National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
White Sands Test Facility
P.O. Box 20
Las Cruces, NM 88004-0020

January 26, 2023

Reply to Attn of: RE-23-023

Mr. Rick Shean, Bureau Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Subject: Approval with Modifications Revised Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report and Risk Assessment Report; NMED Comment 1.b.

On August 3, 2020, NASA submitted the *Revised Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report and Risk Assessment Report* to the NMED Hazardous Waste Bureau. NMED approved the revised report with modifications on November 16, 2022. In the Approval with Modifications (Comment 1.b.), NMED stated:

> *Based on the current nature and extent of contamination at WSTF in association with other known contaminants of concern released at other WSTF SWMUS, areas of concern, and closed hazardous waste management units, and the respective ongoing investigations and groundwater contamination remediation, submittal of a petition for a "corrective action complete" status determination for SWMUs 29, 30, and 31 is not appropriate at this time; a petition may be considered in the future by NMED with appropriate prior consultation. The RCR may be revised to address NMED's determination, and any necessary replacement pages provided.*

NASA does not understand NMED's rationale for this statement and requests additional clarification. The connection between solid waste management units (SWMUs) 29-31 and other WSTF SWMUs, Area of Concern (AOCs), hazardous waste management units (HWMUs), and groundwater contamination is not clear.

NASA performed NMED-approved accelerated corrective measures at the three small arms firing ranges in accordance with Section VII.L of the WSTF Hazardous Waste Permit, issued by NMED in 2009. The accelerated cleanup process is used "…at sites to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup…" NASA proposed in the NMED-approved *NASA WSTF Small Arms Firing Ranges (SWMUs 29 - 31) Accelerated Corrective Measures Work Plan and Historical Information Summary* (February 26, 2015) and demonstrated in the *Remedy Completion Report* (August 3, 2020; revised) that soil contamination at these SWMUs does not impact groundwater at the site. NASA also demonstrated in the *Risk Assessment Report* (August

3, 2020) that the risk to potential receptors was acceptable at all three firing ranges and that there was no potential for migration of contaminants of concern to the groundwater.

SWMUs 29-31 are not connected to or associated with other WSTF SWMUs or HWMUs, and the firing ranges contaminants of concern are typically different from other SWMUs and HWMUs. SWMU 29 (Small Arms Range at STGT) is adjacent to AOC 51 (STGT Wastewater Lagoons); however, contaminants of concern differ between the units and each unit is subject to investigation and cleanup independent of the other as indicated in NMED-approved work plans for each.

NASA was unable to locate specific information regarding the request for corrective action complete determinations in available regulations or NMED risk assessment guidance. NASA's 2009 Hazardous Waste Permit does not provide specific information on the process for changing the status of a unit from "corrective action required" to "corrective action complete." NASA reviewed the Draft Hazardous Waste Permit for WSTF, published by NMED on May 26, 2022, and compared the Draft Permit to the Permits of other Federal Facilities in New Mexico. NASA noted that permits issued to Sandia and Los Alamos National Laboratories include specific instructions to the Permittees on how to request corrective action complete status determinations from NMED. NASA requested that comparable language to be added to the WSTF Permit in comments provided to NMED on August 23, 2022. Pending release of the new WSTF Hazardous Waste Permit, NASA relies on NMED's approach to granting corrective action complete status at other regulated facilities to provide guidance for such a request. Based on a review of documents related to corrective action complete efforts at the U.S. Army's White Sands Missile Range, NASA concluded that petitions for corrective action complete status determinations are submitted to NMED following completion of NMED-approved investigations and/or corrective action and NMED's determination that those activities are complete and that there is no residual risk from the SWMU. These actions have been completed for WSTF SWMUs 29-31; thus, NASA believes the three firing ranges are ideally suited for corrective action complete status based on the successful accelerated corrective measures and positive risk assessment.

NASA's clearly stated objective in various correspondence to NMED related to site investigation and corrective action is to complete cleanup of WSTF's HWMUs, SWMUs, and AOCs. NASA pursued this objective while performing NMED-approved accelerated corrective measures at SWMUs 29-31 and demonstrated that the cleanup criteria and health risk goals were achieved. NMED's technical justification for the "inappropriate" determination provided in Comment 1.b. of the *Approval with Modifications Revised Small Arms Firing Ranges (SWMU 29-31) Remedy Completion Report and Risk Assessment Report* is not clear to NASA. NASA requests NMED provide additional information and clarification on the appropriateness of requesting a Permit modification that petitions for corrective action complete status determination. Further, pending release of NASA's Hazardous Waste Permit, NASA requests NMED guidance on the manner in which corrective action complete status determinations can be requested and granted by NMED.

This submittal provides a response table of NMED's comments and NASA's responses as Enclosure 1. Printed replacement pages for the revised remedy completion report and risk assessment report are provided as Enclosure 2. A DVD-ROM with the electronic revised and redline-strikeout versions of the remedy completion report, revised and redline-strikeout version of the risk assessment report and response table are included as Enclosure 3.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions or comments concerning this submittal, please contact Antonette Doherty of my staff at 575-202-5406.

AMANDA SKARSGARD
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Date: 2023.01.26 15:08:50 -07'00'

For: Timothy J. Davis
Chief, Environmental Office

3 Enclosures

cc:
Mr. Gabriel Acevedo
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Comments for Approval with Modifications of the Revised Small Arms Firing Range (SWMUs 29-31) Remedy Completion Report

NMED Comment Number	NMED Comments	NASA Revisions/Responses/Discussion
1. Remedy Completion Report (RCR), Section 8.2, Remedy Certification, Page 28	**NMED Comment:** The following RCR Section 8.2 issues must be addressed: a. A discrepancy in the cited Permit section for the proposed remedy certification was noted (i.e., Permit Section VILK.6.a [sic]). Furthermore, the remedy certification required by November 2009 National Aeronautics and Space Administration White Sands Test [WSTF] Facility Hazardous Waste Permit (Permit), Section VII.K. 6.a, Remedy Completion Report, only applies to projects implemented under Permit Section VII.K, Corrective Measures Implementation. The project was Approved by NMED upon issuance of the May 29, 2015 Approval with Modifications NASA WSTF Small Arms Firing (SWMUs 29 - 31) Ranges Accelerated Corrective Measures Work Plan and Historical Information Summary, for the Permit Section VII.L, Accelerated Cleanup Process (see RCR Section 1.2, Regulatory Requirements), and does not require remedy certification; the section only requires submittal of a Remedy Completion Report for NMED review and response. The Remedy Certification section must be removed from the RCR, and revised replacement pages provided. b. Based on the current nature and extent of contamination at WSTF in association with other known contaminants of concern released at other WSTF SWMUs, areas of concern, and closed hazardous waste management units, and the respective ongoing investigations and groundwater contamination remediation, submittal of a petition for a "corrective action complete" status determination for SWMUs 29, 30, and 31 is not	a. Section 8.2 (Remedy Completion) has been revised to remove the discrepancy. The section now states that the submittal of this report satisfies the requirements of Permit Section VII.L, Accelerated Cleanup Process. b. NASA will consult with NMED to determine the process, if not previously established, to develop and submit a petition for a "Corrective Action Complete" status determination for the STGT (SMWU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges. Section 8.2 has been revised accordingly.

NMED Comment Number	NMED Comments	NASA Revisions/Responses/Discussion
	appropriate at this time; a petition may be considered in the future by NMED with appropriate prior consultation. The RCR may be revised to address NMED's determination, and any necessary replacement pages provided.	
2. Risk Assessment Report (RAR), Section 3.1.4, Exposure Pathways, Pages 4 and 5	**Permittee Statement:** "Consistent with NMED soil screening methodology, four potential exposure pathways are evaluated: 1) ingestion of lead-contaminated soil; 2) inhalation of airborne lead-contaminated dust; 3) dermal contact with lead-contaminated soil, and 4) ingestion of lead-contaminated groundwater." **NMED Comment:** The Permittee statement must be revised to remove the specific reference to lead as the exposure pathways apply to all contaminants of potential concern (COPCs) that are addressed in the risk assessments for SWMUs 29, 30, and 31. Revise the RAR accordingly and provide the revised replacement pages.	Specific reference to lead has been removed from Section 3.1.4 of the Risk Assessment Report (RAR) so that all contaminants of potential concern (COPCs) are now addressed in the section.
3. Risk Assessment Report, Section 6.0, Risk Screening Levels, Page 10	**NMED Comment:** The following comments must be addressed: a. The Permittee stated that "[t]he RA Guidance [NMED's Risk Assessment Guidance for Site Investigations and Remediation] does not include SSLs [Soil Screening Levels] for tin, so these screening levels were obtained from EPA [United States Environmental Protection Agency] Regional Screening Levels (RSLs) at the EPA risk assessment website and adjusted to 1E-05 for cancer risk." Tin is non-carcinogenic, as such, a carcinogenic correction factor would not be required for use of the screening level during risk evaluation. However, NMED notes that the correct screening levels for the resident and industrial worker were used during risk assessment. Remove	a. The text stating that a carcinogenic correction factor is needed for tin has been removed from Section 6.0 of the Risk Assessment Report. b. Noted.

NMED Comment Number	NMED Comments	NASA Revisions/Responses/Discussion
	the statement from the RAR and provide a revised replacement page. b. For evaluation of tin during the ecological risk assessment the Permittee stated that, "[t]he EPA does not include tin in the Table 1.1 list of metals to be considered in developing ecological soil screening levels." NMED notes that no ecological toxicological data are readily available for tin to derive a screening level for ecological risk screen evaluation. Exclusion of tin from the ecological risk assessment is acceptable and no revisions to the RAR or RCR are required in response to this comment.	
4. Risk Assessment Report, Section 7.3.2, STGT (SWMU 29) Ecological Receptors, Pages 12 and 13	**Permittee Statement:** "Maximum COPEC [contaminant of potential ecological concern] (copper) concentrations were used to generate screening level hazard quotients (SLHQs) for the deer mouse, horned lark, and plant receptor populations. The NMED target hazard of 1 was exceeded for each receptor." **NMED Comment:** The HQs on RAR Appendix D, Table 1, Tier I Hazard Quotients for Ecological Receptors at the STGT Firing Range (SWMU 29), indicate all three Tier I SLHQs are either equal to or less than the NMED hazard index 1. As such, a Tier II assessment would not be required. Clarify this apparent discrepancy, and if needed, remove the Tier II screening assessment from the revised RAR and provide revised replacement pages.	Section 7.3.2 of the Risk Assessment Report was revised to state that the Tier I Hazard Quotients did not exceed the NMED hazard index 1 and that a Tier II screening assessment is not required for SWMU 29. The Tier II Screening Level Ecological Risk Assessment for SWMU 29 was removed from the report. The Tier II screening discussion was also removed from Section 5.2.3.2 of the revised Remedy Completion Report.
5. Risk Assessment Report, Section 7.5.2, WB-2 (SWMU 31) Ecological Receptors, Page 15	**Permittee Statement:** "The NMED target hazard of 1 was exceeded for the deer mouse, horned lark, and receptors [sic]." **NMED Comment:** Clarify the statement to indicate that the risk screen evaluation results also apply to plant receptors. Provide a replacement page with the revised statement.	Section 7.5.2 of the Risk Assessment Report was revised to include “plant receptors” where appropriate.

NMED Comment Number	NMED Comments	NASA Revisions/Responses/Discussion
6. Risk Assessment Report, Table 7.1, Residential, Industrial, and Construction Worker Hazard from Firing Range COPCs, Page 33	**NMED Comment:** The following issues must be addressed: a. A screening level was not listed for tin for the construction worker on Table 7.1 for the SWMU 31 risk screen evaluation, and footnote four indicates that a screening level for the construction worker is not established. The RAR must be revised to address the construction worker and potential risk from tin by providing lines of evidence to address the exclusion of tin in the risk assessment. As exposure to tin in soil is not driven by inhalation toxicity, lines of evidence that clarify that the residential exposure scenario risk assessment results would also be protective of the construction worker and are acceptable in addition to any other supporting information. Revise the RAR to address risk to the construction worker for tin and provide revised replacement pages. b. A hazard quotient (HQ) was calculated for lead for SWMUs 30 and 31 risk screen evaluations, and the HQ was conservatively added to the hazard indices (HIs) for each receptor. While the footnote indicates this was conservative, it is incorrect to include lead in the cumulative risk screen evaluation because the screening levels for lead are not based on an oral reference dose, but rather blood lead levels (see NMED's June 2022 RA Guidance, Section 5.0, Use of the SSL for reference). The required modification does not adversely affect the conclusions of the human health risk assessments for the sites; however, Table 7.1 HIs must be revised to exclude lead from the cumulative risk screen evaluations, and the RAR must be revised to discuss the results of the screening level evaluation for lead and the revised cumulative risk screen results for the remaining	a. Section 7.5.1 of the Risk Assessment Report has been revised to include lines of evidence that the residential exposure scenario risk assessment results are also protective of the construction worker. b. Table 7.1 in the Risk Assessment Report was revised to exclude lead hazard quotients from cumulative hazard indices. Lead remains in Table 7.1 to show its individual risk, but a footnote now states that lead is not included in the cumulative risk screen evaluation. Sections 7.4.1 and 7.5.1 of the Risk Assessment Report have both been revised to reflect the changes to Table 7.1. Text has also been added to both sections stating that lead individually does not exceed screening levels. Section 5.2.4.1 and Section 5.2.5.1 of the revised Remedy Completion Report have also been revised to state that lead is not included in cumulative hazard indices and individually did not exceed screening levels.

