i)perylene	1.40E-02	2.53E-03	4.95E-05	2.79E-04	3.29E-04	6.15E-01	3.84E+01	5.3E-04	8.6E-06
Benzo(k)fluoranthene	1.30E-02	2.77E-03	4.60E-05	3.06E-04	3.51E-04	6.15E-01	3.84E+01	5.7E-04	9.2E-06
Chrysene	2.00E-02	6.52E-03	7.07E-05	7.20E-04	7.91E-04	6.15E-01	3.84E+01	1.3E-03	2.1E-05
Fluoranthene	3.10E-02	1.55E-02	1.10E-04	1.71E-03	1.82E-03	6.56E+01	3.56E+02	2.8E-05	5.1E-06
Indeno(1,2,3-cd)pyrene	1.60E-02	1.76E-03	5.66E-05	1.94E-04	2.51E-04	6.15E-01	3.84E+01	4.1E-04	6.5E-06

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.70E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.88E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Soil Ingestion Rate = (Is)	6.01E-05	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (vegetation)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Avg Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	e (mg/kg/d) from: Soil	Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	zard Quotients NOAEL	LOAEL
Northern Range Area									
Lead									
Lead - Surface Soil	1.11E+03	1.35E+01	6.47E-01	6.59E-01	1.31E+00	4.70E+00	1.86E+02	2.8E-01	7.0E-03
Lead - Subsurface Soil	1.70E+02	4.72E+00	9.91E-02	2.30E-01	3.29E-01	4.70E+00	1.86E+02	7.0E-02	1.8E-03
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.06E-02	1.51E-03	6.20E-06	7.36E-05	7.98E-05	4.70E+00	1.86E+02	1.7E-05	4.3E-07
Benzo(b)fluoranthene	2.17E-02	6.73E-03	1.27E-05	3.28E-04	3.40E-04	4.70E+00	1.86E+02	7.2E-05	1.8E-06
Benzo(g,h,i)perylene	8.40E-03	1.38E-03	4.91E-06	6.73E-05	7.22E-05	6.15E-01	3.84E+01	1.2E-04	1.9E-06
Benzo(k)fluoranthene	7.75E-03	1.77E-03	4.53E-06	8.64E-05	9.09E-05	6.15E-01	3.84E+01	1.5E-04	2.4E-06
Chrysene	1.19E-02	4.80E-03	6.98E-06	2.34E-04	2.41E-04	6.15E-01	3.84E+01	3.9E-04	6.3E-06
Dibenzo(a,h)anthracene	9.40E-03	1.22E-03	5.50E-06	5.95E-05	6.50E-05	6.15E-01	3.84E+01	1.1E-04	1.7E-06
Fluoranthene	1.43E-02	7.14E-03	8.35E-06	3.48E-04	3.56E-04	6.56E+01	3.56E+02	5.4E-06	1.0E-06
Indeno(1,2,3-cd)pyrene	9.18E-03	1.01E-03	5.36E-06	4.92E-05	5.45E-05	6.15E-01	3.84E+01	8.9E-05	1.4E-06
Southern Range Area									
Lead									
Lead - Surface Soil	1.90E+02	5.03E+00	1.11E-01	2.45E-01	3.57E-01	4.70E+00	1.86E+02	7.6E-02	1.9E-03
Lead - Subsurface Soil	8.42E+01	3.19E+00	4.92E-02	1.55E-01	2.04E-01	4.70E+00	1.86E+02	4.4E-02	1.1E-03
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	7.07E-02	3.70E-02	4.14E-05	1.80E-03	1.85E-03	6.56E+01	3.56E+02	2.8E-05	5.2E-06
Anthracene	3.34E-01	1.59E-01	1.95E-04	7.72E-03	7.92E-03	6.56E+01	3.56E+02	1.2E-04	2.2E-05
Benzo(a)anthracene	4.27E+00	1.58E-01	2.49E-03	7.70E-03	1.02E-02	6.15E-01	3.84E+01	1.7E-02	2.7E-04
Benzo(a)pyrene	4.17E+00	5.12E-01	2.44E-03	2.50E-02	2.74E-02	6.15E-01	3.84E+01	4.5E-02	7.1E-04
Benzo(b)fluoranthene	5.65E+00	1.75E+00	3.30E-03	8.54E-02	8.87E-02	6.15E-01	3.84E+01	1.4E-01	2.3E-03
Benzo(g,h,i)perylene	2.09E+00	9.42E-01	1.22E-03	4.59E-02	4.71E-02	6.15E-01	3.84E+01	7.7E-02	1.2E-03
Benzo(k)fluoranthene	2.32E+00	2.38E-01	1.36E-03	1.16E-02	1.30E-02	6.15E-01	3.84E+01	2.1E-02	3.4E-04
Chrysene	4.43E+00	1.62E-01	2.59E-03	7.87E-03	1.05E-02	6.15E-01	3.84E+01	1.7E-02	2.7E-04
Dibenzo(a,h)anthracene	1.22E+00	1.58E-01	7.12E-04	7.71E-03	8.43E-03	6.15E-01	3.84E+01	1.4E-02	2.2E-04
Fluoranthene	3.82E+00	1.91E+00	2.23E-03	9.30E-02	9.53E-02	6.56E+01	3.56E+02	1.5E-03	2.7E-04
Fluorene	4.03E-02	6.00E-02	2.35E-05	2.92E-03	2.95E-03	6.56E+01	3.56E+02	4.5E-05	8.3E-06
Indeno(1,2,3-cd)pyrene	3.36E+00	3.70E-01	1.96E-03	1.80E-02	2.00E-02	6.15E-01	3.84E+01	3.2E-02	5.2E-04
Pyrene	2.93E+00	2.11E+00	1.71E-03	1.03E-01	1.04E-01	6.15E-01	3.84E+01	1.7E-01	2.7E-03
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.23E+00	7.55E-02	7.21E-04	3.68E-03	4.40E-03	6.15E-01	3.84E+01	7.2E-03	1.1E-04
Benzo(a)pyrene	1.13E+00	1.43E-01	6.61E-04	6.99E-03	7.65E-03	6.15E-01	3.84E+01	1.2E-02	2.0E-04
Benzo(b)fluoranthene	1.60E+00	4.95E-01	9.34E-04	2.41E-02	2.51E-02	6.15E-01	3.84E+01	4.1E-02	6.5E-04
Benzo(k)fluoranthene	4.74E-01	6.09E-02	2.77E-04	2.97E-03	3.24E-03	6.15E-01	3.84E+01	5.3E-03	8.4E-05
Chrysene	1.28E+00	7.72E-02	7.47E-04	3.76E-03	4.51E-03	6.15E-01	3.84E+01	7.3E-03	1.2E-04
Dibenzo(a,h)anthracene	2.56E-01	3.33E-02	1.50E-04	1.62E-03	1.77E-03	6.15E-01	3.84E+01	2.9E-03	4.6E-05
Indeno(1,2,3-cd)pyrene	8.19E-01	9.01E-02	4.79E-04	4.39E-03	4.87E-03	6.15E-01	3.84E+01	7.9E-03	1.3E-04
High Tower Range Area									
Lead									
Lead - Surface Soil	1.17E+02	3.83E+00	6.83E-02	1.86E-01	2.55E-01	4.70E+00	1.86E+02	5.4E-02	1.4E-03
Lead - Subsurface Soil	4.01E+01	2.10E+00	2.34E-02	1.02E-01	1.26E-01	4.70E+00	1.86E+02	2.7E-02	6.7E-04
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	4.66E-03	2.10E-06	2.27E-04	2.29E-04	6.56E+01	3.56E+02	3.5E-06	6.4E-07
Benzo(a)pyrene	2.00E-02	2.81E-03	1.17E-05	1.37E-04	1.48E-04	6.15E-01	3.84E+01	2.4E-04	3.9E-06
Benzo(b)fluoranthene	2.00E-02	6.20E-03	1.17E-05	3.02E-04	3.14E-04	6.15E-01	3.84E+01	5.1E-04	8.2E-06
Benzo(g,h,i)perylene	1.40E-02	2.53E-03	8.18E-06	1.23E-04	1.31E-04	6.15E-01	3.84E+01	2.1E-04	3.4E-06
Benzo(k)fluoranthene	1.30E-02	2.77E-03	7.60E-06	1.35E-04	1.42E-04	6.15E-01	3.84E+01	2.3E-04	3.7E-06
Chrysene	2.00E-02	6.52E-03	1.17E-05	3.18E-04	3.29E-04	6.15E-01	3.84E+01	5.4E-04	8.6E-06
Fluoranthene	3.10E-02	1.55E-02	1.81E-05	7.55E-04	7.73E-04	6.56E+01	3.56E+02	1.2E-05	2.2E-06
Indeno(1,2,3-cd)pyrene	1.60E-02	1.76E-03	9.35E-06	8.57E-05	9.51E-05	6.15E-01	3.84E+01	1.5E-04	2.5E-06

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	3.58E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.74E-03	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Soil Ingestion Rate = (Is)	2.09E-05	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	6.59E-02	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (vegetation)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Max Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
Northern Range Area									
Lead									
Lead - Surface Soil	2.22E+04	7.27E+01	3.26E+02	7.69E+00	3.34E+02	1.63E+00	4.46E+01	2.0E+02	7.5E+00
Lead - Subsurface Soil	8.46E+02	1.16E+01	1.24E+01	1.23E+00	1.37E+01	1.63E+00	4.46E+01	8.4E+00	3.1E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.30E-02	1.84E-03	1.91E-04	1.95E-04	3.86E-04	2.00E+00	2.00E+01	1.9E-04	1.9E-05
Benzo(b)fluoranthene	2.20E-02	6.82E-03	3.23E-04	7.21E-04	1.04E-03	2.00E+00	2.00E+01	5.2E-04	5.2E-05
Benzo(g,h,i)perylene	1.10E-02	1.90E-03	1.62E-04	2.01E-04	3.63E-04	2.00E+00	2.00E+01	1.8E-04	1.8E-05
Benzo(k)fluoranthene	1.10E-02	2.40E-03	1.62E-04	2.53E-04	4.15E-04	2.00E+00	2.00E+01	2.1E-04	2.1E-05
Chrysene	1.80E-02	6.12E-03	2.65E-04	6.47E-04	9.12E-04	2.00E+00	2.00E+01	4.6E-04	4.6E-05
Dibenzo(a,h)anthracene	9.40E-03	1.22E-03	1.38E-04	1.29E-04	2.67E-04	2.00E+00	2.00E+01	1.3E-04	1.3E-05
Fluoranthene	2.50E-02	1.25E-02	3.67E-04	1.32E-03	1.69E-03	2.00E+00	2.00E+01	8.4E-04	8.4E-05
Indeno(1,2,3-cd)pyrene	1.10E-02	1.21E-03	1.62E-04	1.28E-04	2.90E-04	2.00E+00	2.00E+01	1.4E-04	1.4E-05
Southern Range Area									
Lead									
Lead - Surface Soil	1.14E+03	1.37E+01	1.68E+01	1.45E+00	1.82E+01	1.63E+00	4.46E+01	1.1E+01	4.1E-01
Lead - Subsurface Soil	7.28E+02	1.07E+01	1.07E+01	1.13E+00	1.18E+01	1.63E+00	4.46E+01	7.3E+00	2.7E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	6.70E-01	5.41E-03	9.85E-03	5.72E-04	1.04E-02	2.00E+00	2.00E+01	5.2E-03	5.2E-04
Anthracene	2.80E+00	8.29E-01	4.12E-02	8.77E-02	1.29E-01	2.00E+00	2.00E+01	6.4E-02	6.4E-03
Benzo(a)anthracene	6.00E+01	7.60E-01	8.82E-01	8.04E-02	9.62E-01	2.00E+00	2.00E+01	4.8E-01	4.8E-02
Benzo(a)pyrene	4.90E+01	5.66E+00	7.20E-01	5.98E-01	1.32E+00	2.00E+00	2.00E+01	6.6E-01	6.6E-02
Benzo(b)fluoranthene	7.20E+01	2.23E+01	1.06E+00	2.36E+00	3.42E+00	2.00E+00	2.00E+01	1.7E+00	1.7E-01
Benzo(g,h,i)perylene	2.40E+01	1.69E+01	3.53E-01	1.79E+00	2.14E+00	2.00E+00	2.00E+01	1.1E+00	1.1E-01
Benzo(k)fluoranthene	2.30E+01	1.71E+00	3.38E-01	1.81E-01	5.19E-01	2.00E+00	2.00E+01	2.6E-01	2.6E-02
Chrysene	6.10E+01	7.68E-01	8.97E-01	8.12E-02	9.78E-01	2.00E+00	2.00E+01	4.9E-01	4.9E-02
Dibenzo(a,h)anthracene	1.20E+01	1.56E+00	1.76E-01	1.65E-01	3.41E-01	2.00E+00	2.00E+01	1.7E-01	1.7E-02
Fluoranthene	3.60E+01	1.80E+01	5.29E-01	1.90E+00	2.43E+00	2.00E+00	2.00E+01	1.2E+00	1.2E-01
Fluorene	3.80E-01	8.79E-03	5.58E-03	9.29E-04	6.51E-03	2.00E+00	2.00E+01	3.3E-03	3.3E-04
Indeno(1,2,3-cd)pyrene	3.80E+01	4.18E+00	5.58E-01	4.42E-01	1.00E+00	2.00E+00	2.00E+01	5.0E-01	5.0E-02
Pyrene	3.00E+01	2.16E+01	4.41E-01	2.28E+00	2.72E+00	2.00E+00	2.00E+01	1.4E+00	1.4E-01
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.60E+01	3.47E-01	2.35E-01	3.66E-02	2.72E-01	2.00E+00	2.00E+01	1.4E-01	1.4E-02
Benzo(a)pyrene	1.40E+01	1.67E+00	2.06E-01	1.76E-01	3.82E-01	2.00E+00	2.00E+01	1.9E-01	1.9E-02
Benzo(b)fluoranthene	2.00E+01	6.20E+00	2.94E-01	6.56E-01	9.50E-01	2.00E+00	2.00E+01	4.7E-01	4.7E-02
Benzo(k)fluoranthene	5.50E+00	5.00E-01	8.08E-02	5.29E-02	1.34E-01	2.00E+00	2.00E+01	6.7E-02	6.7E-03
Chrysene	1.60E+01	3.47E-01	2.35E-01	3.66E-02	2.72E-01	2.00E+00	2.00E+01	1.4E-01	1.4E-02
Dibenzo(a,h)anthracene	3.00E+00	3.90E-01	4.41E-02	4.12E-02	8.53E-02	2.00E+00	2.00E+01	4.3E-02	4.3E-03
Indeno(1,2,3-cd)pyrene	9.30E+00	1.02E+00	1.37E-01	1.08E-01	2.45E-01	2.00E+00	2.00E+01	1.2E-01	1.2E-02
High Tower Range Area									
Lead									
Lead - Surface Soil	5.08E+02	8.73E+00	7.47E+00	9.24E-01	8.39E+00	1.63E+00	4.46E+01	5.1E+00	1.9E-01
Lead - Subsurface Soil	1.76E+02	4.82E+00	2.59E+00	5.10E-01	3.10E+00	1.63E+00	4.46E+01	1.9E+00	6.9E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	4.66E-03	5.29E-05	4.93E-04	5.46E-04	2.00E+00	2.00E+01	2.7E-04	2.7E-05
Benzo(a)pyrene	2.00E-02	2.81E-03	2.94E-04	2.97E-04	5.91E-04	2.00E+00	2.00E+01	3.0E-04	3.0E-05
Benzo(b)fluoranthene	2.00E-02	6.20E-03	2.94E-04	6.56E-04	9.50E-04	2.00E+00	2.00E+01	4.7E-04	4.7E-05
Benzo(g,h,i)perylene	1.40E-02	2.53E-03	2.06E-04	2.67E-04	4.73E-04	2.00E+00	2.00E+01	2.4E-04	2.4E-05
Benzo(k)fluoranthene	1.30E-02	2.77E-03	1.91E-04	2.92E-04	4.83E-04	2.00E+00	2.00E+01	2.4E-04	2.4E-05
Chrysene	2.00E-02	6.52E-03	2.94E-04	6.89E-04	9.83E-04	2.00E+00	2.00E+01	4.9E-04	4.9E-05
Fluoranthene	3.10E-02	1.55E-02	4.56E-04	1.64E-03	2.09E-03	2.00E+00	2.00E+01	1.0E-03	1.0E-04
Indeno(1,2,3-cd)pyrene	1.60E-02	1.76E-03	2.35E-04	1.86E-04	4.21E-04	2.00E+00	2.00E+01	2.1E-04	2.1E-05

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.54E-01	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.63E-02	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Soil Ingestion Rate = (Is)	2.26E-03	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (vegetation)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Avg Soil Conc. (mg/kg)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Veget.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
Lead									
Lead - Surface Soil	1.11E+03	1.35E+01	5.25E+00	1.05E+00	6.30E+00	1.63E+00	4.46E+01	3.9E+00	1.4E-01
Lead - Subsurface Soil	1.70E+02	4.72E+00	8.04E-01	3.67E-01	1.17E+00	1.63E+00	4.46E+01	7.2E-01	2.6E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.06E-02	1.51E-03	5.03E-05	1.18E-04	1.68E-04	2.00E+00	2.00E+01	8.4E-05	8.4E-06
Benzo(b)fluoranthene	2.17E-02	6.73E-03	1.03E-04	5.23E-04	6.26E-04	2.00E+00	2.00E+01	3.1E-04	3.1E-05
Benzo(g,h,i)perylene	8.40E-03	1.38E-03	3.98E-05	1.07E-04	1.47E-04	2.00E+00	2.00E+01	7.4E-05	7.4E-06
Benzo(k)fluoranthene	7.75E-03	1.77E-03	3.68E-05	1.38E-04	1.75E-04	2.00E+00	2.00E+01	8.7E-05	8.7E-06
Chrysene	1.19E-02	4.80E-03	5.66E-05	3.73E-04	4.30E-04	2.00E+00	2.00E+01	2.1E-04	2.1E-05
Dibenzo(a,h)anthracene	9.40E-03	1.22E-03	4.46E-05	9.50E-05	1.40E-04	2.00E+00	2.00E+01	7.0E-05	7.0E-06
Fluoranthene	1.43E-02	7.14E-03	6.77E-05	5.55E-04	6.23E-04	2.00E+00	2.00E+01	3.1E-04	3.1E-05
Indeno(1,2,3-cd)pyrene	9.18E-03	1.01E-03	4.35E-05	7.85E-05	1.22E-04	2.00E+00	2.00E+01	6.1E-05	6.1E-06
Southern Range Area									
Lead									
Lead - Surface Soil	1.90E+02	5.03E+00	9.02E-01	3.91E-01	1.29E+00	1.63E+00	4.46E+01	7.9E-01	2.9E-02
Lead - Subsurface Soil	8.42E+01	3.19E+00	3.99E-01	2.48E-01	6.47E-01	1.63E+00	4.46E+01	4.0E-01	1.5E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	7.07E-02	3.70E-02	3.35E-04	2.88E-03	3.22E-03	2.00E+00	2.00E+01	1.6E-03	1.6E-04
Anthracene	3.34E-01	1.59E-01	1.59E-03	1.23E-02	1.39E-02	2.00E+00	2.00E+01	7.0E-03	7.0E-04
Benzo(a)anthracene	4.27E+00	1.58E-01	2.02E-02	1.23E-02	3.25E-02	2.00E+00	2.00E+01	1.6E-02	1.6E-03
Benzo(a)pyrene	4.17E+00	5.12E-01	1.98E-02	3.98E-02	5.96E-02	2.00E+00	2.00E+01	3.0E-02	3.0E-03
Benzo(b)fluoranthene	5.65E+00	1.75E+00	2.68E-02	1.36E-01	1.63E-01	2.00E+00	2.00E+01	8.2E-02	8.2E-03
Benzo(g,h,i)perylene	2.09E+00	9.42E-01	9.91E-03	7.32E-02	8.32E-02	2.00E+00	2.00E+01	4.2E-02	4.2E-03
Benzo(k)fluoranthene	2.32E+00	2.38E-01	1.10E-02	1.85E-02	2.95E-02	2.00E+00	2.00E+01	1.5E-02	1.5E-03
Chrysene	4.43E+00	1.62E-01	2.10E-02	1.26E-02	3.36E-02	2.00E+00	2.00E+01	1.7E-02	1.7E-03
Dibenzo(a,h)anthracene	1.22E+00	1.58E-01	5.78E-03	1.23E-02	1.81E-02	2.00E+00	2.00E+01	9.0E-03	9.0E-04
Fluoranthene	3.82E+00	1.91E+00	1.81E-02	1.48E-01	1.67E-01	2.00E+00	2.00E+01	8.3E-02	8.3E-03
Fluorene	4.03E-02	6.00E-02	1.91E-04	4.66E-03	4.85E-03	2.00E+00	2.00E+01	2.4E-03	2.4E-04
Indeno(1,2,3-cd)pyrene	3.36E+00	3.70E-01	1.59E-02	2.87E-02	4.47E-02	2.00E+00	2.00E+01	2.2E-02	2.2E-03
Pyrene	2.93E+00	2.11E+00	1.39E-02	1.64E-01	1.78E-01	2.00E+00	2.00E+01	8.9E-02	8.9E-03
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.23E+00	7.55E-02	5.85E-03	5.87E-03	1.17E-02	2.00E+00	2.00E+01	5.9E-03	5.9E-04
Benzo(a)pyrene	1.13E+00	1.43E-01	5.36E-03	1.12E-02	1.65E-02	2.00E+00	2.00E+01	8.3E-03	8.3E-04
Benzo(b)fluoranthene	1.60E+00	4.95E-01	7.58E-03	3.85E-02	4.61E-02	2.00E+00	2.00E+01	2.3E-02	2.3E-03
Benzo(k)fluoranthene	4.74E-01	6.09E-02	2.25E-03	4.73E-03	6.98E-03	2.00E+00	2.00E+01	3.5E-03	3.5E-04
Chrysene	1.28E+00	7.72E-02	6.06E-03	6.00E-03	1.21E-02	2.00E+00	2.00E+01	6.0E-03	6.0E-04
Dibenzo(a,h)anthracene	2.56E-01	3.33E-02	1.22E-03	2.59E-03	3.81E-03	2.00E+00	2.00E+01	1.9E-03	1.9E-04
Indeno(1,2,3-cd)pyrene	8.19E-01	9.01E-02	3.89E-03	7.01E-03	1.09E-02	2.00E+00	2.00E+01	5.4E-03	5.4E-04
High Tower Range Area									
Lead									
Lead - Surface Soil	1.17E+02	3.83E+00	5.54E-01	2.98E-01	8.51E-01	1.63E+00	4.46E+01	5.2E-01	1.9E-02
Lead - Subsurface Soil	4.01E+01	2.10E+00	1.90E-01	1.63E-01	3.53E-01	1.63E+00	4.46E+01	2.2E-01	7.9E-03
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	4.66E-03	1.71E-05	3.62E-04	3.79E-04	2.00E+00	2.00E+01	1.9E-04	1.9E-05
Benzo(a)pyrene	2.00E-02	2.81E-03	9.48E-05	2.18E-04	3.13E-04	2.00E+00	2.00E+01	1.6E-04	1.6E-05
Benzo(b)fluoranthene	2.00E-02	6.20E-03	9.48E-05	4.82E-04	5.77E-04	2.00E+00	2.00E+01	2.9E-04	2.9E-05
Benzo(g,h,i)perylene	1.40E-02	2.53E-03	6.64E-05	1.96E-04	2.63E-04	2.00E+00	2.00E+01	1.3E-04	1.3E-05
Benzo(k)fluoranthene	1.30E-02	2.77E-03	6.17E-05	2.15E-04	2.77E-04	2.00E+00	2.00E+01	1.4E-04	1.4E-05
Chrysene	2.00E-02	6.52E-03	9.48E-05	5.07E-04	6.02E-04	2.00E+00	2.00E+01	3.0E-04	3.0E-05
Fluoranthene	3.10E-02	1.55E-02	1.47E-04	1.21E-03	1.35E-03	2.00E+00	2.00E+01	6.8E-04	6.8E-05
Indeno(1,2,3-cd)pyrene	1.60E-02	1.76E-03	7.59E-05	1.37E-04	2.13E-04	2.00E+00	2.00E+01	1.1E-04	1.1E-05