NMED Comment Number	NMED Comments	NASA Revisions/Responses/Discussion
	COPCs for all SWMUs 30 and 31 human health receptors. Revise the RAR and RCR accordingly and provide revised replacement pages.	

National Aeronautics and Space Administration

Revised Small Arms Firing Ranges (SWMUs 29-31)
Remedy Completion Report

March 2018

Revised April 2020

Revised January 2023

NM 8800019434

Revised Small Arms Firing Ranges (SWMUs 29-31)
Remedy Completion Report

March 2018

Revised April 2020

Revised January 2023

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

AMANDA SKARSGARD Digitally signed by AMANDA SKARSGARD Date: 2023.01.26 15:09:46 -07'00'

For: Timothy J. Davis
Chief, Environmental Office

See Electronic Signature

Date

National Aeronautics and Space Administration

Johnson Space Center
White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012
www.nasa.gov/centers/wstf

www.nasa.gov

Executive Summary

The National Aeronautics and Space Administration (NASA) is required by the White Sands Test Facility (WSTF) Hazardous Waste Permit (Permit; NMED, 2019e) issued by the New Mexico Environment Department (NMED) to develop investigation work plans (IWPs) for identified closed hazardous waste management units (HWMUs) and solid waste management units (SWMUs) at WSTF. Three WSTF small arms ranges are identified in the Permit as SWMUs:

- SWMU 29 – Second TDRSS Ground Terminal (STGT) Small Arms Range.
- SWMU 30 – 200 Area Small Arms Range.
- SWMU 31 – Westbay (WB)-2 Small Arms Range.

In accordance with Permit Section VII.L, NASA and NMED agreed to implement the accelerated cleanup process at these units. The accelerated corrective measures (ACM) activity described in this Remedy Completion Report (RCR) is a presumptive remedy that reduced risks to human health and the environment and achieved cleanup of the SWMUs more rapidly than the IWP process. As indicated in the Permit, the remedy is expected to be final when complete. NMED disapproved this RCR on September 7, 2017 (NMED, 2017b) and directed NASA to revise the report in response to 19 comments in the disapproval. The first revision of the RCR (NASA, 2018) provided additional information required by NMED. NMED disapproved the revised RCR on February 21, 2019 (NMED, 2019a), citing the need for additional information and completion of a screening risk assessment. This revision to the RCR provides the additional information required by the NMED and includes a screening risk assessment provided as a stand-alone report.

This RCR describes the activities performed to conduct field screening at the three firing ranges in order to define the horizontal extent of each study area, recover and dispose of as many ammunition fragments as possible from the surface soil, remove potentially contaminated soil from firing range impact berms, and concurrently perform sampling activities to confirm that concentrations of hazardous constituents in the soil at the firing ranges do not pose a continuing risk to human health or the environment. The activities described in this RCR were implemented at all three historic firing ranges and focused on three elements: the firing range floors; firing range fallout areas; and, firing range impact berms (present at the STGT and WB-2 firing ranges). ACM activities specifically targeted lead (the primary contaminant of potential concern) and six other metals: antimony; arsenic; copper; iron; tin; and zinc. During ACM fieldwork, NASA performed composite soil sample sampling at specific locations established on range floor and fallout area sampling grids and confirmation sampling along the front and back faces of impact berms to provide confirmation of successful cleanup. NMED's two disapprovals indicate that composite soil sampling performed during ACM fieldwork was inadequate to make this determination (NMED, 2017b, 2019b). As part of the fieldwork associated with response to NMED comments, NASA collected discrete soil samples at each range floor and outfall area to replace the previously collected composite samples and used chemical results from confirmation (impact berm) and discrete (range floor and fallout area) soil samples to complete a screening risk assessment in accordance with the NMED *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, 2019b).

The enclosed Risk Assessment Report, White Sands Test Facility, SWMUs 29-31 (RAR; NASA, 2020b) includes a complete comparison of composite and discrete sample chemical results with established background levels found in the WSTF Soil Background Study (NASA, 2015c), approved by the NMED on September 16, 2015 (NMED, 2015c). The background comparison identified the following metals at concentrations greater than background levels:

- STGT Firing Range (SWMU 29) – copper.

- 200 Area Firing Range (SWMU 30) – copper and lead.
- WB-2 Firing Range (SWMU 31) – antimony, copper, lead, and tin.

All metals identified above are identified by the NMED and the Environmental Protection Agency (EPA) as non-carcinogenic toxic substances. The RAR evaluated the toxicity hazard to all identified human (residential, industrial worker, and construction worker) and ecological receptors. The toxicity hazard at each of the three firing ranges for all identified metals cumulatively were less than NMED target levels, indicating the toxicity hazard to human and ecological receptors is minimal. The RAR also evaluates the potential for these metals to impact groundwater beneath each firing range, and this potential was likewise determined to be minimal.

Based on the results of ACM activities, available analytical data, and the screening risk assessment results, NASA concludes that the primary objectives of planned ACM were successfully achieved. Ammunition scraps and fragments were removed from the firing range floors and fallout areas at all three firing ranges. Soil at the firing range impact berms (at the STGT and WB-2 firing ranges) that contained ammunition scraps and fragments was excavated and disposed of at a permitted disposal facility.

Based on current available data, results of the risk assessment, and the status of the three firing ranges, NASA recommends that site restoration and grading at SWMUs 29, 30, and 31 be completed.

Following review and approval of this final RCR and enclosed RAR, NASA will provide confirmation that the remedy has been completed and that the sites have been restored. At that point, NASA will request a “Corrective Action Complete” status determination for the STGT (SMWU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges.

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List of Acronyms

ACM	Accelerated Corrective Measures
ACMWP	Accelerated Corrective Measures Work Plan
AOC	Area of Concern
ASTM	American Society for Testing and Materials
bgs	Below ground surface
BTV	Background Threshold Value
CFR	Code of Federal Regulations
CoC	Chain-of-custody
COPC	Contaminant of Potential Concern
COPEC	Contaminant of Potential Ecological Concern
CWSSL	Construction Worker Soil Screening Level
cy	Cubic Yard
DQO	Data Quality Objectives
EDD	Electronic Data Deliverable
EPA	Environmental Protection Agency
ESL	Ecological Screening Level
FD	Field Duplicate
ft	Feet
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operation and Emergency Response
HIS	Historical Information Summary
HQ	Hazard Quotient
HWMU	Hazardous Waste Management Unit
IMWP	Interim Measures Work Plan
in.	Inch(es)
ISSL	Industrial Soil Screening Level
ITRC	Interstate Technology and Regulatory Council
IWP	Investigation Work Plan
JSC	Johnson Space Center
kg	Kilogram
mg	Milligram
mm	Millimeter
MS	Matrix Spike
NASA	National Aeronautics and Space Administration
ND	Not Detected
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
oz	Ounce(s)
PDF	Portable Document Files
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
QGIS	Quantum Geographic Information System
RA Guidance	Risk Assessment Guidance for Site Investigations and Remediation
RAR	Risk Assessment Report
RCR	Remedy Completion Report
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level

RSSL	Residential Soil Screening Level
SBS	Soil Background Study
SLERA	Screening Level Ecological Risk Assessment
SLHQ	Screening Level Hazard Quotient
SL-SSL	Soil Leachate Soil Screening Level
SSL	Soil Screening Level
STGT	Second TDRSS Ground Terminal
SWMU	Solid Waste Management Unit
TDRSS	Tracking and Delay Relay Satellite System
TRV	Threshold Reference Value
TSDF	Treatment, storage, and disposal facility
UCL95	95th percent Upper Confidence Limit
USCS	United Soil Classification System
USDA	United States Department of Agriculture
WB	Westbay
WMP	Waste Management Plan
WSTF	White Sands Test Facility
XRF	X-Ray Fluorescence

1.0 Introduction

The National Aeronautics and Space Administration (NASA) Johnson Space Center (JSC) White Sands Test Facility (WSTF; Environmental Protection Agency [EPA] Identification Number NM8800019434) has supported testing of space flight equipment and used hazardous materials since 1964. The facility contains five closed hazardous waste management units (HWMUs) that are under post-closure care (PCC) and 37 solid waste management units (SWMUs) within the 100, 200, 300, 400, and 600 Areas. PCC requirements are specified by the NASA WSTF Hazardous Waste Permit (Permit) issued by the New Mexico Environment Department (NMED) in 2009, and recently updated in 2019 (NMED, 2019e).

This Remedy Completion Report (RCR) addresses three historical small arms firing ranges at WSTF. These firing ranges represent SWMUs 29-31 (the Second Tracking and Data Relay Satellite System [TDRSS] Ground Terminal [STGT] Small Arms Range, the 200 Area Small Arms Range, and the Westbay®[1] [WB]-2 Small Arms Range, respectively). The target contaminants associated with the firing ranges sourced from spent lead bullets, copper bullet jackets, and brass casings that were typically distorted (referred to as "ammunition scrap" within the RCR). This RCR summarizes pre-screening field activities, ammunition scrap identification and recovery within the firing range floor and fallout areas, and impact berm soil excavation activities performed in the field between September 2015 and December 2019. Chemical analytical results for the metals concentrations in discrete soil samples were used to develop the enclosed *Risk Assessment Report Small Arms Firing Range (SWMUs 29-31)* (RAR; NASA, 2020) developed in accordance with the NMED publication *Risk Assessment Guidance for Site Investigations and Remediation* (RA Guidance; NMED, 2019b). Results and interpretation of the RAR are presented herein, along with conclusions and recommendations based on the results.

1.1 Facility Location and Description

The NASA JSC WSTF is located at 12600 NASA Road in central Doña Ana County, New Mexico approximately 12 miles northeast of Las Cruces, New Mexico and 65 miles north of El Paso, Texas (Figure 1.1).

1.2 Regulatory Requirements

The Permit issued by the NMED requires the preparation of investigation work plans (IWPs) to assess the potential impact of historical releases of hazardous waste or hazardous constituents. The Permit requires NASA to determine whether these releases may have the potential to serve as continuing sources of groundwater contamination. Attachment 16 of the Permit requires submittal of an IWP for SWMUs 29-31 by December 30, 2014.

While developing the combined IWP for these units, NASA determined that it would be more appropriate to implement interim measures at these SWMUs as indicated in Permit Section VII.G.3. On December 17, 2014, NASA proposed the development and submittal of an Interim Measures Work Plan (IMWP) for SWMUs 29-31 (NASA, 2014) rather than the IWP required by the Permit. NASA also requested additional time to develop and submit the IMWP and proposed a new due date of January 30, 2015. In early January 2015, NMED recommended that NASA consider implementing the accelerated cleanup process described in Permit Section VII.L. The cleanup activities planned for these SWMUs met the requirements established in Permit Section VII.L, so NASA subsequently submitted a proposed outline for the Accelerated Corrective Measures Work Plan (ACMWP; NASA, 2015a). Section VII.H.1.c of the Permit required the submittal of a historical information summary (HIS) in conjunction with each IWP. NASA submitted the *NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Accelerated Corrective*

[1] Westbay is a registered trademark of Nova Metrix Ground Monitoring (Canada) Ltd.

Measures Work Plan and Historical Information Summary on February 26, 2015 (NASA, 2015b) to satisfy these requirements. NMED approved the ACMWP and HIS with modification on May 29, 2015 (NMED, 2015a).

When implemented, accelerated corrective measures (ACM) at the firing ranges reduce risks to human health and the environment by removing and/or recycling the ammunition scrap and lowering concentrations of contaminants of potential concern (COPCs, [Table 1.1]) in soils to levels required by the Permit (i.e., soil screening levels [SSLs]). The ACM also reduce costs associated with cleanup and long-term monitoring of the firing ranges. The Permit required notification to NMED at least 30 days prior to commencing fieldwork associated with the ACM, which was provided by submittal of the ACMWP (NASA, 2015b).

The Permit requires that fieldwork be completed within 180 days after it is initiated. On March 8, 2016, NASA submitted the *Status Update for NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Accelerated Corrective Measures* proposing a revised cleanup strategy (NASA, 2016a). On May 11, 2016, NMED provided the *Approval with Modifications Status Update Small Arms Firing Ranges (SWMUs 29 – 31) Accelerated Corrective Measures* (NMED, 2016a). In order to comply with the additional investigation requirements in NMED's approval with modifications, NASA submitted the *Request for Extension of Time for Small Arms Firing Ranges (SWMUs 29 – 31)* on June 28, 2016 (NASA, 2016b). NMED provided the *Approval Request for Extension of Time for Small Arms Firing Ranges (SWMUs 29 – 31)* on July 28, 2016 (NMED, 2016b), with the requirement that the RCR be submitted no later than March 31, 2017.

NASA submitted the *NASA WSTF Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report* on March 30, 2017 (NASA, 2017a). On September 7, 2017, NMED provided the *Disapproval Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report* (NMED, 2017b). In order to comply with the additional investigation requirements in NMED's disapproval, NASA submitted the *Request for Extension of Time for Response to Disapproval Small Arms Firing Ranges (SWMUs 29-31)* on November 8, 2017 (NASA, 2017b). NMED provided the *Approval Request for Extension of Time for Response to Disapproval Small Arms Firing Range (SWMUs 29-31)* on December 1, 2017 (NMED, 2017c), with the requirement that the revised RCR be submitted no later than March 30, 2018.

NASA submitted the *Response to Disapproval Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report* on March 29, 2018 (NASA, 2018), that was disapproved by the NMED on February 21, 2019 (NMED, 2019a). Due to unforeseen delays in execution of field activities associated with the ongoing wastewater lagoons closure project at the co-located STGT Wastewater Lagoons (Area of Concern [AOC] 51), NASA submitted the *Request for Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Response to Second Disapproval Remedy Completion Report* on October 28, 2019 (NASA, 2019b). NMED provided the *Approval Request for Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29-31) Response to Second Disapproval Remedy Completion Report* on November 13, 2019 (NMED, 2019d), with the requirement that the revised RCR be submitted no later than February 28, 2020. NASA submitted the *Second Request for Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Response to Second Disapproval Remedy Completion Report* on October 28, 2019 (NASA, 2019b). NMED provided the *Approval Request for Second Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29-31) Response to Second Disapproval Remedy Completion Report* on March 21, 2020 (NMED, 2020), with the requirement that the revised RCR be submitted no later than April 24, 2020.

1.3 Firing Ranges Location and Description

The three historical small arms firing ranges are all sited in the NASA controlled area; two are located at WSTF and one is located at STGT (Figure 1.2). Detailed discussions of the location and description of the firing ranges are provided in the ACMWP and HIS (NASA, 2015b).

1.4 Firing Range Components

The WSTF firing ranges incorporated three main components: the range floor; primary impact berm; and the safety fan or fallout area (ITRC, 2003). A lateral or side berm was present on the south side of the STGT firing range; however, this was not found to have been affected by any direct bullet impacts. The applicable components present at each firing range are depicted in Figure 1.2.

Primary impact berms at the STGT firing range and the WB-2 firing range are well defined. A primary impact berm was not constructed at the 200 Area firing range. The impact berms at STGT and WB-2 received the full force of impact of bullets and fragments, which penetrated up to 10 inches (in.) for native soils used for the berms (silty sandy gravel) and up to 5 feet (ft) for a well-sorted sandy soil encountered in the central part of the WB-2 berm.

At the 200 Area firing range (SWMU 30), an impact berm was not established. Instead, the natural, sloping hillside comprising outcropping limestone beds separated by thin veneers of alluvial cover along the strike of the bedding planes was used as a backstop. Penetration into the rocky backstop at this range was minimal and ammunition scrap were scattered across the fallout area.

Fallout areas represented the areas behind the impact berm and adjacent to the firing range where most bullets are frequently the result of ricochet and are typically found on or near the surface. The extent of the fallout areas at the STGT, 200 Area, and WB-2 firing ranges are discussed in Section 4.0. In addition to the primary fallout areas, an additional area of interest exists at the 200 Area firing range. As indicated in the ACMWP and HIS (NASA, 2015b), sloughing of the hillside used as a backstop is inferred to have transported bullets or bullet fragments down-slope away from the hillside along a small drainage. As with the firing range fallout areas, this area of interest was field screened with the metal detector to determine the location of bullets and bullet fragments.

1.5 ACM Field Methods

The ACM conducted at the STGT, 200 Area, and WB-2 firing ranges comprised the removal and recycling of spent ammunition scrap from range floor, fallout areas, and impact berms. At the 200 Area firing range, the hillside was used as the impact structure and no impact berm was present. The field detection equipment utilized for the identification and recovery of ammunition scrap from the firing range floors and fallout areas was a Whites Coinmaster GT metal detector equipped with a 9 in. diameter concentric coil. NASA was required to demonstrate that the equipment utilized during the metal detector survey was designed for a level of sensitivity that allowed for comprehensive survey and removal of buried firing range constituents (NMED, 2016a).

Prior to field screening with the metal detector, a field test was conducted to evaluate the capability of the equipment. The field test was performed to demonstrate that ammunition scrap clearly registered at a variety of depths in the native soil of the area. Ammunition scrap including whole bullets and fragments of shell casing were buried to depths of up to 12 in., which exceeded the maximum depth anticipated for ammunition fragments at the firing ranges. The metal detector was able to successfully identify whole bullets (approximate weight 20 grams) and small pieces of ammunition scrap (approximate weight 3 – 5 grams) to the target depth of 12 in. The primary issue with the identification of ammunition scrap in the

field was later determined not to be the capability of the metal detector, but the increased time required for the identification and location of smaller fragments during the sieving process for recovery.

User reviews for the metal detector similarly indicate a 12” depth capability on a United States quarter (weight approximately 5.7 grams). Almost all of the bullets and ammunition scrap at the STGT, 200 Area, and WB-2 firing ranges were detected and recovered at depth of 6 in. or less within the firing range floor and fallout areas. Smaller pieces of ammunitions scrap of limited weight were typically found at, or near (within 2 in.) of the surface. Bullets were only found to penetrate soil by 6 in. or greater where fired directly into the impact berms at the STGT and WB-2 firing ranges. In these cases, the composition of the berm soil had a significant effect on the depth of penetration. Impact berm ammunition scrap was not removed through manual recovery processes, but by progressively excavating the soil in 6 in. lifts until the metal detector surveys indicated no further detections.

Ammunition scrap removal was initially followed by composite soil sampling (fallout area) and confirmation sampling (impact berms) to verify that the soils within and adjacent to the firing ranges did not contain residual contamination that presented a risk to human health and the environment. Based on comments received by the NMED in both disapprovals to the RCR (NMED, 2017b, 2019a), NASA collected discrete soil samples at each firing range to assess potential residual contamination present following completion of corrective measures. The ACM is limited in scope to the shallow soil, and to the areas impacted by the three small arms firing ranges.

2.0 Types of Results

The soil sample results presented for the STGT, 200 Area, and WB-2 firing ranges fall into three categories: firing range floor soil samples; firing range fallout area soil samples; and, impact berm soil samples. Because no berm or backstop existed for the 200 Area firing range, confirmation berm samples were not collected. Instead, a comprehensive search for ammunition scrap was performed across the outcropping limestone located behind the former firing range within the surrounding fallout area.

2.1 Firing Range Floor Soil Sampling

Established sampling grids provided comprehensive sampling coverage of the footprints of former range floors. Firing range floor samples were collected during an individual sampling event to evaluate the concentrations of target metals soil samples in the range floor between the maximum distance firing line and the berm/backstop. Initially, each soil sample was composited from five locations within each grid cell. It was ultimately determined that composite sampling was not fully representative of contaminants of potential concern (COPC) presence. Discrete soil samples were required to confirm that corrective measures at the firing ranges were successful (NMED, 2017b). NASA collected discrete soil samples in 2019 from each grid cell that was composite sampled during initial ACM fieldwork. Results of composite soil samples were replaced with results of discrete soil samples for evaluation in this RCR.

2.2 Firing Range Fallout Area Soil Sampling

Established sampling grids were constructed to provide comprehensive sampling coverage of the footprints that define the fallout areas outside of the range floors. The fallout grids were defined following the manual recovery of ammunition scrap associated with firing range operations throughout the fallout areas. The fallout areas were characteristically fan shaped, widening with distance from the firing line. Each fallout grid incorporated the location of the impact berm where present. Firing range fallout soil samples were collected during a single sampling event following the manual recovery of all ammunition scrap within the fallout area. Initially, each soil sample was composited from five locations within each grid cell. As mentioned above, it was ultimately determined that composite sampling was not fully

representative of potential COPC presence (NMED, 2017b). NASA collected discrete soil samples of the fallout area at each firing range in late 2019. Results of composite soil samples were replaced with results of discrete soil samples for evaluation in this RCR.

2.3 Firing Range Impact Berm Confirmation Soil Sampling

The firing range impact berm soil sampling was performed to provide final confirmation evaluation of the condition of the residual soil remaining following excavation of the berm. Excavation was performed in conjunction with soil screening using a metal detector of the berm surface each time a progressive soil lift was removed. Impact berm soil samples were collected during an individual soil sampling event to ensure all soil containing residual ammunition scrap had been removed from the berm. Each soil sample was collected from a single discrete location as required by NMED (NMED, 2015a). Results of discrete soil samples were evaluated in this RCR.

2.4 Soil Analytical Results

Data packages from off-site analytical laboratories consisted of two primary components: comprehensive reports submitted as Adobe portable document files (PDF) for review and archiving; and electronic data deliverable (EDD) files to facilitate transfer of chemical analytical data into WSTF's analytical database(s). The PDF reports included laboratory name, report date, sample-specific information, analyte names and Chemical Abstract Service numbers, analytical results, quality control (QC) sample results, data qualifiers and narratives, pertinent analytical notes, laboratory reviewer signatures, and a variety of other information specific to the laboratory and analytical method. The EDD included the associated electronic data.

3.0 Background

The following sections discuss historical information, previous investigations, and COPCs for the STGT (SWMU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges.

3.1 Historical Information

Results of historical research conducted on the STGT, 200 Area, and WB-2 firing ranges was presented in the ACMWP and HIS (NASA, 2015b). Refer to those submittals for details.

3.2 Previous Investigations

No previous investigations have been conducted at SWMUs 29-31. The STGT, 200 Area, and WB-2 firing ranges are not located within the known footprint of the WSTF groundwater contaminant plume.

3.3 Contaminants of Potential Concern

The ACMWP and HIS (NASA, 2015b) reported that lead bullets, with and without copper jackets, were discharged at each of the firing ranges and allowed to accumulate on site. There was no evidence that other hazardous wastes or hazardous constituents were managed or disposed of at these sites. Therefore, COPCs consist of components used in the manufacture and discharge of small arms ammunition (ITRC, 2003). The COPCs for this cleanup are provided in Table 1.1, which also provides the NMED soil screening level (SSL) and soil leachate SSL (SL-SSL) or EPA regional screening level (RSL), where available. Soil samples collected during ACM field activities were analyzed for these COPCs and compared to NMED SSLs or EPA regional screening levels.

3.4 Site Conceptual Exposure Model

To summarize the site conceptual exposure model discussed in the ACMWP (NASA, 2015b), spent ammunition scrap in soil is the source of contamination at the firing ranges, airborne transport by wind and surface transport by precipitation runoff of contaminated soil are the primary release mechanisms, and exposure pathways of ingestion, inhalation, and dermal contact with the contaminated soil are considered complete for the construction and industrial worker exposure scenarios. COPC concentrations measured at the firing ranges were directly compared to NMED construction worker soil screening levels (CWSSLs) and industrial soil screening levels (ISSLs). COPC concentrations in firing ranges soil were also compared to more conservative residential soil screening levels (RSSLs) and SL-SSLs. When no NMED SSL was available, the EPA RSL was used for comparison. Environmental conditions at WSTF are not considered conducive to dissolution of lead and subsequent migration to groundwater. Current groundwater chemical analytical data indicate that WSTF groundwater, including groundwater monitored near the firing ranges and pumped from the NASA WSTF water supply wells located downgradient, is not contaminated with the COPCs identified for this ACM.