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.75E-01	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.36E-02	kg/day	Dose (vegetation) = (Cv * If)(H)/BW
Soil Ingestion Rate = (Is)	8.30E-04	kg/day	Cv = Contaminant concentration in vegetation
Home Range = (HR)	1.88E+01	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (vegetation)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Max Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
Northern Range Area									
Lead									
Lead - Surface Soil	2.22E+04	2.59E+03	7.11E+01	2.76E+02	3.47E+02	4.70E+00	1.86E+02	7.4E+01	1.9E+00
Lead - Subsurface Soil	8.46E+02	1.85E+02	2.71E+00	1.98E+01	2.25E+01	4.70E+00	1.86E+02	4.8E+00	1.2E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.30E-02	1.73E-02	4.16E-05	1.84E-03	1.89E-03	6.15E-01	3.84E+01	3.1E-03	4.9E-05
Benzo(b)fluoranthene	2.20E-02	5.72E-02	7.04E-05	6.10E-03	6.17E-03	6.15E-01	3.84E+01	1.0E-02	1.6E-04
Benzo(g,h,i)perylene	1.10E-02	3.23E-02	3.52E-05	3.45E-03	3.49E-03	6.15E-01	3.84E+01	5.7E-03	9.1E-05
Benzo(k)fluoranthene	1.10E-02	2.86E-02	3.52E-05	3.05E-03	3.09E-03	6.15E-01	3.84E+01	5.0E-03	8.0E-05
Chrysene	1.80E-02	4.12E-02	5.76E-05	4.40E-03	4.46E-03	6.15E-01	3.84E+01	7.2E-03	1.2E-04
Dibenzo(a,h)anthracene	9.40E-03	2.17E-02	3.01E-05	2.32E-03	2.35E-03	6.15E-01	3.84E+01	3.8E-03	6.1E-05
Fluoranthene	2.50E-02	7.60E-02	8.00E-05	8.11E-03	8.19E-03	6.56E+01	3.56E+02	1.2E-04	2.3E-05
Indeno(1,2,3-cd)pyrene	1.10E-02	3.15E-02	3.52E-05	3.36E-03	3.39E-03	6.15E-01	3.84E+01	5.5E-03	8.8E-05
Southern Range Area									
Lead									
Lead - Surface Soil	1.14E+03	2.36E+02	3.65E+00	2.51E+01	2.88E+01	4.70E+00	1.86E+02	6.1E+00	1.5E-01
Lead - Subsurface Soil	7.28E+02	1.64E+02	2.33E+00	1.75E+01	1.98E+01	4.70E+00	1.86E+02	4.2E+00	1.1E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	6.70E-01	9.85E-01	2.14E-03	1.05E-01	1.07E-01	6.56E+01	3.56E+02	1.6E-03	3.0E-04
Anthracene	2.80E+00	6.78E+00	8.96E-03	7.23E-01	7.32E-01	6.56E+01	3.56E+02	1.1E-02	2.1E-03
Benzo(a)anthracene	6.00E+01	9.54E+01	1.92E-01	1.02E+01	1.04E+01	6.15E-01	3.84E+01	1.7E+01	2.7E-01
Benzo(a)pyrene	4.90E+01	6.52E+01	1.57E-01	6.95E+00	7.11E+00	6.15E-01	3.84E+01	1.2E+01	1.9E-01
Benzo(b)fluoranthene	7.20E+01	1.87E+02	2.30E-01	2.00E+01	2.02E+01	6.15E-01	3.84E+01	3.3E+01	5.3E-01
Benzo(g,h,i)perylene	2.40E+01	7.06E+01	7.68E-02	7.53E+00	7.60E+00	6.15E-01	3.84E+01	1.2E+01	2.0E-01
Benzo(k)fluoranthene	2.30E+01	5.98E+01	7.36E-02	6.38E+00	6.45E+00	6.15E-01	3.84E+01	1.0E+01	1.7E-01
Chrysene	6.10E+01	1.40E+02	1.95E-01	1.49E+01	1.51E+01	6.15E-01	3.84E+01	2.5E+01	3.9E-01
Dibenzo(a,h)anthracene	1.20E+01	2.77E+01	3.84E-02	2.96E+00	3.00E+00	6.15E-01	3.84E+01	4.9E+00	7.8E-02
Fluoranthene	3.60E+01	1.09E+02	1.15E-01	1.17E+01	1.18E+01	6.56E+01	3.56E+02	1.8E-01	3.3E-02
Fluorene	3.80E-01	3.64E+00	1.22E-03	3.88E-01	3.89E-01	6.56E+01	3.56E+02	5.9E-03	1.1E-03
Indeno(1,2,3-cd)pyrene	3.80E+01	1.09E+02	1.22E-01	1.16E+01	1.17E+01	6.15E-01	3.84E+01	1.9E+01	3.1E-01
Pyrene	3.00E+01	5.25E+01	9.60E-02	5.60E+00	5.70E+00	6.15E-01	3.84E+01	9.3E+00	1.5E-01
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.60E+01	2.54E+01	5.12E-02	2.71E+00	2.77E+00	6.15E-01	3.84E+01	4.5E+00	7.2E-02
Benzo(a)pyrene	1.40E+01	1.86E+01	4.48E-02	1.99E+00	2.03E+00	6.15E-01	3.84E+01	3.3E+00	5.3E-02
Benzo(b)fluoranthene	2.00E+01	5.20E+01	6.40E-02	5.55E+00	5.61E+00	6.15E-01	3.84E+01	9.1E+00	1.5E-01
Benzo(k)fluoranthene	5.50E+00	1.43E+01	1.76E-02	1.53E+00	1.54E+00	6.15E-01	3.84E+01	2.5E+00	4.0E-02
Chrysene	1.60E+01	3.66E+01	5.12E-02	3.91E+00	3.96E+00	6.15E-01	3.84E+01	6.4E+00	1.0E-01
Dibenzo(a,h)anthracene	3.00E+00	6.93E+00	9.60E-03	7.39E-01	7.49E-01	6.15E-01	3.84E+01	1.2E+00	2.0E-02
Indeno(1,2,3-cd)pyrene	9.30E+00	2.66E+01	2.98E-02	2.84E+00	2.87E+00	6.15E-01	3.84E+01	4.7E+00	7.5E-02
High Tower Range Area									
Lead									
Lead - Surface Soil	5.08E+02	1.23E+02	1.63E+00	1.31E+01	1.47E+01	4.70E+00	1.86E+02	3.1E+00	7.9E-02
Lead - Subsurface Soil	1.76E+02	5.22E+01	5.63E-01	5.57E+00	6.13E+00	4.70E+00	1.86E+02	1.3E+00	3.3E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	8.71E-03	1.15E-05	9.29E-04	9.41E-04	6.56E+01	3.56E+02	1.4E-05	2.6E-06
Benzo(a)pyrene	2.00E-02	2.66E-02	6.40E-05	2.84E-03	2.90E-03	6.15E-01	3.84E+01	4.7E-03	7.6E-05
Benzo(b)fluoranthene	2.00E-02	5.20E-02	6.40E-05	5.55E-03	5.61E-03	6.15E-01	3.84E+01	9.1E-03	1.5E-04
Benzo(g,h,i)perylene	1.40E-02	4.12E-02	4.48E-05	4.39E-03	4.44E-03	6.15E-01	3.84E+01	7.2E-03	1.2E-04
Benzo(k)fluoranthene	1.30E-02	3.38E-02	4.16E-05	3.61E-03	3.65E-03	6.15E-01	3.84E+01	5.9E-03	9.5E-05
Chrysene	2.00E-02	4.58E-02	6.40E-05	4.89E-03	4.95E-03	6.15E-01	3.84E+01	8.0E-03	1.3E-04
Fluoranthene	3.10E-02	9.42E-02	9.92E-05	1.01E-02	1.02E-02	6.56E+01	3.56E+02	1.5E-04	2.9E-05
Indeno(1,2,3-cd)pyrene	1.60E-02	4.58E-02	5.12E-05	4.88E-03	4.93E-03	6.15E-01	3.84E+01	8.0E-03	1.3E-04

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.50E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.60E-03	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW
Soil Ingestion Rate = (Is)	4.80E-05	kg/day	Ci = Contaminant concentration in invertebrate
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Avg Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
Northern Range Area									
Lead									
Lead - Surface Soil	1.11E+03	2.30E+02	8.86E-01	2.05E+01	2.14E+01	4.70E+00	1.86E+02	4.5E+00	1.1E-01
Lead - Subsurface Soil	1.70E+02	5.06E+01	1.36E-01	4.50E+00	4.64E+00	4.70E+00	1.86E+02	9.9E-01	2.5E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.06E-02	1.41E-02	8.49E-06	1.25E-03	1.26E-03	6.15E-01	3.84E+01	2.1E-03	3.3E-05
Benzo(b)fluoranthene	2.17E-02	5.64E-02	1.74E-05	5.02E-03	5.04E-03	6.15E-01	3.84E+01	8.2E-03	1.3E-04
Benzo(g,h,i)perylene	8.40E-03	2.47E-02	6.73E-06	2.20E-03	2.20E-03	6.15E-01	3.84E+01	3.6E-03	5.7E-05
Benzo(k)fluoranthene	7.75E-03	2.02E-02	6.21E-06	1.79E-03	1.80E-03	6.15E-01	3.84E+01	2.9E-03	4.7E-05
Chrysene	1.19E-02	2.73E-02	9.56E-06	2.43E-03	2.44E-03	6.15E-01	3.84E+01	4.0E-03	6.4E-05
Dibenzo(a,h)anthracene	9.40E-03	2.17E-02	7.53E-06	1.93E-03	1.94E-03	6.15E-01	3.84E+01	3.2E-03	5.1E-05
Fluoranthene	1.43E-02	4.34E-02	1.14E-05	3.86E-03	3.87E-03	6.56E+01	3.56E+02	5.9E-05	1.1E-05
Indeno(1,2,3-cd)pyrene	9.18E-03	2.62E-02	7.35E-06	2.33E-03	2.34E-03	6.15E-01	3.84E+01	3.8E-03	6.1E-05
Southern Range Area									
Lead									
Lead - Surface Soil	1.90E+02	5.56E+01	1.52E-01	4.94E+00	5.10E+00	4.70E+00	1.86E+02	1.1E+00	2.7E-02
Lead - Subsurface Soil	8.42E+01	2.88E+01	6.74E-02	2.56E+00	2.63E+00	4.70E+00	1.86E+02	5.6E-01	1.4E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	7.07E-02	1.04E-01	5.66E-05	9.25E-03	9.31E-03	6.56E+01	3.56E+02	1.4E-04	2.6E-05
Anthracene	3.34E-01	8.09E-01	2.68E-04	7.20E-02	7.23E-02	6.56E+01	3.56E+02	1.1E-03	2.0E-04
Benzo(a)anthracene	4.27E+00	6.78E+00	3.42E-03	6.04E-01	6.07E-01	6.15E-01	3.84E+01	9.9E-01	1.6E-02
Benzo(a)pyrene	4.17E+00	5.55E+00	3.34E-03	4.94E-01	4.97E-01	6.15E-01	3.84E+01	8.1E-01	1.3E-02
Benzo(b)fluoranthene	5.65E+00	1.47E+01	4.53E-03	1.31E+00	1.31E+00	6.15E-01	3.84E+01	2.1E+00	3.4E-02
Benzo(g,h,i)perylene	2.09E+00	6.14E+00	1.67E-03	5.47E-01	5.48E-01	6.15E-01	3.84E+01	8.9E-01	1.4E-02
Benzo(k)fluoranthene	2.32E+00	6.04E+00	1.86E-03	5.37E-01	5.39E-01	6.15E-01	3.84E+01	8.8E-01	1.4E-02
Chrysene	4.43E+00	1.02E+01	3.55E-03	9.03E-01	9.07E-01	6.15E-01	3.84E+01	1.5E+00	2.4E-02
Dibenzo(a,h)anthracene	1.22E+00	2.81E+00	9.75E-04	2.50E-01	2.51E-01	6.15E-01	3.84E+01	4.1E-01	6.5E-03
Fluoranthene	3.82E+00	1.16E+01	3.06E-03	1.03E+00	1.04E+00	6.56E+01	3.56E+02	1.6E-02	2.9E-03
Fluorene	4.03E-02	3.85E-01	3.22E-05	3.43E-02	3.43E-02	6.56E+01	3.56E+02	5.2E-04	9.6E-05
Indeno(1,2,3-cd)pyrene	3.36E+00	9.61E+00	2.69E-03	8.55E-01	8.58E-01	6.15E-01	3.84E+01	1.4E+00	2.2E-02
Pyrene	2.93E+00	5.12E+00	2.34E-03	4.56E-01	4.58E-01	6.15E-01	3.84E+01	7.4E-01	1.2E-02
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.23E+00	1.96E+00	9.87E-04	1.74E-01	1.75E-01	6.15E-01	3.84E+01	2.9E-01	4.6E-03
Benzo(a)pyrene	1.13E+00	1.50E+00	9.06E-04	1.34E-01	1.35E-01	6.15E-01	3.84E+01	2.2E-01	3.5E-03
Benzo(b)fluoranthene	1.60E+00	4.15E+00	1.28E-03	3.70E-01	3.71E-01	6.15E-01	3.84E+01	6.0E-01	9.7E-03
Benzo(k)fluoranthene	4.74E-01	1.23E+00	3.80E-04	1.10E-01	1.10E-01	6.15E-01	3.84E+01	1.8E-01	2.9E-03
Chrysene	1.28E+00	2.93E+00	1.02E-03	2.61E-01	2.62E-01	6.15E-01	3.84E+01	4.3E-01	6.8E-03
Dibenzo(a,h)anthracene	2.56E-01	5.92E-01	2.05E-04	5.27E-02	5.29E-02	6.15E-01	3.84E+01	8.6E-02	1.4E-03
Indeno(1,2,3-cd)pyrene	8.19E-01	2.34E+00	6.56E-04	2.08E-01	2.09E-01	6.15E-01	3.84E+01	3.4E-01	5.4E-03
High Tower Range Area									
Lead									
Lead - Surface Soil	1.17E+02	3.75E+01	9.35E-02	3.33E+00	3.43E+00	4.70E+00	1.86E+02	7.3E-01	1.8E-02
Lead - Subsurface Soil	4.01E+01	1.58E+01	3.21E-02	1.41E+00	1.44E+00	4.70E+00	1.86E+02	3.1E-01	7.7E-03
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	8.71E-03	2.88E-06	7.75E-04	7.78E-04	6.56E+01	3.56E+02	1.2E-05	2.2E-06
Benzo(a)pyrene	2.00E-02	2.66E-02	1.60E-05	2.37E-03	2.38E-03	6.15E-01	3.84E+01	3.9E-03	6.2E-05
Benzo(b)fluoranthene	2.00E-02	5.20E-02	1.60E-05	4.63E-03	4.64E-03	6.15E-01	3.84E+01	7.5E-03	1.2E-04
Benzo(g,h,i)perylene	1.40E-02	4.12E-02	1.12E-05	3.66E-03	3.67E-03	6.15E-01	3.84E+01	6.0E-03	9.6E-05
Benzo(k)fluoranthene	1.30E-02	3.38E-02	1.04E-05	3.01E-03	3.02E-03	6.15E-01	3.84E+01	4.9E-03	7.9E-05
Chrysene	2.00E-02	4.58E-02	1.60E-05	4.08E-03	4.09E-03	6.15E-01	3.84E+01	6.7E-03	1.1E-04
Fluoranthene	3.10E-02	9.42E-02	2.48E-05	8.39E-03	8.41E-03	6.56E+01	3.56E+02	1.3E-04	2.4E-05
Indeno(1,2,3-cd)pyrene	1.60E-02	4.58E-02	1.28E-05	4.07E-03	4.08E-03	6.15E-01	3.84E+01	6.6E-03	1.1E-04

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.61E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.43E-03	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW
Soil Ingestion Rate = (Is)	1.29E-05	kg/day	Ci = Contaminant concentration in invertebrate
Home Range = (HR)	9.70E-01	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

AMERICAN ROBIN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Max Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
Northern Range Area									
Lead									
Lead - Surface Soil	2.22E+04	2.59E+03	5.88E+02	4.18E+02	1.01E+03	1.63E+00	4.46E+01	6.2E+02	2.3E+01
Lead - Subsurface Soil	8.46E+02	1.85E+02	2.24E+01	2.99E+01	5.23E+01	1.63E+00	4.46E+01	3.2E+01	1.2E+00
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.30E-02	1.73E-02	3.44E-04	2.79E-03	3.13E-03	1.63E+00	4.46E+01	1.9E-03	7.0E-05
Benzo(b)fluoranthene	2.20E-02	5.72E-02	5.82E-04	9.23E-03	9.81E-03	2.00E+00	2.00E+01	4.9E-03	4.9E-04
Benzo(g,h,i)perylene	1.10E-02	3.23E-02	2.91E-04	5.22E-03	5.51E-03	2.00E+00	2.00E+01	2.8E-03	2.8E-04
Benzo(k)fluoranthene	1.10E-02	2.86E-02	2.91E-04	4.62E-03	4.91E-03	2.00E+00	2.00E+01	2.5E-03	2.5E-04
Chrysene	1.80E-02	4.12E-02	4.76E-04	6.65E-03	7.13E-03	2.00E+00	2.00E+01	3.6E-03	3.6E-04
Dibenzo(a,h)anthracene	9.40E-03	2.17E-02	2.49E-04	3.50E-03	3.75E-03	2.00E+00	2.00E+01	1.9E-03	1.9E-04
Fluoranthene	2.50E-02	7.60E-02	6.62E-04	1.23E-02	1.29E-02	2.00E+00	2.00E+01	6.5E-03	6.5E-04
Indeno(1,2,3-cd)pyrene	1.10E-02	3.15E-02	2.91E-04	5.08E-03	5.37E-03	2.00E+00	2.00E+01	2.7E-03	2.7E-04
Southern Range Area									
Lead									
Lead - Surface Soil	1.14E+03	2.36E+02	3.02E+01	3.80E+01	6.82E+01	1.63E+00	4.46E+01	4.2E+01	1.5E+00
Lead - Subsurface Soil	7.28E+02	1.64E+02	1.93E+01	2.65E+01	4.57E+01	1.63E+00	4.46E+01	2.8E+01	1.0E+00
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	6.70E-01	9.85E-01	1.77E-02	1.59E-01	1.77E-01	2.00E+00	2.00E+01	8.8E-02	8.8E-03
Anthracene	2.80E+00	6.78E+00	7.41E-02	1.09E+00	1.17E+00	2.00E+00	2.00E+01	5.8E-01	5.8E-02
Benzo(a)anthracene	6.00E+01	9.54E+01	1.59E+00	1.54E+01	1.70E+01	2.00E+00	2.00E+01	8.5E+00	8.5E-01
Benzo(a)pyrene	4.90E+01	6.52E+01	1.30E+00	1.05E+01	1.18E+01	2.00E+00	2.00E+01	5.9E+00	5.9E-01
Benzo(b)fluoranthene	7.20E+01	1.87E+02	1.91E+00	3.02E+01	3.21E+01	2.00E+00	2.00E+01	1.6E+01	1.6E+00
Benzo(g,h,i)perylene	2.40E+01	7.06E+01	6.35E-01	1.14E+01	1.20E+01	2.00E+00	2.00E+01	6.0E+00	6.0E-01
Benzo(k)fluoranthene	2.30E+01	5.98E+01	6.09E-01	9.65E+00	1.03E+01	2.00E+00	2.00E+01	5.1E+00	5.1E-01
Chrysene	6.10E+01	1.40E+02	1.61E+00	2.25E+01	2.42E+01	2.00E+00	2.00E+01	1.2E+01	1.2E+00
Dibenzo(a,h)anthracene	1.20E+01	2.77E+01	3.18E-01	4.47E+00	4.79E+00	2.00E+00	2.00E+01	2.4E+00	2.4E-01
Fluoranthene	3.60E+01	1.09E+02	9.53E-01	1.77E+01	1.86E+01	2.00E+00	2.00E+01	9.3E+00	9.3E-01
Fluorene	3.80E-01	3.64E+00	1.01E-02	5.87E-01	5.97E-01	2.00E+00	2.00E+01	3.0E-01	3.0E-02
Indeno(1,2,3-cd)pyrene	3.80E+01	1.09E+02	1.01E+00	1.75E+01	1.85E+01	2.00E+00	2.00E+01	9.3E+00	9.3E-01
Pyrene	3.00E+01	5.25E+01	7.94E-01	8.47E+00	9.27E+00	2.00E+00	2.00E+01	4.6E+00	4.6E-01
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.60E+01	2.54E+01	4.23E-01	4.11E+00	4.53E+00	2.00E+00	2.00E+01	2.3E+00	2.3E-01
Benzo(a)pyrene	1.40E+01	1.86E+01	3.71E-01	3.00E+00	3.38E+00	2.00E+00	2.00E+01	1.7E+00	1.7E-01
Benzo(b)fluoranthene	2.00E+01	5.20E+01	5.29E-01	8.39E+00	8.92E+00	2.00E+00	2.00E+01	4.5E+00	4.5E-01
Benzo(k)fluoranthene	5.50E+00	1.43E+01	1.46E-01	2.31E+00	2.45E+00	2.00E+00	2.00E+01	1.2E+00	1.2E-01
Chrysene	1.60E+01	3.66E+01	4.23E-01	5.91E+00	6.34E+00	2.00E+00	2.00E+01	3.2E+00	3.2E-01
Dibenzo(a,h)anthracene	3.00E+00	6.93E+00	7.94E-02	1.12E+00	1.20E+00	2.00E+00	2.00E+01	6.0E-01	6.0E-02
Indeno(1,2,3-cd)pyrene	9.30E+00	2.66E+01	2.46E-01	4.29E+00	4.54E+00	2.00E+00	2.00E+01	2.3E+00	2.3E-01
High Tower Range Area									
Lead									
Lead - Surface Soil	5.08E+02	1.23E+02	1.34E+01	1.98E+01	3.33E+01	1.63E+00	4.46E+01	2.0E+01	7.5E-01
Lead - Subsurface Soil	1.76E+02	5.22E+01	4.66E+00	8.42E+00	1.31E+01	1.63E+00	4.46E+01	8.0E+00	2.9E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	8.71E-03	9.53E-05	1.41E-03	1.50E-03	2.00E+00	2.00E+01	7.5E-04	7.5E-05
Benzo(a)pyrene	2.00E-02	2.66E-02	5.29E-04	4.29E-03	4.82E-03	2.00E+00	2.00E+01	2.4E-03	2.4E-04
Benzo(b)fluoranthene	2.00E-02	5.20E-02	5.29E-04	8.39E-03	8.92E-03	2.00E+00	2.00E+01	4.5E-03	4.5E-04
Benzo(g,h,i)perylene	1.40E-02	4.12E-02	3.71E-04	6.64E-03	7.01E-03	2.00E+00	2.00E+01	3.5E-03	3.5E-04
Benzo(k)fluoranthene	1.30E-02	3.38E-02	3.44E-04	5.45E-03	5.80E-03	2.00E+00	2.00E+01	2.9E-03	2.9E-04
Chrysene	2.00E-02	4.58E-02	5.29E-04	7.39E-03	7.92E-03	2.00E+00	2.00E+01	4.0E-03	4.0E-04
Fluoranthene	3.10E-02	9.42E-02	8.20E-04	1.52E-02	1.60E-02	2.00E+00	2.00E+01	8.0E-03	8.0E-04
Indeno(1,2,3-cd)pyrene	1.60E-02	4.58E-02	4.23E-04	7.38E-03	7.81E-03	2.00E+00	2.00E+01	3.9E-03	3.9E-04

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	7.73E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.25E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW
Soil Ingestion Rate = (Is)	2.05E-03	kg/day	Ci = Contaminant concentration in invertebrate
Home Range = (HR)	Assume 100% on site		Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