3.5 Data Quality Objectives

The corrective measures and sampling methodology were developed based on input from NMED personnel, the Accelerated Cleanup Process requirements of the Permit (NMED, 2019e; Section VII.L), *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges* (ITRC, 2003), Guidance on *Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006), and the investigation and sampling requirement specified in Attachment 17 of the Permit. The data acquisition plan (i.e., sampling design) is based on the data quality objectives (DQO) process.

3.5.1 Problems and Objectives

The ACM problem statement is summarized in the Permit (NMED, 2019e; Section VII.L), which states that "[t]he accelerated cleanup process shall be used at sites to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered to be the final remedy for the site, and where field work will be completed within 180 days of the commencement of field activities." Based on available groundwater chemical analytical data, the depth to groundwater at the three firing ranges, and the relative immobility of lead and other COPCs through WSTF soils, NASA does not believe that groundwater has been impacted by historical operations at the sites, thus groundwater cleanup at these locations is not required as part of the ACM. Subsequent to NMED approval of the ACMWP (NMED, 2015a), it was expected that following the cleanup activities and confirmation sampling presented in this RCR, the remedy would be complete and no further investigatory or corrective actions would be required at the firing ranges.

There are known and suspected quantities of COPCs in the soil at the historical firing ranges that constitute SWMUs 29-31. As the priority of the ACM, cleanup activities were performed to remove as much contamination as possible from the soil at these sites. As part of ACM activities, soil sampling was performed for the firing range floor, firing range fallout area, and impact berm (where applicable) at each SWMU to determine if residual soil contamination presents a risk to human health or the environment. The problem statement for the remedy completion of SWMUs 29-31 is: confirm that soil beneath, and where applicable downgradient, of the three historical firing ranges does not contain hazardous constituents at concentrations above regulatory limits as a result of past activities.

3.5.2 Information Inputs

The primary decision after cleanup of SWMUs 29-31 is whether ACM activities effectively reduced the risk to human health or the environment. Alternative actions for the decisions include:

- Consider a "Corrective Action Complete" status determination.
- If needed, perform additional remedial activities to complete the corrective measures implementation, thus mitigating source(s) of continuing contamination or human health risk.

The COPC concentrations measured in soil following ACM activities at SWMUs 29–31 are the primary inputs to the decision. COPCs for this investigation were identified using two primary information sources:

- Available literature that provides information regarding the assessment and cleanup of small arms firing ranges.
- Detailed information pertinent to the operational history and use of materials documented in the SWMUs 29-31 HIS (NASA, 2015b) through a variety of historical documents and reports, personnel interviews, and personnel questionnaires.

3.5.3 Spatial Extent of Investigation

This investigation addresses, and is limited to, the shallow surface soils beneath SWMUs 29-31 and associated areas, as applicable. This includes the Small Arms Ranges at STGT (SWMU 29), the 200 Area (SWMU 30), and WB-2 (SWMU 31; Figure 1.2), as well as any nearby areas impacted by historical activities at these SWMUs. The extent of ammunition scrap was conclusively determined during field activities utilizing the initial metal detector surveys that defined the fallout areas as part of the pre-screening investigation phase. This allowed definition of the horizontal boundaries of each study area, which had to be clearly defined in order to successfully complete ACM activities.

3.5.4 Performance or Acceptance Criteria

The performance or acceptance criteria are as follows: ACM activities continued until cleanup levels as described in Permit Attachment 15 for direct exposure routes under the NMED ISSL and CWSSL scenarios were achieved for site soils as determined by analytical testing. NASA also performed a comparison of ACM soil sample results to the NMED RSSL scenario. Following completion of corrective measures, final confirmation soil sampling as directed by NMED (Comment 7; NMED, 2017b), final updating of the RCR, completion of an RAR, and any subsequent site restoration activities, a "Corrective Action Complete" status determination for each of the firing ranges will be requested. The request will be provided as a separate submittal.

4.0 Scope of Activities

This section provides a summary of all activities performed as part of accelerated corrective measures at the firing ranges (SWMUs 29-31).

4.1 Safety and Health Measures

Safety and health measures employed during ACM field activities were conducted in accordance with requirements of Occupational Safety and Health Administration Standards for Hazardous Waste Operations and Emergency Response (HAZWOPER; 29 Code of Federal Regulations [CFR] 1910.120 [a] – [o], 2013), the environmental contractor's Corporate-wide Safety and Health Plan with site-specific

documentation to address potential hazards for the project, and the ACMWP. Daily Tailgate Safety meetings were conducted, recorded, signed by the daily project crew, and are maintained in the project file. Additional details on safety and health measures used during ACM field activities are available in the ACMWP (NASA, 2015b).

4.2 Field Documentation

ACM field activities were documented using a field logbook, field data records, and/or any required site-specific procedural documentation. Pertinent logbook notes documenting the field activities are included as Appendix A. Logbook entries included, as applicable, information such as:

- Standard daily header – project name, logbook number, date, weather conditions, team members present and their affiliations (including subcontractors), sample location identification, day's task(s), daily safety meeting topics, personal protective equipment (PPE) to be used, equipment in use, and any calibration information, if applicable.
- Daily activities (time and observations recorded) – site arrival and departure, cleanup or investigation activities planned and completed, visitors and the purpose of their visit, field and laboratory sample information, soil type, soil conditions, decontamination (i.e., method, equipment cleaned), hazardous waste management procedures and waste quantities, and reference data sheets or maps, if applicable.
- Daily summary – action items, materials used, changes or deviations made from planned protocol, and a summary of plans for the next day of fieldwork.
- Signatures (field personnel and logbook reviewer) and relevant dates.

Field records included Daily Tailgate Safety meeting forms, observations of soil conditions, location surveys using Global Positioning System (GPS), and sample documentation. For analytical samples, the date, location, depth, sample type, collection method, identification number, sampler, and any circumstances, events, or decisions that could impact sample quality were documented. In addition to the field logbook entries for sampling events, chain-of-custody (CoC) forms were completed for analytical samples and maintained with project documentation.

Evidential records for the entire project are maintained in hard copy or electronic form and consist of:

- Project ACMWP with any revisions.
- Site-specific internal procedural documentation or plans.
- Project logbooks.
- Field data records (i.e., surveyed site location).
- Sample CoC forms.
- Correspondence with NMED.
- Final analytical data packages.
- Reports.
- Hazardous Waste Manifests documenting the off-site shipment and disposal of excavated soil.
- Miscellaneous related records such as meeting sign-in sheets, photos, maps, drawings, etc.

4.3 Decontamination

Decontamination procedures were performed by personnel who have completed the HAZWOPER (29 Code of Federal Regulations [CFR] 1910.120 [a] – [o]) 40-hour training personnel wearing appropriate PPE. The decontamination of heavy equipment was performed under the supervision of the site supervisor.

Individual smaller-scale decontamination areas were constructed adjacent to each firing range to collect and contain soil brushed from the sampling equipment. Small, non-disposable sampling equipment was decontaminated at these small decontamination areas. Smaller reusable sampling equipment that contacted soil samples was decontaminated, first by hand washing the item with non-phosphate detergent such as Alconox®[2], rinsing with WSTF potable water, and finally by rinsing with purified water. Field screening instruments, such as the metal detector were wiped with a clean rag moistened with WSTF potable water before use at the next firing range. Solid waste materials removed from the equipment and the wipes used were managed as indicated in the ACMWP. All soil sampling equipment was decontaminated after completion of sampling activities within each grid cell and between collection of discrete soil samples.

Heavy equipment used for the impact berm excavation component of the ACM was decontaminated prior to commencement of activities at the STGT and WB-2 firing ranges. Heavy equipment was also decontaminated following excavation activities at the STGT and WB-2 firing ranges. General decontamination guidance available in American Society for Testing and Materials (ASTM) D5088-02 (ASTM, 2008) was followed for this project. The decontamination of heavy equipment was performed at the existing concrete decontamination pad in the 600 Area.

Soil was removed from heavy equipment using a shovel. The removal of any solids from the heavy equipment was performed over Department of Transportation-compliant roll-off boxes lined with plastic sheeting used to collect the excavated berm soil. All solid materials were removed from the equipment prior to leaving the firing range areas.

4.4 Investigation-Derived Waste Management

As required by Permit Attachment 20 (Section 20.2.13), a Waste Management Plan (WMP) was provided with the ACMWP (NMED, 2019e). The WMP provided a description of potential wastes that would be generated from the small arms firing ranges (SWMUs 29-31) ACM and procedures for waste management, waste characterization, and waste disposition. Waste generated during the project included:

- Metal ammunition scraps and fragments from each of the three small arms firing ranges.
- Environmental media – soil progressively excavated in lifts from the surface of firing range back berms at the STGT firing range (SWMU 29) and the WB-2 firing range (SWMU 31).
- Decontamination water from soil sampling and excavation equipment.
- Sampling debris:
  - Non-dedicated sampling equipment
  - Disposable PPE
  - Plastic sheeting

[2] Alconox is a registered trademark of Alconox, Inc.

- Rags

4.4.1 Waste Management Plan Deviations

NASA requested to modify the clean-up strategy for bullets and bullet fragments at SWMUs 29-31 in a March 8, 2016 project status update (NASA, 2016a) that was provided to the NMED. The strategy was approved with modifications by the NMED on May 11, 2016 (NMED, 2016a). The revised strategy included excavation and disposal of lead contaminated environmental media in lieu of mechanically separating spent small arms bullets and bullet fragments from impacted soil berms at the WB-2 and STGT firing ranges. This new strategy required a change to the waste characterization and management procedures identified for environmental media in the WMP. Specific deviations from the WMP procedures as a result of the revised clean-up strategy, and rationale for the changes were:

- **Environmental media definition** – The WMP identified environmental media as soil spoils from mechanical separation of bullets and bullet fragments. As described in NASA's revised clean-up strategy (NASA, 2016a), the mechanical separation of bullets and bullet fragments originally proposed in the ACM was substituted with the removal of impacted soil from the firing range berms. The change was made for technical and financial reasons. After initial field screening, NASA determined that off-site disposal was practical and the preferred clean-up method at other small arms firing ranges.
- **Environmental media characterization** – In lieu of managing soil spoils from sieving as unregulated material as described in the ACM, contaminated soil was instead excavated, characterized as hazardous waste, and managed in accordance with 20.4.1.300 NMAC and 40 CFR 262.17 (2017). The revised scope of the project, to include the generation of lead contaminated soil, required a change to the waste characterization originally stated in the WMP for environmental media.
- **Final characterization and disposal of metal ammunition scraps and fragments** – NASA proposed in the original WMP to recycle ammunition scraps and fragments at the conclusion of the project. Bullets, bullet fragments, and casings were accumulated and managed as materials for recycle during the project, but a cost-effective recycling path for this waste stream was not identified. NASA evaluated the cost to recycle the amount of bullets, bullet fragments, and casings accumulated during the project and determined it to be more cost effective and expedient to properly dispose of this waste stream as hazardous waste. After this decision was made, bullets, bullet fragments, and casings collected during the project were consolidated with lead contaminated soil in a roll-off container and shipped off-site for treatment and disposal as hazardous waste. A small amount of bullets and bullet fragments recovered from the STGT and WB-2 firing ranges during 2019 ACM screening efforts were combined with other lead recyclable materials that were generated at the active WSTF firing range.

4.4.2 Waste Characterization

Initial waste characterization for this project was provided in the WMP submitted with the ACMWP (NASA, 2015b). Deviations to the waste characterization described in the WMP for environmental media and metal ammunition scraps and fragments as a result of implementing the revised clean-up strategy were summarized in Section 4.4.1. Final waste characterization was conducted in accordance with the requirements of the WSTF Hazardous Waste Permit and Waste Analysis Plan, Permit Attachment 12 (NMED, 2019e).

Metal ammunition scraps and fragments consisted of bullets, bullet fragments, and casings collected from the firing range floors and fallout areas and were initially characterized as recyclable materials, which are exempt from hazardous waste management requirements per 40 CFR 261.6(a)(3)(ii). The ammunition

scraps and fragments were collected manually and hand-sieved from the firing range floors and fallout areas at the STGT, 200 Area, and WB-2 firing ranges. The majority of this material was subsequently re-characterized as hazardous waste exhibiting the lead D008 toxicity characteristic once it was determined it would not be recycled. A small amount of bullets and bullet fragments recovered from the STGT and WB-2 firing ranges during 2019 ACM screening efforts continued to be managed as recyclable material. These were combined with other lead recyclable materials that are routinely generated at the active WSTF firing range.