AMERICAN ROBIN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION

Chemical	Avg Soil Conc. (mg/kg)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Hazard Quotients NOAEL	Hazard Quotients LOAEL
Northern Range Area									
Lead									
Lead - Surface Soil	1.11E+03	2.30E+02	1.05E+01	3.40E+01	4.44E+01	1.63E+00	4.46E+01	2.7E+01	1.0E+00
Lead - Subsurface Soil	1.70E+02	5.06E+01	1.60E+00	7.48E+00	9.08E+00	1.63E+00	4.46E+01	5.6E+00	2.0E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Benzo(a)pyrene	1.06E-02	1.41E-02							
Benzo(b)fluoranthene	2.17E-02	5.64E-02	2.05E-04	8.33E-03	8.54E-03	2.00E+00	2.00E+01	4.3E-03	4.3E-04
Benzo(g,h,i)perylene	8.40E-03	2.47E-02	7.94E-05	3.65E-03	3.73E-03	2.00E+00	2.00E+01	1.9E-03	1.9E-04
Benzo(k)fluoranthene	7.75E-03	2.02E-02	7.33E-05	2.98E-03	3.05E-03	2.00E+00	2.00E+01	1.5E-03	1.5E-04
Chrysene	1.19E-02	2.73E-02	1.13E-04	4.04E-03	4.15E-03	2.00E+00	2.00E+01	2.1E-03	2.1E-04
Dibenzo(a,h)anthracene	9.40E-03	2.17E-02	8.89E-05	3.21E-03	3.30E-03	2.00E+00	2.00E+01	1.6E-03	1.6E-04
Fluoranthene	1.43E-02	4.34E-02	1.35E-04	6.41E-03	6.55E-03	2.00E+00	2.00E+01	3.3E-03	3.3E-04
Indeno(1,2,3-cd)pyrene	9.18E-03	2.62E-02	8.67E-05	3.88E-03	3.96E-03	2.00E+00	2.00E+01	2.0E-03	2.0E-04
Southern Range Area									
Lead									
Lead - Surface Soil	1.90E+02	5.56E+01	1.80E+00	8.21E+00	1.00E+01	1.63E+00	4.46E+01	6.1E+00	2.2E-01
Lead - Subsurface Soil	8.42E+01	2.88E+01	7.96E-01	4.25E+00	5.05E+00	1.63E+00	4.46E+01	3.1E+00	1.1E-01
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Acenaphthene	7.07E-02	1.04E-01	6.69E-04	1.54E-02	1.60E-02	2.00E+00	2.00E+01	8.0E-03	8.0E-04
Anthracene	3.34E-01	8.09E-01	3.16E-03	1.20E-01	1.23E-01	2.00E+00	2.00E+01	6.1E-02	6.1E-03
Benzo(a)anthracene	4.27E+00	6.78E+00	4.03E-02	1.00E+00	1.04E+00	2.00E+00	2.00E+01	5.2E-01	5.2E-02
Benzo(a)pyrene	4.17E+00	5.55E+00	3.94E-02	8.20E-01	8.59E-01	2.00E+00	2.00E+01	4.3E-01	4.3E-02
Benzo(b)fluoranthene	5.65E+00	1.47E+01	5.34E-02	2.17E+00	2.22E+00	2.00E+00	2.00E+01	1.1E+00	1.1E-01
Benzo(g,h,i)perylene	2.09E+00	6.14E+00	1.98E-02	9.07E-01	9.27E-01	2.00E+00	2.00E+01	4.6E-01	4.6E-02
Benzo(k)fluoranthene	2.32E+00	6.04E+00	2.20E-02	8.92E-01	9.14E-01	2.00E+00	2.00E+01	4.6E-01	4.6E-02
Chrysene	4.43E+00	1.02E+01	4.19E-02	1.50E+00	1.54E+00	2.00E+00	2.00E+01	7.7E-01	7.7E-02
Dibenzo(a,h)anthracene	1.22E+00	2.81E+00	1.15E-02	4.16E-01	4.27E-01	2.00E+00	2.00E+01	2.1E-01	2.1E-02
Fluoranthene	3.82E+00	1.16E+01	3.61E-02	1.72E+00	1.75E+00	2.00E+00	2.00E+01	8.8E-01	8.8E-02
Fluorene	4.03E-02	3.85E-01	3.81E-04	5.69E-02	5.73E-02	2.00E+00	2.00E+01	2.9E-02	2.9E-03
Indeno(1,2,3-cd)pyrene	3.36E+00	9.61E+00	3.18E-02	1.42E+00	1.45E+00	2.00E+00	2.00E+01	7.3E-01	7.3E-02
Pyrene	2.93E+00	5.12E+00	2.77E-02	7.56E-01	7.84E-01	2.00E+00	2.00E+01	3.9E-01	3.9E-02
Polycyclic Aromatic Hydrocarbons - Subsurface Soil									
Benzo(a)anthracene	1.23E+00	1.96E+00	1.17E-02	2.90E-01	3.01E-01	2.00E+00	2.00E+01	1.5E-01	1.5E-02
Benzo(a)pyrene	1.13E+00	1.50E+00	1.07E-02	2.22E-01	2.33E-01	2.00E+00	2.00E+01	1.2E-01	1.2E-02
Benzo(b)fluoranthene	1.60E+00	4.15E+00	1.51E-02	6.14E-01	6.29E-01	2.00E+00	2.00E+01	3.1E-01	3.1E-02
Benzo(k)fluoranthene	4.74E-01	1.23E+00	4.48E-03	1.82E-01	1.87E-01	2.00E+00	2.00E+01	9.3E-02	9.3E-03
Chrysene	1.28E+00	2.93E+00	1.21E-02	4.33E-01	4.45E-01	2.00E+00	2.00E+01	2.2E-01	2.2E-02
Dibenzo(a,h)anthracene	2.56E-01	5.92E-01	2.42E-03	8.75E-02	8.99E-02	2.00E+00	2.00E+01	4.5E-02	4.5E-03
Indeno(1,2,3-cd)pyrene	8.19E-01	2.34E+00	7.74E-03	3.46E-01	3.54E-01	2.00E+00	2.00E+01	1.8E-01	1.8E-02
High Tower Range Area									
Lead									
Lead - Surface Soil	1.17E+02	3.75E+01	1.10E+00	5.53E+00	6.64E+00	1.63E+00	4.46E+01	4.1E+00	1.5E-01
Lead - Subsurface Soil	4.01E+01	1.58E+01	3.79E-01	2.34E+00	2.71E+00	1.63E+00	4.46E+01	1.7E+00	6.1E-02
Polycyclic Aromatic Hydrocarbons - Surface Soil									
Anthracene	3.60E-03	8.71E-03	3.40E-05	1.29E-03	1.32E-03	2.00E+00	2.00E+01	6.6E-04	6.6E-05
Benzo(a)pyrene	2.00E-02	2.66E-02	1.89E-04	3.93E-03	4.12E-03	2.00E+00	2.00E+01	2.1E-03	2.1E-04
Benzo(b)fluoranthene	2.00E-02	5.20E-02	1.89E-04	7.68E-03	7.87E-03	2.00E+00	2.00E+01	3.9E-03	3.9E-04
Benzo(g,h,i)perylene	1.40E-02	4.12E-02	1.32E-04	6.08E-03	6.21E-03	2.00E+00	2.00E+01	3.1E-03	3.1E-04
Benzo(k)fluoranthene	1.30E-02	3.38E-02	1.23E-04	4.99E-03	5.12E-03	2.00E+00	2.00E+01	2.6E-03	2.6E-04
Chrysene	2.00E-02	4.58E-02	1.89E-04	6.77E-03	6.95E-03	2.00E+00	2.00E+01	3.5E-03	3.5E-04
Fluoranthene	3.10E-02	9.42E-02	2.93E-04	1.39E-02	1.42E-02	2.00E+00	2.00E+01	7.1E-03	7.1E-04
Indeno(1,2,3-cd)pyrene	1.60E-02	4.58E-02	1.51E-04	6.76E-03	6.91E-03	2.00E+00	2.00E+01	3.5E-03	3.5E-04

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	8.04E-02	kg	Dose (soil) = (Cs * Is)(H)/BW
Food Ingestion Rate = (If)	1.19E-02	kg/day	Dose (invertebrate) = (Ci * If)(H)/BW
Soil Ingestion Rate = (Is)	7.60E-04	kg/day	Ci = Contaminant concentration in invertebrate
Home Range = (HR)	6.10E-01	acres	Cs = Contaminant concentration in soil
Contaminated Area = (CA)	Assume equal to home range		Total Dose = Dose (soil) + Dose (invertebrate)
			H=CA/HR (Assume = to 1)

Conc = Concentration
LOAEL = Lowest Observed Adverse Effects Concentration
NOAEL = No Observed Adverse Effects Concentration

FIGURE SHOWING PAH EXCEEDANCES OF SCREENING CRITERION

Legend

- 2009 Soil Sample Locations
- Fence Line
- Total risk from PAH COPCs > 1 x 10^{-4}
- Soil Sample Locations
- March 2018 Surface Soil Sample Locations
- March 2018 Subsurface Soil Sample Locations
- Proposed Surface Soil Sample
- Former Skeet Range MRS
- Structure Existing Area
- Paved Surfaces
- 2010 LIDAR Contours (feet msl)

Notes:
COPC - chemical of potential concern
mg/kg - milligrams per kilogram
msl - mean seal level
PAH - polycyclic aromatic hydrocarbon
- Duplicate sample exceeded Total Risk but not the parent sample

N

SR-SS-039
SR-SS-006
SR-SS-038
SR-SS-108
SR-SS-107
SR-SS-005
SR-SS-103
SR-SS-104
SR-SS-037
SR-SS-105
SR-SS-100
SR-SS-102
SR-SS-106
RR-SS-009
RR-SS-008
RR-SS-010
SR-SS-004
SR-SS-035
SR-SS-012
SR-SS-003
SR-SS-264
RR-SS-007
SR-SS-034
SR-SS-257
SR-SS-002
SR-SS-265
SR-SS-033
SR-SS-011
SR-SS-036
SR-SS-010
SR-SS-260
SR-SS-009
SR-SS-001
SR-SS-008
SR-SS-007
SR-SS-258
SR-SS-013
SR-SS-014
SR-SS-019
SR-SS-274
SR-SS-015
SR-SS-259
SR-SS-025
SR-SS-261
SR-SS-263
NOAA ANTENNAE SITE 8
SR-SS-271
SR-SS-016
SR-SS-273
SR-SS-266
SR-SS-017
SR-SS-325
SR-SS-020
SR-SS-267
SR-SS-272
SR-SS-021
SR-SS-018
SR-SS-262
SR-SS-270
SR-SS-268
SR-SS-026
SR-SS-269
SR-SS-326
SR-SS-022
SR-SS-327
SR-SS-031
SR-SS-027
SR-SS-032
SR-SS-023
SR-SS-044
NOAA ANTENNAE SITE 5
SR-SS-028
SR-SS-043
SR-SS-041
SR-SS-052
SR-SS-024
SR-SS-042
SR-SS-040
SR-SS-276*
SR-SS-275
SR-SS-277
SR-SS-278
SR-SS-029
SR-SS-050
SR-SS-045
SR-SS-054
SR-SS-051
SR-SS-047
SR-SS-053
SR-SS-055
SR-SS-056
SR-SS-049
SR-SS-030

Samples from locations circled in red have individual PAH concentrations exceeding 30,000 ug/kg.

Base Map:
Aerial Imagery 2013 ESRI map service

PAH SOIL SAMPLING LOCATIONS
MAIN BASE FIRING RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

0 70 140 Feet

FIGURE: 6

Prepared For: NASA

Prepared By: TETRA TECH

Date: 10/18/2018

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LEAD PROBABILITY MODEL PARAMETERS AND CALCULATIONS

SOURCE OF PARAMETERS FOR
MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]

Parameter	Parameter code	Values	Basis for Value
Mean # grit-sized particles/gizzard	*G*	10	Based average value for mourning doves in Table 2 on Bennett et al., (2011)
Mean particle retention time (i.e., mean # days particle retained in gizzard)	*RT*	6	Value in Ecological Risk Assessment for Range 17 (Trap and Skeet Range), Patuxent Research Refuge (USFWS and USEPA, March 2004)
# days in exposure period	*D*	245	Value in Ecological Risk Assessment for Range 17 (Trap and Skeet Range), Patuxent Research Refuge (USFWS and USEPA, March 2004)
# Lead particles per unit area	L_{ON}	Field data[2]	Proportion of grit-sized particles available ***on-site*** that are lead.
Total # grit-sized particles per unit area	T_{ON}	Field data[2]	
# Lead particles per unit area	L_{OFF}	0	Proportion of grit-sized particles available ***off-site*** that are lead. Estimated to be zero.
Total # grit-sized particles per unit area	T_{OFF}	1,000,000	
Proportion of foraging time on-site	*F*	0.005	Home range for the mourning dove as cited in USFWS and USEPA, (March 2004) is 538 acres. The size of the area with one or more lead shot pellets at the Skeet range is ~2.5 acres. The value of "F" is calculated by dividing 2.5 acres by 538 acres for a value of 0.0046.

1 - Values are input parameters for the lead probability model.
2 - Values from field collected soil samples.

Bennett, R., D. Hoff and M. Etterson. 2011. Assessment of Methods for Estimating Risk to Birds from Ingestion of Contaminated Grit Particles. U.S. Environmental Protection Agency, Ecological Risk Assessment Support Center, Cincinnati, OH. EPA/600/R-11/023.

USFWS and USEPA. 2004 Ecological Risk Assessment for Range 17 (Trap and Skeet Range), Patuxent Research Refuge, Laurel, MD. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD and Division of Environmental Quality, Edison, NJ; U.S. Environmental Protection Agency, Environmental Response Team, Edison, NJ. March.

LEAD PROBABILITY MODEL CALCULATIONS

#14 Sieve

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	151								
	Total # grit-sized particles per unit area	T_{ON}	1,118								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.13506		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00067531**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	6.75E-04	4.56E-07	3.08E-10	2.08E-13	1.40E-16	9.48E-20	6.41E-23	4.33E-26
	$(1 - P)^{T-N}$		0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.76	0.21	2.89E-02	2.65E-03	1.82E-04	9.95E-06	4.53E-07	1.76E-08	5.98E-10
Same probabilities as previous line expressed in scientific notation			7.59E-01	2.10E-01	2.89E-02	2.65E-03	1.82E-04	9.95E-06	4.53E-07	1.76E-08	5.98E-10
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.24								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	54								
	Total # grit-sized particles per unit area	T_{ON}	1,438								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.03755		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00018776**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.88E-04	3.53E-08	6.62E-12	1.24E-15	2.33E-19	4.38E-23	8.23E-27	1.54E-30
	$(1 - P)^{T-N}$		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.93	0.07	2.73E-03	6.94E-05	1.32E-06	2.01E-08	2.55E-10	2.75E-12	2.60E-14
Same probabilities as previous line expressed in scientific notation			9.26E-01	7.11E-02	2.73E-03	6.94E-05	1.32E-06	2.01E-08	2.55E-10	2.75E-12	2.60E-14
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.07								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	25								
	Total # grit-sized particles per unit area	T_{ON}	275								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.09091		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00045455**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	4.55E-04	2.07E-07	9.39E-11	4.27E-14	1.94E-17	8.82E-21	4.01E-24	1.82E-27
	$(1 - P)^{T-N}$		0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.83	0.15	1.43E-02	8.84E-04	4.08E-05	1.50E-06	4.60E-08	1.20E-09	2.75E-11
Same probabilities as previous line expressed in scientific notation			8.30E-01	1.54E-01	1.43E-02	8.84E-04	4.08E-05	1.50E-06	4.60E-08	1.20E-09	2.75E-11
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.17								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	0								
	Total # grit-sized particles per unit area	T_{ON}	5,657								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00000		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	#NUM!	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Same probabilities as previous line expressed in scientific notation			#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	#NUM!								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	8								
	Total # grit-sized particles per unit area	T_{ON}	3,408								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00235		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.1737E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.17E-05	1.38E-10	1.62E-15	1.90E-20	2.23E-25	2.61E-30	3.07E-35	3.60E-40
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.14E-05	1.82E-08	2.17E-11	2.06E-14	1.63E-17	1.10E-20	6.50E-24
Same probabilities as previous line expressed in scientific notation			9.95E-01	4.78E-03	1.14E-05	1.82E-08	2.17E-11	2.06E-14	1.63E-17	1.10E-20	6.50E-24
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	35								
	Total # grit-sized particles per unit area	T_{ON}	1,200								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.02917		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00014583**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.46E-04	2.13E-08	3.10E-12	4.52E-16	6.60E-20	9.62E-24	1.40E-27	2.05E-31
	$(1 - P)^{T-N}$		0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.94	0.06	1.67E-03	3.31E-05	4.90E-07	5.79E-09	5.68E-11	4.77E-13	3.50E-15
Same probabilities as previous line expressed in scientific notation			9.42E-01	5.62E-02	1.67E-03	3.31E-05	4.90E-07	5.79E-09	5.68E-11	4.77E-13	3.50E-15
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.06								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	241								
	Total # grit-sized particles per unit area	T_{ON}	1,993								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.12092		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00060462**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	6.05E-04	3.66E-07	2.21E-10	1.34E-13	8.08E-17	4.89E-20	2.95E-23	1.79E-26
	$(1 - P)^{T-N}$		0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.78	0.19	2.38E-02	1.96E-03	1.20E-04	5.89E-06	2.40E-07	8.36E-09	2.54E-10
Same probabilities as previous line expressed in scientific notation			7.81E-01	1.93E-01	2.38E-02	1.96E-03	1.20E-04	5.89E-06	2.40E-07	8.36E-09	2.54E-10
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.22								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	62								
	Total # grit-sized particles per unit area	T_{ON}	1,940								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.03196		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00015979**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.60E-04	2.55E-08	4.08E-12	6.52E-16	1.04E-19	1.66E-23	2.66E-27	4.25E-31
	$(1 - P)^{T-N}$		0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.94	0.06	2.00E-03	4.33E-05	7.02E-07	9.09E-09	9.78E-11	9.00E-13	7.23E-15
Same probabilities as previous line expressed in scientific notation			9.37E-01	6.12E-02	2.00E-03	4.33E-05	7.02E-07	9.09E-09	9.78E-11	9.00E-13	7.23E-15
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.06								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	6								
	Total # grit-sized particles per unit area	T_{ON}	1,394								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00430		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**2.1521E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.15E-05	4.63E-10	9.97E-15	2.15E-19	4.62E-24	9.93E-29	2.14E-33	4.60E-38
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	3.83E-05	1.12E-07	2.44E-10	4.26E-13	6.17E-16	7.65E-19	8.27E-22
Same probabilities as previous line expressed in scientific notation			9.91E-01	8.73E-03	3.83E-05	1.12E-07	2.44E-10	4.26E-13	6.17E-16	7.65E-19	8.27E-22
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	59								
	Total # grit-sized particles per unit area	T_{ON}	2,132								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.02767		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00013837**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.38E-04	1.91E-08	2.65E-12	3.67E-16	5.07E-20	7.02E-24	9.71E-28	1.34E-31
	$(1 - P)^{T-N}$		0.94	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.94	0.05	1.51E-03	2.83E-05	3.98E-07	4.46E-09	4.16E-11	3.31E-13	2.30E-15
Same probabilities as previous line expressed in scientific notation			9.45E-01	5.35E-02	1.51E-03	2.83E-05	3.98E-07	4.46E-09	4.16E-11	3.31E-13	2.30E-15
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.06								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	15								
	Total # grit-sized particles per unit area	T_{ON}	2,093								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00717		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**3.5834E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	3.58E-05	1.28E-09	4.60E-14	1.65E-18	5.91E-23	2.12E-27	7.59E-32	2.72E-36
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	1.06E-04	5.13E-07	1.87E-09	5.42E-12	1.31E-14	2.70E-17	4.86E-20
Same probabilities as previous line expressed in scientific notation			9.85E-01	1.44E-02	1.06E-04	5.13E-07	1.87E-09	5.42E-12	1.31E-14	2.70E-17	4.86E-20
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	24								
	Total # grit-sized particles per unit area	T_{ON}	1,388								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.01729		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**8.6455E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	8.65E-05	7.47E-09	6.46E-13	5.59E-17	4.83E-21	4.18E-25	3.61E-29	3.12E-33
	$(1 - P)^{T-N}$		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.97	0.03	6.02E-04	7.06E-06	6.20E-08	4.34E-10	2.53E-12	1.26E-14	5.47E-17
Same probabilities as previous line expressed in scientific notation			9.65E-01	3.41E-02	6.02E-04	7.06E-06	6.20E-08	4.34E-10	2.53E-12	1.26E-14	5.47E-17
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.03								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	12								
	Total # grit-sized particles per unit area	T_{ON}	2,102								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00571		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**2.8544E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.85E-05	8.15E-10	2.33E-14	6.64E-19	1.89E-23	5.41E-28	1.54E-32	4.41E-37
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	6.72E-05	2.60E-07	7.54E-10	1.74E-12	3.35E-15	5.51E-18	7.90E-21
Same probabilities as previous line expressed in scientific notation			9.88E-01	1.15E-02	6.72E-05	2.60E-07	7.54E-10	1.74E-12	3.35E-15	5.51E-18	7.90E-21
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	3								
	Total # grit-sized particles per unit area	T_{ON}	597								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00503		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**2.5126E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.51E-05	6.31E-10	1.59E-14	3.99E-19	1.00E-23	2.52E-28	6.32E-33	1.59E-37
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	5.21E-05	1.78E-07	4.53E-10	9.22E-13	1.56E-15	2.26E-18	2.85E-21
Same probabilities as previous line expressed in scientific notation			9.90E-01	1.02E-02	5.21E-05	1.78E-07	4.53E-10	9.22E-13	1.56E-15	2.26E-18	2.85E-21
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	0								
	Total # grit-sized particles per unit area	T_{ON}	614								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00000		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	#NUM!	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Same probabilities as previous line expressed in scientific notation			#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	#NUM!								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	79								
	Total # grit-sized particles per unit area	T_{ON}	4,063								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.01944		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**9.7219E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	9.72E-05	9.45E-09	9.19E-13	8.93E-17	8.68E-21	8.44E-25	8.21E-29	7.98E-33
	$(1 - P)^{T-N}$		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.96	0.04	7.58E-04	1.00E-05	9.87E-08	7.77E-10	5.09E-12	2.85E-14	1.39E-16
Same probabilities as previous line expressed in scientific notation			9.61E-01	3.82E-02	7.58E-04	1.00E-05	9.87E-08	7.77E-10	5.09E-12	2.85E-14	1.39E-16
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.04								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	132								
	Total # grit-sized particles per unit area	T_{ON}	1,079								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.12234		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00061168**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	6.12E-04	3.74E-07	2.29E-10	1.40E-13	8.56E-17	5.24E-20	3.20E-23	1.96E-26
	$(1 - P)^{T-N}$		0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.78	0.19	2.43E-02	2.02E-03	1.26E-04	6.22E-06	2.56E-07	9.04E-09	2.78E-10
Same probabilities as previous line expressed in scientific notation			7.79E-01	1.95E-01	2.43E-02	2.02E-03	1.26E-04	6.22E-06	2.56E-07	9.04E-09	2.78E-10
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.22								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	138								
	Total # grit-sized particles per unit area	T_{ON}	953								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.14481		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00072403**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	7.24E-04	5.24E-07	3.80E-10	2.75E-13	1.99E-16	1.44E-19	1.04E-22	7.55E-26
	$(1 - P)^{T-N}$		0.74	0.74	0.74	0.75	0.75	0.75	0.75	0.75	0.75
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.74	0.22	3.26E-02	3.20E-03	2.35E-04	1.38E-05	6.74E-07	2.81E-08	1.02E-09
Same probabilities as previous line expressed in scientific notation			7.44E-01	2.20E-01	3.26E-02	3.20E-03	2.35E-04	1.38E-05	6.74E-07	2.81E-08	1.02E-09
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.26								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	47								
	Total # grit-sized particles per unit area	T_{ON}	1,020								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.04608		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00023039**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.30E-04	5.31E-08	1.22E-11	2.82E-15	6.49E-19	1.50E-22	3.45E-26	7.94E-30
	$(1 - P)^{T-N}$		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.91	0.09	4.03E-03	1.26E-04	2.95E-06	5.50E-08	8.54E-10	1.13E-11	1.31E-13
Same probabilities as previous line expressed in scientific notation			9.10E-01	8.58E-02	4.03E-03	1.26E-04	2.95E-06	5.50E-08	8.54E-10	1.13E-11	1.31E-13
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.09								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	3								
	Total # grit-sized particles per unit area	T_{ON}	870								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00345		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.7241E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.72E-05	2.97E-10	5.13E-15	8.84E-20	1.52E-24	2.63E-29	4.53E-34	7.81E-39
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	2.46E-05	5.76E-08	1.01E-10	1.41E-13	1.63E-16	1.62E-19	1.41E-22
Same probabilities as previous line expressed in scientific notation			9.93E-01	7.00E-03	2.46E-05	5.76E-08	1.01E-10	1.41E-13	1.63E-16	1.62E-19	1.41E-22
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	59								
	Total # grit-sized particles per unit area	T_{ON}	2,220								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.02658		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00013288**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.33E-04	1.77E-08	2.35E-12	3.12E-16	4.14E-20	5.51E-24	7.32E-28	9.72E-32
	$(1 - P)^{T-N}$		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.95	0.05	1.40E-03	2.52E-05	3.39E-07	3.65E-09	3.27E-11	2.50E-13	1.67E-15
Same probabilities as previous line expressed in scientific notation			9.47E-01	5.15E-02	1.40E-03	2.52E-05	3.39E-07	3.65E-09	3.27E-11	2.50E-13	1.67E-15
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.05								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	94								
	Total # grit-sized particles per unit area	T_{ON}	2,323								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.04046		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00020232**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.02E-04	4.09E-08	8.28E-12	1.68E-15	3.39E-19	6.86E-23	1.39E-26	2.81E-30
	$(1 - P)^{T-N}$		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.92	0.08	3.15E-03	8.64E-05	1.77E-06	2.91E-08	3.96E-10	4.62E-12	4.69E-14
Same probabilities as previous line expressed in scientific notation			9.21E-01	7.62E-02	3.15E-03	8.64E-05	1.77E-06	2.91E-08	3.96E-10	4.62E-12	4.69E-14
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.08								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	44								
	Total # grit-sized particles per unit area	T_{ON}	3,772								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.01166		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**5.8324E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	5.83E-05	3.40E-09	1.98E-13	1.16E-17	6.75E-22	3.94E-26	2.30E-30	1.34E-34
	$(1 - P)^{T-N}$		0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.98	0.02	2.77E-04	2.19E-06	1.30E-08	6.13E-11	2.41E-13	8.09E-16	2.37E-18
Same probabilities as previous line expressed in scientific notation			9.76E-01	2.33E-02	2.77E-04	2.19E-06	1.30E-08	6.13E-11	2.41E-13	8.09E-16	2.37E-18
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.02								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	9								
	Total # grit-sized particles per unit area	T_{ON}	4,031								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00223		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.1163E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.12E-05	1.25E-10	1.39E-15	1.55E-20	1.73E-25	1.94E-30	2.16E-35	2.41E-40
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.04E-05	1.57E-08	1.78E-11	1.61E-14	1.21E-17	7.76E-21	4.35E-24
Same probabilities as previous line expressed in scientific notation			9.95E-01	4.55E-03	1.04E-05	1.57E-08	1.78E-11	1.61E-14	1.21E-17	7.76E-21	4.35E-24
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	132								
	Total # grit-sized particles per unit area	T_{ON}	2,478								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.05327		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00026634**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.66E-04	7.09E-08	1.89E-11	5.03E-15	1.34E-18	3.57E-22	9.51E-26	2.53E-29
	$(1 - P)^{T-N}$		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.90	0.10	5.31E-03	1.92E-04	5.19E-06	1.12E-07	2.01E-09	3.08E-11	4.13E-13
Same probabilities as previous line expressed in scientific notation			8.97E-01	9.77E-02	5.31E-03	1.92E-04	5.19E-06	1.12E-07	2.01E-09	3.08E-11	4.13E-13
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.10								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	94								
	Total # grit-sized particles per unit area	T_{ON}	709								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.13258		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00066291**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	6.63E-04	4.39E-07	2.91E-10	1.93E-13	1.28E-16	8.49E-20	5.63E-23	3.73E-26
	$(1 - P)^{T-N}$		0.76	0.76	0.76	0.76	0.76	0.76	0.77	0.77	0.77
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.76	0.21	2.80E-02	2.52E-03	1.70E-04	9.11E-06	4.07E-07	1.55E-08	5.18E-10
Same probabilities as previous line expressed in scientific notation			7.62E-01	2.07E-01	2.80E-02	2.52E-03	1.70E-04	9.11E-06	4.07E-07	1.55E-08	5.18E-10
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.24								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	135								
	Total # grit-sized particles per unit area	T_{ON}	838								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.16110		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00080549**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	8.05E-04	6.49E-07	5.23E-10	4.21E-13	3.39E-16	2.73E-19	2.20E-22	1.77E-25
	$(1 - P)^{T-N}$		0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.72	0.24	3.90E-02	4.27E-03	3.49E-04	2.28E-05	1.24E-06	5.74E-08	2.33E-09
Same probabilities as previous line expressed in scientific notation			7.19E-01	2.37E-01	3.90E-02	4.27E-03	3.49E-04	2.28E-05	1.24E-06	5.74E-08	2.33E-09
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.28								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	179								
	Total # grit-sized particles per unit area	T_{ON}	3,149								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.05684		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00028422**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.84E-04	8.08E-08	2.30E-11	6.53E-15	1.85E-18	5.27E-22	1.50E-25	4.26E-29
	$(1 - P)^{T-N}$		0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.89	0.10	6.00E-03	2.32E-04	6.68E-06	1.54E-07	2.95E-09	4.82E-11	6.89E-13
Same probabilities as previous line expressed in scientific notation			8.90E-01	1.04E-01	6.00E-03	2.32E-04	6.68E-06	1.54E-07	2.95E-09	4.82E-11	6.89E-13
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.11								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	32								
	Total # grit-sized particles per unit area	T_{ON}	5,686								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00563		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**2.8139E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.81E-05	7.92E-10	2.23E-14	6.27E-19	1.76E-23	4.96E-28	1.40E-32	3.93E-37
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	6.53E-05	2.49E-07	7.12E-10	1.62E-12	3.08E-15	4.98E-18	7.05E-21
Same probabilities as previous line expressed in scientific notation			9.89E-01	1.14E-02	6.53E-05	2.49E-07	7.12E-10	1.62E-12	3.08E-15	4.98E-18	7.05E-21
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	35								
	Total # grit-sized particles per unit area	T_{ON}	770								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.04545		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00022727**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.27E-04	5.17E-08	1.17E-11	2.67E-15	6.06E-19	1.38E-22	3.13E-26	7.12E-30
	$(1 - P)^{T-N}$		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.91	0.08	3.93E-03	1.21E-04	2.80E-06	5.15E-08	7.88E-10	1.03E-11	1.18E-13
Same probabilities as previous line expressed in scientific notation			9.11E-01	8.47E-02	3.93E-03	1.21E-04	2.80E-06	5.15E-08	7.88E-10	1.03E-11	1.18E-13
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.09								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	162								
	Total # grit-sized particles per unit area	T_{ON}	1,861								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.08705		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00043525**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	4.35E-04	1.89E-07	8.25E-11	3.59E-14	1.56E-17	6.80E-21	2.96E-24	1.29E-27
	$(1 - P)^{T-N}$		0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.84	0.15	1.32E-02	7.82E-04	3.46E-05	1.22E-06	3.57E-08	8.96E-10	1.96E-11
Same probabilities as previous line expressed in scientific notation			8.37E-01	1.49E-01	1.32E-02	7.82E-04	3.46E-05	1.22E-06	3.57E-08	8.96E-10	1.96E-11
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.16								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	109								
	Total # grit-sized particles per unit area	T_{ON}	3,413								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.03194		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00015968**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.60E-04	2.55E-08	4.07E-12	6.50E-16	1.04E-19	1.66E-23	2.65E-27	4.23E-31
	$(1 - P)^{T-N}$		0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.94	0.06	1.99E-03	4.32E-05	7.00E-07	9.06E-09	9.74E-11	8.96E-13	7.19E-15
Same probabilities as previous line expressed in scientific notation			9.37E-01	6.12E-02	1.99E-03	4.32E-05	7.00E-07	9.06E-09	9.74E-11	8.96E-13	7.19E-15
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.06								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	38								
	Total # grit-sized particles per unit area	T_{ON}	920								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.04130		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0.00020652**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.07E-04	4.27E-08	8.81E-12	1.82E-15	3.76E-19	7.76E-23	1.60E-26	3.31E-30
	$(1 - P)^{T-N}$		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.92	0.08	3.27E-03	9.17E-05	1.92E-06	3.22E-08	4.47E-10	5.32E-12	5.52E-14
Same probabilities as previous line expressed in scientific notation			9.19E-01	7.76E-02	3.27E-03	9.17E-05	1.92E-06	3.22E-08	4.47E-10	5.32E-12	5.52E-14
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.08								