Environmental media (soil) generated from removal of STGT and WB-2 firing ranges berms contained lead ammunition scraps and fragments. Though the soil itself was not inherently waste-like, it was managed as exhibiting a characteristic of hazardous waste through application of the EPA Contained-in policy (EPA, 1998). The contaminated soil was characterized as hazardous waste exhibiting the lead D008 toxicity characteristic because of the presence of lead ammunition scraps and fragments.

Wastewater was generated during decontamination of tools, non-disposable sampling equipment, and excavation equipment. The water used for decontamination activities had a neutral pH that would not cause metals from soil or equipment to leach into the waste. The decontamination water also did not contain any visible metals. Given results of samples collected during the soil investigation at SWMUs 29-31, it was concluded that the decontamination water did not contain metal concentrations that would exceed the 40 CFR 261.24 (2012) toxicity characteristic threshold concentrations for COPC for this project (lead [D008]: 5.0 mg/L; arsenic [D004]: 5.0 mg/L). Using this information, the decontamination water was characterized as non-hazardous solid waste.

Sampling debris generated during the project included non-dedicated disposable sampling equipment, PPE, plastic sheeting, and rags. Analysis of results from the SWMU 29-31 soil investigation indicated that any debris that came into contact with the ammunition scraps and fragments or environmental media would not exceed the maximum concentration of contaminants for the COPC metal constituents found in Table 1 of 40 CFR 261.24 (lead [D008]: 5.0 mg/L; arsenic [D004]: 5.0 mg/L). NASA determined the sampling debris did not exhibit hazardous waste toxicity characteristics, and the sampling debris were characterized as non-hazardous solid waste.

4.4.3 Waste Accumulation, Management, and Disposal Activities

Metal ammunition scraps and fragments were accumulated in 1-gallon plastic bags, which were sealed and placed into a 55-gallon container. The ammunition scraps and fragments were initially managed as materials for recycle, or scrap metal, that were exempt from hazardous waste management requirements per 40 CFR 261.6(a)(3)(ii) (2012). Bullet and bullet fragments recovered from the STGT and WB-2 firing ranges during 2019 ACM screening efforts were combined with other lead recyclable materials that were generated at the active WSTF firing range. These materials are pending recycling. For the remainder of ammunition scraps and fragments generated during this project, NASA determined it was not economically feasible to recycle these materials. After this determination was made, NASA began managing the ammunition scraps and fragments as hazardous waste and emptied a 55-gallon container with these materials into the 20-cubic yard (cy) roll-off container of contaminated soil from the STGT Firing Range. This waste was managed in accordance with the requirements of 20.4.1.300 NMAC and 40 CFR 262.17 (2017) and subsequently shipped to a RCRA permitted treatment, storage, and disposal facility (TSDF) for proper treatment and disposal of the waste.

Contaminated soil was managed as hazardous waste exhibiting the lead D008 toxicity characteristic and was managed in accordance with 20.4.1.300 NMAC and 40 CFR 262.17 (2017). The lead contaminated soil was placed into 20-cy roll-off containers that were lined with plastic sheeting. The liner was sealed after adding waste to each container, and the roll-off containers were transported off-site to a RCRA permitted TSDF for treatment and disposal. Four 20-cy roll-off containers and four 1-cy Super Sacks with

a combined weight of 57,569 kilograms (kg) were shipped from the WB-2 firing range for disposal. A total of six 20-cy roll-off containers with a combined weight of 79,823 kg were transported from the STGT firing range for disposal. One roll-off from the STGT firing range also contained the ammunition scraps and fragments collected from fallout areas and range floors from the initial phase of the project. Lead contaminated soil removed from the WB-2 and STGT impact berms was shipped off-site for treatment and disposal at a RCRA permitted TSDF operated by US Ecology in Beatty, Nevada. The hazardous waste manifests documenting hazardous waste transport (ACT Environmental Services, Chaparral, New Mexico) and subsequent treatment and disposal (US Ecology, Beatty, Nevada) are provided in Appendix B.

Water used to decontaminate soil sampling and excavation equipment was collected in a 55-gallon container and managed as non-hazardous waste. Prior to August 2015, decontamination water was discharged to the STGT Wastewater Lagoons, subsequent iterations of decontamination water was discharged to the WSTF sanitary sewer system. Sampling debris were collected in a 55-gallon container and managed as non-hazardous waste throughout the project period. Once sampling and investigation activities had concluded, the debris were bagged and placed in a solid waste dumpster and transported to a permitted Subtitle D landfill for disposal.

4.5 Accelerated Corrective Measures

ACM activities performed comprised three primary phases of work:

- Pre-screening activities comprised preparatory firing range floor soil sampling, the delineation of the firing range fallout area boundaries, and partial manual ammunition scrap recovery. These activities were proposed in the original ACMWP (NASA, 2015b).
- Following a subsequent status update provided by NASA (NASA, 2016a) and associated modifications and requirements provided by NMED (NMED, 2015a, 2016a), ACM field activities comprised supplemental firing range fallout area soil sampling and continued manual ammunition scrap recovery.
- The final phase of work consisted of excavation activities focused on impact berm cleanup in conjunction with the conclusion of manual ammunition scrap recovery. The cleanup and sampling activities were planned in accordance with Permit Section VII.L and are based primarily on *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges* (ITRC, 2003), with additional consideration of project DQOs and other requirements of Permit Attachment 17.

Basic sampling grids for each of the range floors were established for each firing range in the ACMWP. Figure 4.1, Figure 4.2, and Figure 4.3 provide the sampling grids established for the STGT firing range (SWMU 29), the 200 Area firing range (SWMU 30), and the WB-2 firing range (SMWU 31), respectively.

4.5.1 Chronology of Events

A summary of the chronology of field events related to soil sampling and ammunition scrap recovery at the STGT, 200 Area, and WB-2 firing ranges is provided below.

STGT Firing Range (SWMU 29)

- Prescreening activities
  - Firing range floor sampling grid – soil samples collected 9/14/15 – 9/16/15 and shipped to the analytical laboratory on 9/23/15. Samples for X-Ray Fluorescence (XRF) analysis delivered to WSTF Laboratory same day as collection.

  - Fallout area – manual recovery of fallout area ammunition scrap performed 9/15/15 – 3/1/16.
  - Range floor and berm of southern lagoon had previously been off limits, cleared to screen for scrap ammunition with metal detector completed 11/13/19 – 11/18/19.
- ACM field activities
  - Fallout area sampling grid – soil samples collected 1/17/17 – 1/20/17 and shipped to the analytical laboratory on 1/24/17.
  - Fallout area – manual recovery of fallout area ammunition scrap performed 5/16/16 – 3/15/17.
  - Firing range floor – manual recovery of range floor ammunition scrap performed 3/6/17 – 3/7/17.
  - Fallout area and range floor resampled for discrete soil samples. Samples collected 9/18/19 – 9/26/19 and shipped to analytical laboratory 9/26/19.
  - Cleared to survey cells located in southern lagoon floor and adjacent berms; collected soil samples from said grid cells 11/19/19. Samples shipped to analytical laboratory on 11/20/19.
- ACM excavation activities
  - Impact back berm/backstop – soil excavation performed 2/8/17 – 2/27/17.
  - Impact berm/backstop – confirmation soil samples collected 3/1/17 and shipped to the analytical laboratory on 3/2/17.

<u>200 Area Firing Range (SWMU 30)</u>

- Prescreening activities
  - Firing range floor sampling grid – soil samples collected 9/4/15 and shipped to the analytical laboratory on 9/9/15. Samples for XRF analysis delivered to WSTF Laboratory same day as collection.
  - Fallout area – manual recovery of fallout area ammunition scrap performed 9/4/15 – 9/14/15.
- ACM field activities
  - Fallout area sampling grid – soil samples collected 1/3/17 – 1/5/17 and shipped to the analytical laboratory on 1/10/17.
  - Firing range floor – manual recovery of range floor ammunition scrap performed 1/3/17 – 1/5/17.
  - Fallout area and range floor resampled for discrete soil samples. Samples collected 9/26/19 – 9/30/19 and shipped to analytical laboratory 10/1/19.
- ACM excavation activities
  - No impact berm/backstop, no work performed.

<u>WB-2 Firing Range (SWMU 31)</u>

- Prescreening activities
  - Firing range floor sampling grid – soil samples collected 8/27/15 – 9/4/15 and shipped to the analytical laboratory on 9/9/15. Samples for XRF analysis delivered to WSTF Laboratory same day as collection.

  - Fallout area – manual recovery of fallout area ammunition scrap performed 8/27/15 – 9/3/15.
- ACM field activities
  - Fallout area sampling grid – soil samples collected 11/15/16 – 11/16/16 and shipped to the analytical laboratory on 11/21/16.
  - Firing range floor – manual recovery of range floor ammunition scrap performed 11/15/16 – 11/16/16.
  - Fallout area and range floor resampled, discrete soil samples. Samples collected 10/1/19 – 10/3/19 and shipped to analytical laboratory 10/7/19.
  - Recovery of remaining trace ammunition scrap at the former impact berm 10/20/19 - 10/21/19. Due to the high density of ammunition scrap, it was determined that the best course of action was to excavate soil from the impact berm for removal and off-site disposal at a permitted TSDF for treatment and disposal.
- ACM excavation activities
  - Impact back berm/backstop – soil excavation performed 2/1/17 – 2/6/17.
  - Impact back berm/backstop – soil confirmation samples collected 2/7/17 and shipped to the analytical laboratory on 2/9/17.
  - Final soil excavation and scrap recovery from front of WB-2 berm area 12-12-19. Approximately 4 cy of soil and scrap removed, placed into Super Sacks, and transferred to a permitted TSDF for treatment and disposal.

4.5.2 Soil Sampling Procedures

4.5.2.1 Composite and XRF Samples

Soil samples were collected following the guidelines outlined in the ACMWP (NASA, 2015b). During the pre-screening project phase only, soil samples were collected for analysis by both the WSTF Laboratories using a XRF instrument and a contracted off-site analytical laboratory using SW-846 Method 6010C. The results of the samples evaluated using the XRF were compared with the off-site chemical analysis of the corresponding soil sample. All remaining ACM project phases utilized an off-site contracted analytical laboratory for soil sample analysis.

In order to obtain representative soil samples from the firing range floors and fallout areas, five subsamples from each sample grid cell were collected and composited. Each subsample was collected from a vertical soil column of approximately 6 in. Subsamples were collected using a standard shovel and were placed in a stainless-steel bowl to facilitate thorough mixing. The composited sample was then collected with a decontaminated stainless-steel trowel to fill sample containers for submittal to the off-site chemical analytical laboratory and for further preparation prior to analysis using the XRF instrumentation. Unprepared (unsifted) samples were provided to the chemical analytical laboratory and sifted and unsifted samples to the WSTF Laboratories for the XRF analyses. Unused soil was returned to the subsample locations, and the sampling equipment decontaminated prior to compositing and collection of the next sample.

After collecting the sample for the off-site analytical laboratory (described below), a polyethylene baggie was filled with unprepared soil and a second with soil prepared by sifting using a 2-millimeter (mm) mesh to remove large objects, then grinding with a pestle to reduce particle size to less than 0.250 mm. Both baggies were labeled with the date and sample location. The moisture content of WSTF soils averages 5-8 percent therefore further preparation by drying the sample was not considered necessary. The soil samples

were analyzed using a ThermoNiton XL3t 980 Goldd+ portable XRF spectrometer (s/n 84659). XRF detection limits were less than the applicable regulatory limits, thus providing adequate characterization of specific COPC concentrations in the soil (NASA, 2015b).

The portion of the composited sample not prepared for XRF analysis was placed in a 4-ounce sample container provided by the off-site laboratory. Excess soil around the top of the sample containers was removed to ensure proper lid fit and container closure, and the jars were labeled and sealed with CoC seals. The NMED does not consider results of composite samples fully representative of COPC concentrations remaining in soils (NMED, 2017b, 2019a), so results of composite samples are not evaluated in this RCR.

4.5.2.2 Discrete Samples

Initially, composite soil samples were collected from the range floor and fallout area of each firing range, and discrete soil samples were collected from the impact berms at the STGT and 200 Area Firing Ranges. An impact berm was not constructed at the 200 Area Firing Range. Based on NMED comments (NMED, 2017b, 2019a) stating that composite samples are not appropriate to characterize COPC concentrations in soils, NASA collected discrete soil samples at each range floor and fallout area following completion of ACM activities (ammunition scrap removal).

Discrete soil samples were submitted to an off-site analytical laboratory and analyzed by SW-846 Method 6010C. Sample collection methods are described as follows.

NASA collected discrete soil samples from each grid cell (Figure 4.4, Figure 4.5, and Figure 4.6) that were not discretely sampled during initial ACM fieldwork. To accomplish this, each grid cell was evenly divided into quadrants which were numbered "1" through "4," with quadrant 1 as the northwest corner, quadrant 2 as the northeast corner, quadrant 3 as the southwest corner, and quadrant 4 as the southeast corner. A spreadsheet was generated via Excel random number generator, which was used to identify the target quadrant within each grid cell for sampling. A discrete soil sample was then be collected from the approximate center of each randomly selected quadrant. Sampled locations were named in the following manner: cell "STGT 4.2" indicates STGT site, Cell number 4, northeastern quadrant approximate center.

Discrete soil samples were collected using hand tools (hand auger or shovel) that was decontaminated before initial use and between each sample location. Collected soil samples were placed in a 4-ounce sample container provided by the off-site laboratory. Excess soil around the top of the sample containers was removed to ensure proper lid fit and container closure, and the jars were labeled and sealed with CoC seals. In total, 229 discrete soil samples were collected from the three firing ranges.

4.5.2.3 Sample Quality

All samples collected were handled in a manner that maintained their integrity. The following applied to soil sampling performed for this ACM:

- The inside of soil sample containers was not touched. Dedicated chemical resistant gloves were donned prior to sample collection to prevent cross-contamination.
- All samples were collected in a manner that minimizes the introduction of foreign material (e.g., dust, rain, and snow).
- Laboratory-specified holding times, containers, and preservatives were utilized.
- Equipment was decontaminated before initial use and between individual sample collection locations to prevent contamination and cross-contamination of samples.

- Multiple use sampling equipment was decontaminated in accordance with the applicable site-specific internal procedural documentation and ASTM D5088-02 (ASTM, 2008).

Field quality control samples were collected as described below to ensure high quality data were generated during the cleanup.

- Field rinsate (equipment) blanks were collected from the sampling tooling, (1) at the onset of each day prior to sampling activities, (2) between each firing range project area, and (3) when the equipment tooling was required to leave the project site prior to completion of the project.
- Field duplicate (FD) samples were collected at 10% of soil sampling locations designated for chemical analysis. Duplicate samples were analyzed for the same parameters as the primary samples.
- Matrix spike (MS) samples were collected at 5% of soil sampling locations designated for chemical analysis. MS samples were analyzed for the same chemical analytical parameters as the primary samples.

Comprehensive internal procedures for sample collection, shipping, and management were utilized to ensure appropriate sample management. These procedures provide specific information on sample management and related documentation, including instructions for sample custody (internal to NASA and external during shipment), storage, packaging, shipment, delivery tracking, and related recordkeeping.

4.5.3 Manual Recovery of Ammunition Scrap

The ammunition scrap cleanup objectives within the firing range fallout areas (pre-screening phase) and on the firing range floors (ACM fieldwork phase) were accomplished using manual recovery methods. Where ammunition scrap, including bullets, jackets, and casings were observed or identified with field equipment during field screening, the materials were manually recovered in order to mitigate the finding at that location. Comprehensive ammunition scrap recovery was achieved by manually separating bullets and bullet fragments from indigenous soils and berms impacted by firing range activities as described in this section. However, when ammunition scrap density appeared high in localized areas of the impact berms, it was determined that the most effective means of removal would be excavation and off-site disposal of the contaminated soil. Care was taken to limit the amount of soil removed and limit disturbance of the specific location and site.

4.5.3.1 Screening Survey Sections

To ensure that each fallout area and firing range floor was properly screened for the manual recovery of ammunition scraps and fragments, NASA established individual survey sections within each area. The size and shape of individual survey sections varied depending on the density of visual ammunition scrap present. Where a higher density of ammunition scraps or fragments were observed in the fallout areas or firing range floors, survey sections were smaller in size. Individual survey sections were established with the objective of clearing less than 150 ammunition scraps or fragments, and thus comprised areas of approximately 500 to 1,000 square ft based on professional observation of ammunition scrap density. Survey sections of this size were more easily identified, screened, and cleared of ammunition scrap than larger sections.

Each survey section was outlined on the ground surface with a scraping tool prior to beginning the manual recovery process. The overall pattern of screening across the fallout areas followed a mosaic of interlocking or overlapping survey sections with irregular boundaries impacted by the location of surficial topography, drainage, and vegetation. These survey sections covered the entire target screening areas.

4.5.3.2 Location of Ammunition Scraps and Fragments in Survey Sections

After clearly identifying each survey section, the commercial metal detector was used to locate ammunition scraps and fragments for manual removal. Field personnel walked linear traverses of approximately 5 ft in width (a comfortable sweeping distance for the metal detector while walking). Each traverse was extended the length of the survey section and overlapped the adjacent section by at least 6 in. to ensure comprehensive coverage of each section.

Each ammunition scrap or fragment identified by a positive response from the metal detector was marked with a pin flag. Particular care was taken when using the metal detector in the vicinity of native vegetation where ammunition scraps or fragments were often concentrated in groups around the base of creosote, mesquite, or other bushes.

The pin flags placed within each survey section were then located on a base map using a portable field tablet equipped with Quantum Geographic Information System (QGIS) software. The accuracy of this equipment was assessed to be within three feet of horizontal distance based on continuous comparison of landmarks on the tablet's photographic base map to the same landmark in the field. Coverage of each survey section was visually confirmed by assessing distribution of the linear transverses and pin flag locations before beginning manual removal of ammunition scraps or fragments from the section.

4.5.3.3 Manual Removal of Ammunition Scraps and Fragments

Field personnel returned systematically to each of the pin flag locators for ammunition scrap or fragment removal. Each individual pin flag was removed and soil at the location was excavated with a stainless steel trowel and sifted through a sieve, from which ammunition scraps or fragments were recovered. The location was scanned with the metal detector during excavation to confirm that all potential ammunition scraps or fragments had been excavated. Soil that passed through the sieve was scanned with the metal detector to confirm the removal of ammunition scraps or fragments before being returned to the excavation. A final scan was performed to ensure all ammunition scraps or fragments had been removed from that location. Once sieved and recovered, the ammunition scrap was placed in a one-gallon bag for proper management. This process was repeated at each location until all pin flags had been removed and the survey section was clear.

4.5.3.4 Confirmation of Ammunition Scrap and Fragment Removal

As previously stated, each location with a positive response from the metal detector was reevaluated with the metal detector following soil excavation and sieving. The field coverage for each survey section was confirmed by marking each traverses on the ground, and continually mapping progress of the traverses on the field tablet. Finally, field personnel performed a final sweep across each section with the metal detector to confirm the recovery of all of the ammunition scrap before proceeding to the next adjacent survey section. In order to confirm that removal of the potential contaminants was successful, and soil contaminant levels were below acceptable values, discrete sampling of each individual grid location then was conducted for each of the firing range locations.

4.5.3.5 Potential for Remaining Ammunition Scraps and Fragments

NASA believes that the manual recovery methods previously described provided the most efficient mechanism for removal of the largest quantity of ammunition scraps and fragments from potentially impacted soil at the firing ranges. The metal detector used to locate scraps and fragments was consistently able to identify and facilitate the removal of even smaller fragments of less than 0.1 in. diameter. The use of overlapping survey sections and overlapping linear traverses within those sections ensured optimal

coverage of potentially impacted areas. Subsequent confirmation screening of each individual location and of each survey section with the metal detector minimized the potential for unrecovered ammunition scraps or fragments. Analytical data from discrete soil sampling of the range floors and fallout areas was also used to verify that minimal residual ammunition scraps and fragments remained in the soil following manual removal efforts.

Using the available information, it is not possible to evaluate whether all ammunition scraps and fragments were removed. As explained in the HIS (NASA, 2015b), no written records of bullet usage are available. NASA attempted to estimate the weight of bullets discharged at the firing ranges based on long-term employee interviews performed in 1998 (during initial SWMU identification) and from a combination of 1998 information and additional interviews conducted during preparation of the HIS. There are significant discrepancies between the 1998 and 2015 estimates, such as the increased estimate of 168 pounds at the 200 Area firing range (SWMU 30) in 1998 and up to 2,250 pounds in 2015. The lack of documentation related to actual discharges and the contradictory information obtained from employee interviews introduces significant uncertainty into any estimate of the weight or volume of ammunition scraps or fragments present at the firing ranges. Furthermore, it is not possible to estimate the quantity of scraps or fragments that did not impact the berms and would thus have been present in soil at the range floors and fallout areas. Finally, the weight and volume of scraps and fragments in soil at the impact berms was not quantified during removal of the soil for off-site disposal. Any attempt to reconcile the volume or weight of ammunition scraps and fragments at the firing ranges with the volume or weight of material recovered would be highly speculative.

4.5.4 Excavation Recovery of Ammunition Scrap from Impact Berms

Front end loaders were used to scrape off the surficial soil in individual 4 in. to 6 in. lifts from the impact berms and transfer the soil to Department of Transportation-approved roll-off boxes that were lined with 10-mil black plastic sheeting (Appendix C). After the excavation of each individual lift, a metal detector survey of the berm face was performed and pin flags used to delineate all areas where residual bullet fragments were identified. Following the removal of the initial lifts from the berm face with a large front end loader, a smaller capacity front end loader was used to target smaller specific areas of the berm face. This process continued until the entire berm face was confirmed to be essentially clear of ammunition scrap through the results of the metal detector survey. The berm soil comprising native gravelly sandy silt (STGT) and a combination of native gravelly sandy silt and imported well sorted sand (WB-2) containing ammunition scraps was subsequently transferred to 20 cy roll-offs that were filled with up to approximately 10 cy at the request of the transportation subcontractor due to loading and hauling considerations.

4.5.5 Pre Screening Field Activities

The following pre-screening activities were performed in order to evaluate the firing range floors, perform manual ammunition scrap recovery, and delineate the horizontal boundaries of the firing range fallout areas:

- Preparation of the three firing range sites (restoring vehicular access and clearing the range floors of primary vegetation and any existing debris) in order to ensure access to surface soils for screening and associated cleanup activities. The on-site geologist supervised the removal of these materials to ensure that the soil comprising the range floor was not disturbed.
- Transfer of the firing range floor soil sampling grids presented in the ACMWP (NASA, 2015b) to the field using GPS and flagging equipment. The known extent of the range floors was overlain

with the sampling grid that was used to direct the systematic collection of discrete soil samples for laboratory chemical analysis.

- Surveying and mapping of the field area with a metal detector to refine the horizontal study area boundary is presented in the ACMWP (NASA, 2015b) for each of the three firing ranges (firing range floor and surrounding fallout area). As much of the ammunition scrap was recovered as feasible during the preliminary mapping. The location of the recovered bullets was mapped using QGIS software on a portable field tablet. The location of detectable metals was plotted at each site, and the area subject to ACM identified. The ammunition scrap locations and fallout areas were updated and submitted to NMED as part of the status update for the NASA WSTF small arms firing ranges (NASA, 2016a), and were later used to delineate the discrete soil sampling grid for the fallout areas.

Field screening was conducted at each site to determine the actual extent of the potentially contaminated soil at and near each firing range using a commercially available metal detector set appropriately to detect ammunition scrap within the shallow surface soil. The metal detector was capable of achieving resolution of the shallow subsurface at depths up to approximately 1 ft without breaking ground. Bullets and ammunition scrap penetrated the range floor to depths of less than 1 ft, and were generally found in the top 4 in. or less of surface soil.

4.5.5.1 Firing Range Floor Soil Samples

Basic sampling grids for each of the range floors were established for each firing range in the ACMWP. Figure 4.1, Figure 4.2, and Figure 4.3 provide the initial sampling grids established for the STGT firing range floor (SWMU 29), the 200 Area firing range floor (SWMU 30), and the WB-2 firing range floor (SMWU 31), respectively. At the 200 Area and WB-2, the range floors utilized grid cells measuring 25 ft by 25 ft, while the range floor at STGT utilized grid cells measuring 50 ft by 50 ft. Each range floor grid cell was subject to discrete soil sampling. Gloves and other disposable materials contacting the samples were collected and managed for the appropriate waste characterization and waste disposition (ACMWP Section 6.0; NASA, 2015b).