1 - Source of Table is Appendix A from Bennett et al., (2011)

LEAD PROBABILITY MODEL CALCULATIONS

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TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	151								
	Total # grit-sized particles per unit area	T_{ON}	33,575								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00450		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**2.2487E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	2.25E-05	5.06E-10	1.14E-14	2.56E-19	5.75E-24	1.29E-28	2.91E-33	6.54E-38
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	4.18E-05	1.28E-07	2.91E-10	5.30E-13	8.03E-16	1.04E-18	1.17E-21
Same probabilities as previous line expressed in scientific notation			9.91E-01	9.11E-03	4.18E-05	1.28E-07	2.91E-10	5.30E-13	8.03E-16	1.04E-18	1.17E-21
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	54								
	Total # grit-sized particles per unit area	T_{ON}	51,840								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00104		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**5.2083E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	5.21E-06	2.71E-11	1.41E-16	7.36E-22	3.83E-27	2.00E-32	1.04E-37	5.41E-43
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	2.26E-06	1.60E-09	8.44E-13	3.56E-16	1.25E-19	3.74E-23	9.80E-27
Same probabilities as previous line expressed in scientific notation			9.98E-01	2.13E-03	2.26E-06	1.60E-09	8.44E-13	3.56E-16	1.25E-19	3.74E-23	9.80E-27
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	25								
	Total # grit-sized particles per unit area	T_{ON}	9,125								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00274		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.3699E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.37E-05	1.88E-10	2.57E-15	3.52E-20	4.82E-25	6.61E-30	9.05E-35	1.24E-39
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	1.56E-05	2.89E-08	4.02E-11	4.46E-14	4.12E-17	3.25E-20	2.24E-23
Same probabilities as previous line expressed in scientific notation			9.94E-01	5.57E-03	1.56E-05	2.89E-08	4.02E-11	4.46E-14	4.12E-17	3.25E-20	2.24E-23
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	0								
	Total # grit-sized particles per unit area	T_{ON}	86,900								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00000		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	#NUM!	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Same probabilities as previous line expressed in scientific notation			#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	#NUM!								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	8								
	Total # grit-sized particles per unit area	T_{ON}	56,686								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00014		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**7.0564E-07**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	7.06E-07	4.98E-13	3.51E-19	2.48E-25	1.75E-31	1.23E-37	8.71E-44	6.15E-50
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	4.15E-08	3.98E-12	2.85E-16	1.63E-20	7.73E-25	3.14E-29	1.11E-33
Same probabilities as previous line expressed in scientific notation			1.00E+00	2.89E-04	4.15E-08	3.98E-12	2.85E-16	1.63E-20	7.73E-25	3.14E-29	1.11E-33
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	35								
	Total # grit-sized particles per unit area	T_{ON}	26,672								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00131		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**6.5612E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	6.56E-06	4.30E-11	2.82E-16	1.85E-21	1.22E-26	7.98E-32	5.23E-37	3.43E-42
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	3.58E-06	3.19E-09	2.12E-12	1.13E-15	4.99E-19	1.88E-22	6.21E-26
Same probabilities as previous line expressed in scientific notation			9.97E-01	2.68E-03	3.58E-06	3.19E-09	2.12E-12	1.13E-15	4.99E-19	1.88E-22	6.21E-26
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	241								
	Total # grit-sized particles per unit area	T_{ON}	29,800								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00809		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**4.0436E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	4.04E-05	1.64E-09	6.61E-14	2.67E-18	1.08E-22	4.37E-27	1.77E-31	7.15E-36
	$(1 - P)^{T-N}$		0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.98	0.02	1.34E-04	7.36E-07	3.02E-09	9.90E-12	2.69E-14	6.27E-17	1.27E-19
Same probabilities as previous line expressed in scientific notation			9.84E-01	1.63E-02	1.34E-04	7.36E-07	3.02E-09	9.90E-12	2.69E-14	6.27E-17	1.27E-19
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.02								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	62								
	Total # grit-sized particles per unit area	T_{ON}	33,204								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00187		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**9.3362E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	9.34E-06	8.72E-11	8.14E-16	7.60E-21	7.09E-26	6.62E-31	6.18E-36	5.77E-41
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	7.25E-06	9.18E-09	8.70E-12	6.58E-15	4.13E-18	2.22E-21	1.04E-24
Same probabilities as previous line expressed in scientific notation			9.96E-01	3.80E-03	7.25E-06	9.18E-09	8.70E-12	6.58E-15	4.13E-18	2.22E-21	1.04E-24
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	6								
	Total # grit-sized particles per unit area	T_{ON}	31,532								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00019		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**9.5141E-07**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	9.51E-07	9.05E-13	8.61E-19	8.19E-25	7.80E-31	7.42E-37	7.06E-43	6.71E-49
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	7.55E-08	9.74E-12	9.41E-16	7.25E-20	4.65E-24	2.54E-28	1.22E-32
Same probabilities as previous line expressed in scientific notation			1.00E+00	3.89E-04	7.55E-08	9.74E-12	9.41E-16	7.25E-20	4.65E-24	2.54E-28	1.22E-32
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	59								
	Total # grit-sized particles per unit area	T_{ON}	49,554								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00119		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**5.9531E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	5.95E-06	3.54E-11	2.11E-16	1.26E-21	7.48E-27	4.45E-32	2.65E-37	1.58E-42
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	2.95E-06	2.38E-09	1.44E-12	6.94E-16	2.78E-19	9.54E-23	2.85E-26
Same probabilities as previous line expressed in scientific notation			9.98E-01	2.43E-03	2.95E-06	2.38E-09	1.44E-12	6.94E-16	2.78E-19	9.54E-23	2.85E-26
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