4.5.6 ACM Field Activities

Following the field screening activities at each of the three firing ranges, the results of the field activities were evaluated and provided to NMED in a status update (NASA, 2016a). Following the receipt of the NMED's approval with modifications (NMED, 2016a), the following ACM fieldwork activities were performed:

- In accordance with NMED's concern that the potential for "munition constituents" still existed on the range floors, additional metal detector screening (as performed for field screening in the fallout areas) was performed on each of the firing range floors to identify and remove all source ammunition scrap.
- Additional soil sampling was conducted across each fallout area where ammunition scrap was detected during the field screening activities, including the area of interest in the 200 Area firing range wash. The existing grid system was extended at each firing range to accomplish this. Composite soil samples were collected from each grid cell for laboratory chemical analysis.
- Ammunition scrap recovery activities continued at all three SWMUs until all potential source materials were manually identified with the metal detector and removed to the extent practical.

The sampling grids for each of the firing range floors were extended to include all of the fallout areas and the area of interest in the 200 Area firing range wash. Figure 4.4, Figure 4.5, and Figure 4.6 provide the

comprehensive sampling grids finalized for the STGT (SWMU 29), the 200 Area (SWMU 30), and the WB-2 (SMWU 31) firing ranges, respectively. At the 200 Area and WB-2 firing ranges, the fallout areas and area of interest in the 200 Area firing range along a small wash utilized grid cells measuring 50 ft by 50 ft. The fallout area at the STGT firing range utilized grid cells measuring 100 ft by 100 ft due to the significant area covered by the ammunition scrap fallout behind the impact berm. Each supplemental grid cell was again subject to discrete soil sampling described above in Section 4.5.2.2.

Each discrete sample was collected from a vertical soil column of approximately 6 in. The discrete soil sample was placed in a 4 oz sample container for submittal to the off-site chemical analytical laboratory. Unused soil was returned to the sample location, and the sampling equipment was decontaminated prior to collection of the next sample. Gloves and other disposable materials contacting the samples were collected and managed for the appropriate waste characterization and waste disposition (ACMWP Section 6.0; NASA, 2015b).

4.5.7 Excavation Field Activities

The impact berms at the STGT firing range (SWMU 29; Figure 4.1) and the WB-2 firing range (SWMU 31; Figure 4.3) are well defined. Ammunition scrap on the surface and shallow subsurface of the impact berms had been previously identified (NASA, 2015b). To remove the ammunition scrap, surficial soil was excavated from the face of the berm in lifts (Appendix C) until no evidence of bullet penetration was detected by the field geologist, either visible or following a metal detector survey. The metal detector was used to verify that additional bullets or bullet fragments were not present in the upper 12 in. of soil within the exposed berm. Once the visual inspection and metal detector indicated the absence of ammunition scrap, no further excavation was performed and confirmation sampling was performed within the upper 6 in. of the berm face.

Following the approval with modifications by NMED of the revised ACM strategy (NMED, 2016a), the following soil cleanup activities were performed:

- Impact berm/backstop excavation at the STGT and WB-2 firing ranges in the form of progressive lifts with the recovery of ammunition scrap. The extent of each lift was defined by a metal detector survey, with the final survey indicating the successful removal of ammunition scrap. Lifts were performed from the front, top and back of the impact berms as a result of the irregular distribution of ammunition scrap in these areas. No impact berm exists at the 200 Area firing range and no berm samples were collected.

- Following all of the impact berm excavation activities, confirmation sample collection was conducted on soil considered to be “clean” on both the front and back sides of the berms for laboratory chemical analysis. Soil sample XRF data was not collected during confirmation sampling activities of the impact berms. This strategy was originally intended to support soil sifting methodologies and confirm the successful treatment of impact berm soils in real time. The revised ACM strategy (NASA, 2016a) proposed the removal of potentially contaminated soil from the impact berm off site to an approved waste management facility. Confirmation soil samples collected from the final berm face were not composited as requested by NMED (NMED, 2015a).

Impact berm confirmation soil samples were not composited as this may have resulted in metals concentrations that were not representative of the actual metals concentrations remaining in the soil. The sampling locations for the impact berms/backstops at the firing ranges were collected as outlined in the ACMWP (NASA; 2015b) at 10 ft horizontal intervals along the berm face, approximately 3 to 5 ft above the surface of the range floor in order to intercept the most likely impact elevation within the berm.

Figure 4.4 and Figure 4.6 provide the location for the confirmation soil samples for the STGT firing range (SWMU 29) and the WB-2 firing range (SMWU 31), respectively. With direction from NMED (NMED, 2015a), the location of soil samples and duplicate samples was biased to focus on areas that would be expected to contain potentially higher metals concentrations (toward the center of the berm).

Each soil sample was collected directly from the berm face to a depth of approximately 6 in. into the berm. The confirmation soil samples were collected with a decontaminated stainless-steel scoop and transferred to 4 oz. sample containers for submittal to the off-site chemical analytical laboratory. Gloves and other disposable materials contacting the samples were collected and managed for the appropriate waste characterization and waste disposition (ACMWP Section 6.0; NASA, 2015b).

4.5.8 Data Review

After receiving soil data analytical packages from the contractor laboratory, a quality assurance and quality control (QA/QC) specialist evaluated the sample data, field, and laboratory QC results for acceptability with respect to the project quality objectives. Chemical analytical data was compared with the project quality objectives and evaluated using the data validation guidelines contained in EPA guidance documents, the latest version of SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," and industry-accepted QA/QC methods and procedures (EPA, 2013).

The following information (where required and applicable) was compiled and used to conduct a comprehensive review of the sample analytical data:

- The NMED-approved ACMWP (NASA, 2015b).
- Field sampling and geologist logs.
- Laboratory reports.
- Statements of work and the laboratory Quality Management Plan.
- Electronic Data Deliverable Files.
- Standard Operating Procedures.
- Database tools.

4.6 Deviations

4.6.1 Waste Characterization and Management

Deviations from the waste characterization determination and management procedures originally described in the Waste Management Plan provided with the ACMWP (NASA, 2015a) were required to implement the NMED approved revised clean-up strategy for lead contaminated soil (NASA, 2016a). Instead of mechanically separating lead from soil as identified in the ACMWP, NASA removed lead contaminated soil from the berms at the WB-2 and STGT firing ranges. This required re-characterization of the environmental media and a change of its status from an unregulated material to a hazardous waste. Lead contaminated soil was managed onsite has a hazardous waste during the project, and shipped off site to a permitted TSDF for treatment and disposal.

4.6.2 Waste Disposal

NASA also elected to dispose of the bullets, bullet fragments, and casings collected from the firing range floors and fallout areas instead of recycling these items as originally proposed in the ACMWP. A cost-

effective recycling solution was not identified for the lead and brass ammunition scraps and fragments. After the decision to dispose of the bullets, bullet fragments, and casings was made, this waste was characterized as hazardous and consolidated with lead contaminated soil in a roll-off container at the STGT Firing Range. This roll-off with lead contaminated soil and ammunition scraps and fragments was transported off site for treatment and disposal at a permitted TSDF. Refer to Section 4.4 for details.

5.0 Field Investigation Results

The results of the physical characterization of soil during field work and chemical laboratory analysis are presented in this section.

5.1 Surface Conditions

Surface conditions at WSTF are typically characterized by the U.S. Department of Agriculture (USDA) Soil Classification (USDA, 1999) Nickel-Tencee Association (60% Nickel gravelly fine sandy loam and 25% Tencee very gravelly loam). The alluvium is classified as the piedmont slope facies of the Camp Rice Formation, which forms part of the Quaternary Santa Fe Group (Seager, 1981).

5.1.1 STGT (SWMU 29) and WB-2 (SWMU 31) Small Arms Firing Ranges

The STGT (SWMU 29) and WB-2 (SWMU 31) firing ranges are located within soils of the Nickel-Tencee Association. The Nickel series includes deep, well drained soils associated with old, coalescent alluvial fans. The soils are formed in gravelly, medium textured alluvial sediments. The upper 5 ft are characterized by light brown to pink gravelly to fine sandy loam. Gravel content is approximately 50%. The Nickel-Tencee unit soils are gently sloping and are in similar positions on alluvial fans. Tencee soils dominate the older, more stable areas where the source of alluvial material was limestone bedrock. Firing range floor soils generally comprised sandy silts with gravel (Unified Soil Classification System [USCS] symbol ML). The soil was inorganic, loose, dry, poorly sorted, and contained subrounded clasts from granules to pebbles in size. The floor of the STGT firing range partially consisted of a patchy veneer of pebble-sized gravel clasts with a maximum thickness of 2 in.

The primary soil type used for the construction of the impact berms at SWMU 29 and SWMU 31 was native gravelly sandy silt (USCS symbol ML). The soil was inorganic, loose, dry, poorly sorted, and contained a range of subangular to subrounded clasts from granules to boulders in size. Approximately 100% of the STGT (SWMU 29; Figure 4.1) impact berm and 60% of the WB-2 (SWMU 31, Figure 4.3) impact berm consisted of this native material. The remaining 40% at WB-2 comprised a well sorted medium grained sand that was concentrated in the central front portion berm. Ammunition fragments were observed to display limited penetration of the gravelly sandy silt to a depth of approximately 6 in., whereas penetration of the sand at the WB-2 berm was observed up to a depth of 5 ft.

5.1.2 200 Area (SWMU 30) Firing Range

Soils in the vicinity of the 200 Area (SWMU 30) firing range belong to the Lozier-Rock Outcrop Complex. The unit consists of very shallow, well drained soils which formed from weathered limestone material. The upper 5 ft are characterized by strongly calcareous brown, light brown, and pale brown stony loams. The Lozier-Rock Outcrop Complex unit is approximately 45% Lozier Stony Loam and 35% Rock Outcrop. The Lozier soils are moderately sloping to moderately steep and irregularly intermingled with limestone outcrops. Rock outcrops occur as steep scarps, breaks, and ledges in the area. Shale outcrops, arroyos, and recent alluvial deposits make up about 20% of the area (NASA, 1996).

The 200 Area firing range floor soils comprised a sandy silt with gravel (USCS symbol ML) that was capped with a veneer of 1/8 in. grey crusher fines up to 1 in. in thickness. The crusher fines were loose and dry. No impact berm was constructed at the 200 Area firing range and the backstop comprised the Lozier-Rock Outcrop Complex. Immediately behind the firing range, the backstop comprised outcropping Permian Hueco limestone capped with a patchy veneer of gravelly sandy silts that reached a thickness up to 1 ft typically along the strike of bedding planes.

5.2 Chemical Analytical Results

Chemical analytical results from soil samples were reviewed for the seven metals listed as COPCs in the ACMWP (NASA, 2015b) and in Table 1.1: antimony, arsenic, copper, iron, lead, tin, and zinc. Discrete chemical analytical soil samples from the impact berms at the STGT and WB-2 Firing Ranges were analyzed by Hall Environmental Analytical Laboratory in Albuquerque, New Mexico for the target metals by SW-846 Method 6010B. Discrete chemical analytical soil samples collected from the range floors and fallout areas at each firing range were analyzed by ALS Laboratories in Rochester, New York for the target metals by SW-846 Method 6010C.

A total of eight sets of data were collected from the three firing ranges in order to perform the activities summarized in this RCR. Each set of data corresponds to either the firing range floor, fallout area, or impact berm at the STGT firing range (SWMU 29), 200 Area firing range (SWMU 30), or WB-2 firing range (SWMU 31). These data sets were combined to create a single analytical dataset for each SWMU that were evaluated in accordance with the NMED RA Guidance (NMED, 2019b). Results of these SWMU-specific evaluations are detailed in the *Risk Assessment Report Small Arms Firing Ranges (SWMUs 29-31)* (NASA, 2020b), enclosed with this RCR.

The XRF data collected in conjunction with the laboratory analytical data (Section 4.5.2) provided lead results that were comparable to the laboratory analytical results. As a result, for the limited situations where laboratory analytical data was not collected for a cell (STGT firing range floor cells #2, #7, and #11 and WB-2 firing range floor cells #2, #6, #7, and #20), the XRF data is considered reliable. XRF data were not evaluated herein, as NASA only evaluated data from discrete soil sample analyses at each firing range.

There were no data quality exceptions that negatively impacted analytical data quality or project objectives. The original laboratory reports and soil metals analytical results are included as an enclosure to this report. NASA completed a risk assessment in accordance with the RA Guidance (NMED, 2019b) in the stand-alone RAR (NASA, 2020b) enclosed with this RCR. A summary of the risk assessment results for metals for the components of each firing range is provided below.