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Description	Parameter	Parameter code	Values								
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	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	15								
	Total # grit-sized particles per unit area	T_{ON}	55,742								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00027		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.3455E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.35E-06	1.81E-12	2.44E-18	3.28E-24	4.41E-30	5.93E-36	7.98E-42	1.07E-47
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.51E-07	2.76E-11	3.76E-15	4.10E-19	3.72E-23	2.88E-27	1.95E-31
Same probabilities as previous line expressed in scientific notation			9.99E-01	5.50E-04	1.51E-07	2.76E-11	3.76E-15	4.10E-19	3.72E-23	2.88E-27	1.95E-31
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

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Description	Parameter	Parameter code	Values								
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	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	24								
	Total # grit-sized particles per unit area	T_{ON}	32,393								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00074		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**3.7045E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	3.70E-06	1.37E-11	5.08E-17	1.88E-22	6.98E-28	2.58E-33	9.57E-39	3.55E-44
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.14E-06	5.75E-10	2.16E-13	6.48E-17	1.62E-20	3.45E-24	6.42E-28
Same probabilities as previous line expressed in scientific notation			9.98E-01	1.51E-03	1.14E-06	5.75E-10	2.16E-13	6.48E-17	1.62E-20	3.45E-24	6.42E-28
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

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Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	12								
	Total # grit-sized particles per unit area	T_{ON}	42,712								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00028		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.4048E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.40E-06	1.97E-12	2.77E-18	3.89E-24	5.47E-30	7.68E-36	1.08E-41	1.52E-47
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.65E-07	3.14E-11	4.47E-15	5.09E-19	4.81E-23	3.89E-27	2.75E-31
Same probabilities as previous line expressed in scientific notation			9.99E-01	5.74E-04	1.65E-07	3.14E-11	4.47E-15	5.09E-19	4.81E-23	3.89E-27	2.75E-31
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

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	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	3								
	Total # grit-sized particles per unit area	T_{ON}	10,660								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00028		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.4071E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.41E-06	1.98E-12	2.79E-18	3.92E-24	5.52E-30	7.76E-36	1.09E-41	1.54E-47
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.65E-07	3.15E-11	4.50E-15	5.13E-19	4.86E-23	3.94E-27	2.78E-31
Same probabilities as previous line expressed in scientific notation			9.99E-01	5.75E-04	1.65E-07	3.15E-11	4.50E-15	5.13E-19	4.86E-23	3.94E-27	2.78E-31
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

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	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	0								
	Total # grit-sized particles per unit area	T_{ON}	11,390								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00000		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**0**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	#NUM!	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Same probabilities as previous line expressed in scientific notation			#NUM!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	#NUM!								

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	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	79								
	Total # grit-sized particles per unit area	T_{ON}	64,468								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00123		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**6.1271E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	6.13E-06	3.75E-11	2.30E-16	1.41E-21	8.64E-27	5.29E-32	3.24E-37	1.99E-42
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	3.12E-06	2.60E-09	1.62E-12	8.02E-16	3.31E-19	1.17E-22	3.59E-26
Same probabilities as previous line expressed in scientific notation			9.97E-01	2.50E-03	3.12E-06	2.60E-09	1.62E-12	8.02E-16	3.31E-19	1.17E-22	3.59E-26
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

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	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	3								
	Total # grit-sized particles per unit area	T_{ON}	18,431								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00016		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**8.1385E-07**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	8.14E-07	6.62E-13	5.39E-19	4.39E-25	3.57E-31	2.91E-37	2.36E-43	1.92E-49
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	5.52E-08	6.10E-12	5.04E-16	3.32E-20	1.82E-24	8.53E-29	3.49E-33
Same probabilities as previous line expressed in scientific notation			1.00E+00	3.33E-04	5.52E-08	6.10E-12	5.04E-16	3.32E-20	1.82E-24	8.53E-29	3.49E-33
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	59								
	Total # grit-sized particles per unit area	T_{ON}	35,036								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00168		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**8.4199E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	8.42E-06	7.09E-11	5.97E-16	5.03E-21	4.23E-26	3.56E-31	3.00E-36	2.53E-41
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	5.89E-06	6.73E-09	5.75E-12	3.92E-15	2.23E-18	1.08E-21	4.56E-25
Same probabilities as previous line expressed in scientific notation			9.97E-01	3.43E-03	5.89E-06	6.73E-09	5.75E-12	3.92E-15	2.23E-18	1.08E-21	4.56E-25
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	94								
	Total # grit-sized particles per unit area	T_{ON}	41,328								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00227		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.1372E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.14E-05	1.29E-10	1.47E-15	1.67E-20	1.90E-25	2.16E-30	2.46E-35	2.80E-40
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.07E-05	1.66E-08	1.91E-11	1.76E-14	1.35E-17	8.83E-21	5.05E-24
Same probabilities as previous line expressed in scientific notation			9.95E-01	4.63E-03	1.07E-05	1.66E-08	1.91E-11	1.76E-14	1.35E-17	8.83E-21	5.05E-24
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	44								
	Total # grit-sized particles per unit area	T_{ON}	59,464								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00074		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**3.6997E-06**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	3.70E-06	1.37E-11	5.06E-17	1.87E-22	6.93E-28	2.56E-33	9.49E-39	3.51E-44
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	1.14E-06	5.72E-10	2.15E-13	6.44E-17	1.60E-20	3.42E-24	6.35E-28
Same probabilities as previous line expressed in scientific notation			9.98E-01	1.51E-03	1.14E-06	5.72E-10	2.15E-13	6.44E-17	1.60E-20	3.42E-24	6.35E-28
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	9								
	Total # grit-sized particles per unit area	T_{ON}	69,931								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00013		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**6.4349E-07**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	6.43E-07	4.14E-13	2.66E-19	1.71E-25	1.10E-31	7.10E-38	4.57E-44	2.94E-50
	$(1 - P)^{T-N}$		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	1.00	0.00	3.45E-08	3.02E-12	1.97E-16	1.03E-20	4.45E-25	1.65E-29	5.33E-34
Same probabilities as previous line expressed in scientific notation			1.00E+00	2.63E-04	3.45E-08	3.02E-12	1.97E-16	1.03E-20	4.45E-25	1.65E-29	5.33E-34
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.00								

1 - Source of Table is Appendix A from Bennett et al., (2011)

TABLE 6

MODEL FOR ESTIMATING PROBABILITY OF INGESTING N LEAD PARTICLES BY THE MOURNING DOVE[1]
SKEET RANGE - MAIN BASE RANGE COMPLEX
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Description	Parameter	Parameter code	Values								
Estimate particle ingestion rate using mean number of grit particles in gizzards divided by estimated retention time in days	Mean # grit-sized particles/gizzard	G	10		ENTER PARAMETER ESTIMATES ONLY IN BLUE CELLS						
	Mean particle retention time (i.e., mean # days particle reta	RT	6								
	Daily particle ingestion rate (i.e., mean # particles ingested/day)	$DPIR = G/RT$	2		Alternative estimate of $DPIR$		0				
Choose number of days of exposure period to consider—ranging from 1 (if interested in daily risk) to the maximum number of days/year at site of concern—to estimate particle ingestion rate for total exposure period	# days in exposure period	D	245								
	Exposure period particle ingestion rate (i.e., mean # particles ingested/exposure period)	$EPPIR = DPIR \times D$	408								
	Rounded-up particle ingestion rate/exposure period (T)	T = Roundup ($EPPIR$)	**409**								
Proportion of grit-sized particles available on-site that are lead	# Lead particles per unit area	L_{ON}	132								
	Total # grit-sized particles per unit area	T_{ON}	50,727								
	Prop of lead particles on-site	$P_{ON} = L_{ON}/T_{ON}$	0.00260		Alternative method of estimating P_{ON}		0				
Proportion of grit-sized particles available off-site that are lead	# Lead particles per unit area	L_{OFF}	0								
	Total # grit-sized particles per unit area	T_{OFF}	1,000,000								
	Prop of lead particles off-site	$P_{OFF} = L_{OFF}/T_{OFF}$	0		Alternative method of estimating P_{OFF}		0				
	Prop of foraging time on-site	F	0.005								
	Proportion of lead particles from all foraging sites	$P = P_{ON} \times F + P_{OFF} \times (1 - F)$	**1.3011E-05**								
	# of lead particles ingested/ exposure period	N	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Calculate components of the probability mass function for each # of ingested lead particles	P^N		1.00	1.30E-05	1.69E-10	2.20E-15	2.87E-20	3.73E-25	4.85E-30	6.31E-35	8.21E-40
	$(1 - P)^{T-N}$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
	$T!/(N! \times (T - N)!)$ (see note on FACTORIAL worksheet)		1	409	8.34E+04	1.13E+07	1.15E+09	9.31E+10	6.27E+12	3.61E+14	1.81E+16
Probability of ingesting N lead particles during exposure period	$Pr(N) = [T!/(N! \times (T - N)!)] \times P^N \times (1 - P)^{T-N}$	$Pr(N)$	0.99	0.01	1.40E-05	2.48E-08	3.28E-11	3.45E-14	3.02E-17	2.27E-20	1.48E-23
Same probabilities as previous line expressed in scientific notation			9.95E-01	5.29E-03	1.40E-05	2.48E-08	3.28E-11	3.45E-14	3.02E-17	2.27E-20	1.48E-23
Peddicord and LaKind calculates prob of ingesting ≥1 lead particle as 1 minus probability of consuming 0 lead particles		$1 - Pr(0)$	0.01								

1 - Source of Table is Appendix A from Bennett et al., (2011)