The risk assessment requires comparison of discrete and confirmation sampling data and background threshold values (BTV) established in the WSTF soil background study (SBS; NASA, 2015c, approved by NMED [NMED, 2015c]) to determine COPCs at concentrations greater than the associated BTV, which are then evaluated for site risk. Three background soil areas are referenced on Figure 1.2: Area #1 (upgradient of STGT); Area #3 (upgradient of the 200 Area); and, Area #4 (upgradient of WB-2).

Elevated metal concentrations reported in the WSTF SBS (NASA, 2015c) are due to the source rocks for the alluvial sediments found at each of the firing ranges. Host rocks in the Loman Canyon and Bear Canyon areas, upgradient of WSTF, have been eroded and deposited across the mountain front pediment that incorporates the three firing range areas as alluvial fan debris. Several small epigenetic base and precious metal vein deposits upgradient of WSTF within the southern San Andres Mountains located along the Quartzite Mountain fault zone have been described in detail by Dunham (1935) and summarized by Seager (1981). The base metal sulfide deposits are associated with a variety of subsidiary

metals, most notably arsenic and tellurium. The ability of arsenic to bind to sulfur promotes its occurrence with sulfide bearing mineral deposits such as those found within the area. Naturally occurring arsenic is also associated with volcanic glass of rhyolitic composition, which is the host rock that characterizes Quartzite Mountain located 1,500 ft upgradient of the 200 Area. Evidence of this can be seen in the established WSTF BTV values obtained by soil samplings conducted previously in relevant associated areas, as detailed in the WSTF SBS (NASA, 2015c).

5.2.1 Potential Bias Due to Sample Collection Conditions

In the ACMWP approval with modifications (NMED, 2015a), NMED indicated that compositing soil samples may result in contaminant concentrations that are not representative of concentrations remaining in the soil. NASA recognizes that compositing may dilute the concentrations of a contaminant to below its threshold detection limit and prevent adequate comparisons of soil analytical data to established background concentrations. The potentially low-biased soil analytical data are also inadequate for use in human health and ecological risk screenings required by NMED RA Guidance (NMED, 2019b). Results from composite sampling initially performed at each firing range floor and outfall area are provided in an enclosure to this report, however, as NMED does not consider results of composite samples fully representative of COPC concentrations remaining in soils (NMED, 2017b, 2019a), results of composite samples are not evaluated in this RCR.

NASA collected confirmation samples from the impact berms at the STGT and WB-2 firing ranges in January and February 2017. Additional discrete samples were collected from range floor and outfall area sample grids at each of the firing ranges during September, October and November 2019 (Section 8.1). Results of discrete soil samples collected at each firing range (floor, impact berm, and outfall area) were evaluated in accordance with the RA Guidance (NMED, 2019b).

5.2.2 Risk Assessment Overview

Execution of the screening risk assessment in accordance with the RA Guidance (NMED, 2019b) begins with a comparison of discrete and confirmation sampling data and BTV established in the WSTF SBS (NASA, 2015c, approved by NMED [NMED, 2015c]). This comparison will determine those COPC constituents at concentrations greater than the associated BTV. The COPC constituents identified as above background are then evaluated for site risk and toxicity hazard. Three background soil areas are referenced on Figure 1.2: Area #1 (upgradient of STGT); Area #3 (upgradient of the 200 Area); and, Area #4 (upgradient of WB-2).

In accordance with NMED second disapproval Comments #10, 11, and 12 (NMED, 2019a) to the Response to Disapproval Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report (NASA, 2018), comparison of only arsenic concentrations with background at each firing range is not in accordance with the RA Guidance (NMED, 2019b). The NMED correctly stated that all COPCs at each firing range require comparison with established BTVs. For this reason, the ProUCL output files provided as an appendix to the previous submittal have been deleted from this version of the RCR. Full comparison of all COPCs at each firing range are detailed in the enclosed RAR (NASA, 2020), and include ProUCL output files supporting these comparisons in appropriate appendices to the RAR.

The RAR (NASA, 2020b) Section 5.2 presents the comparison of the STGT (SWMU 29) soil analytical data with established background threshold values (BTV) for background Area 1. This comparison identified copper as the only COPC exceeding background at SWMU 29. Copper is designated as a toxicity hazard, and is not designated as a carcinogen. Figure 5.1 presents the COPC (copper) concentration at each discrete sample location, including the berm sample locations.

Section 5.3 of the RAR presents the comparison of the 200 Area (SWMU 30) soil analytical data with Area 3 BTVs. This comparison identified copper and lead as the COPCs exceeding background. As with copper, lead is only characterized as a toxic hazard, not a carcinogen. Figure 5.2 presents the COPC (copper and lead) concentration at each discrete sample location.

Section 5.4 of the RAR presents the comparison of the WB-2 (SWMU 31) soil analytical data with Area 4 BTVs, and identified antimony, copper, lead, and tin at the COPCs exceeding background. Similar to copper and lead, antimony and tin are designated toxic hazards only. Figure 5.3 presents the COPC (antimony, copper, lead, and tin) concentration at each discrete sample location, including the berm sample locations.

Section 7.1 of the RAR describes the methods used to evaluate human health toxicity hazard posed by all identified non-carcinogenic COPC concentrations at each SWMU. The NMED RA Guidance (NMED, 2019b) has established SSLs for residential (RSSL), industrial (ISSL), and construction worker (CWSSL) receptors. The COPC concentrations are compared with the respective SSL to determine the Hazard Quotient (HQ) for each COPC, and all COPC HQs are added to determine the cumulative HQ for the SWMU. The NMED also established SL-SSLs to evaluate the potential for leachate to impact groundwater beneath the site.

Section 7.2 of the RAR describes the methods used to evaluate toxicity hazard to ecological receptors in accordance with Volume II of the RA Guidance (NMED, 2017a). A site evaluation is conducted at each SWMU by qualified biologist to characterize the site environment, and identify observed animal and plant populations. Constituents identified at concentrations greater than background are designated constituents of potential ecological concern (COPEC), identical to COPCs identified for each SWMU. Initially, NASA completed a Tier I screening level ecological risk assessment (SLERA), comparing identified COPEC concentrations with Tier I ecological screening levels (ESL) to determine screening level hazard quotients (SLHQ). Should cumulative Tier I SLHQs exceed the NMED target hazard of 1, a more detailed evaluation is warranted. In these cases, NASA completed a Tier II SLERA, using site-specific and constituent-specific information to evaluate COPECs against Tier II threshold limit values (TRV) and determine the cumulative SLHQ for each COPEC.

5.2.3 STGT (SWMU 29) Firing Range Toxicity Hazard

5.2.3.1 STGT (SWMU 29) Firing Range Human Health Toxicity Hazard

A total of 108 discrete soil metals samples were collected from randomly selected quadrants within the 80 STGT firing range grids and impact berm (Figure 4.1). A summary of the metals results is provided in Table 5.1 and the single identified COPC (copper) concentrations for each location are shown on Figure 5.1. The maximum copper concentration identified in STGT (SWMU 29) firing range discrete soil samples (1.94E+01 milligrams per kilogram [mg/kg]) does not exceed the NMED RSSL, ISSL, CWSSL, and SL-SSL. The resultant toxicity hazard was less than the NMED target hazard of 1, which indicates concentrations at the site are unlikely to result in adverse health impacts; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations were likewise less than the NMED SL-SSLs for copper and lead which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted.

5.2.3.2 STGT (SWMU 29) Firing Range Ecological Toxicity Hazard

NASA completed a Tier I SLERA for the STGT (SWMU 29) firing range, using the maximum COPEC (copper) concentration to generate SLHQs for the deer mouse, horned lark, and plant receptor populations. The NMED target hazard of 1 was not exceeded for each receptor, So a Tier II SLERA is not

warranted for SWMU 29. COPEC concentrations at the site are unlikely to result in adverse ecological impacts; therefore, do not warrant further site-specific evaluation.

5.2.4 200 Area (SWMU 30) Firing Range Toxicity Hazard

5.2.4.1 200 Area (SWMU 30) Firing Range Human Health Toxicity Hazard

A total of 44 discrete soil metals samples were collected from randomly selected quadrants within the 200 Area firing range grids (Figure 4.2). A summary of the metals results is provided in Table 5.2 and the two identified COPCs (copper and lead) concentrations for each location are shown on Figure 5.2. The maximum COPC concentrations identified in the 200 Area (SWMU 30) firing range discrete soil samples (copper at 1.55E+01 mg/kg, and lead at 8.83E+01 mg/kg) do not exceed the respective NMED RSSL, ISSL, CWSSL, and SL-SSLs. Lead hazard quotients are not included in the cumulative toxicity hazard sum because lead screening levels are based on blood lead levels, rather than an oral reference dose as are other constituents. The resultant lead hazard quotient and copper toxicity hazard were both less than the NMED target hazard of 1, which indicates concentrations at the site are unlikely to result in adverse health impacts; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations were likewise less than the NMED SL-SSLs for copper and lead which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted.

5.2.4.2 200 Area (SWMU 30) Firing Range Ecological Toxicity Hazard

NASA completed a Tier I SLERA for the 200 Area (SWMU 30) firing range, using the maximum COPEC (copper and lead) concentrations to generate SLHQs for the deer mouse, horned lark, and plant receptor populations. The NMED target hazard of 1 was exceeded for the deer mouse and horned lark receptors, and neared exceedance (9.57E-01) for plant receptors.

The Tier II SLERA for the 200 Area (SWMU 30) firing range was completed based on the UCL95 values for the two COPECs copper and lead. Results of the Tier II SLERA identified SLHQs for the deer mouse, horned lark, and plant receptor populations that are each less than the NMED target hazard of 1, which indicates COPEC concentrations at the site are unlikely to result in adverse ecological impacts; therefore, do not warrant further site-specific evaluation.

5.2.5 WB-2 (SWMU 31) Firing Range Toxicity Hazard

5.2.5.1 WB-2 (SWMU 31) Firing Range Human Health Toxicity Hazard

A total of 44 discrete soil metals samples were collected from randomly selected quadrants within the WB-2 firing range grids (Figure 4.3). A summary of the metals results is provided in Table 5.3 and the four identified COPCs (antimony, copper, lead, and tin) concentrations for each location are shown on Figure 5.3. The maximum COPC concentrations identified in the WB-2 (SWMU 31) firing range discrete soil samples (antimony at 1.20E+00 mg/kg, copper at 1.48E+01 mg/kg, lead at 1.07E+02 mg/kg, and tin at 5.80E-01 mg/kg) do not exceed the respective NMED RSSL, ISSL, CWSSL, and SL-SSLs. Lead hazard quotients are not included in the cumulative toxicity hazard sum because lead screening levels are based on blood lead levels, rather than an oral reference dose as are other constituents. Both the lead hazard quotient and the toxicity hazard (antimony, copper, and tin) were less than the NMED target hazard of 1, which indicates concentrations at the site are unlikely to result in adverse health impacts; therefore, SWMU 31 does not warrant further site-specific evaluation. The maximum antimony, copper, and lead concentrations are less than the respective NMED SL-SSLs (6.56E+00 mg/kg, 9.15E+02 mg/kg, and 2.70E+02 mg/kg, respectively). The NMED does not establish an SL-SSL for tin, so the EPA RSL

for groundwater protection is used. The maximum concentration of tin does not exceed the EPA RSL of 3.00E+03 mg/kg. The maximum COPC concentrations were likewise less than the NMED SL-SSLs for antimony, copper, lead, and tin which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted.

5.2.5.2 WB-2 (SWMU 31) Firing Range Ecological Toxicity Hazard

NASA completed a Tier I SLERA for the WB-2 (SWMU 31) firing range, using the maximum COPEC concentrations for three contaminants (antimony, copper, and lead) to generate SLHQs for the deer mouse, horned lark, and plant receptor populations. The NMED target hazard of 1 was exceeded for ecological receptors. Studies of the toxicity of tin to ecological receptors are insufficient to assign either Tier I ESLs or Tier II TRVs, so tin toxicity to ecological receptors was not evaluated.

The Tier II SLERA for the WB-2 (SWMU 31) firing range was completed based on the UCL95 values for the COPECs antimony, copper and lead. Results of the Tier II SLERA identified SLHQs for the deer mouse, horned lark, and plant receptor populations that are each less than the NMED target hazard of 1, which indicates COPEC concentrations at the site are unlikely to result in adverse ecological impacts; therefore, do not warrant further site-specific evaluation.

6.0 Remedy Completion Summary and Interpretation of Results

NASA completed collection of discrete soil samples at all firing range grids in accordance with NMED requirements (NMED, 2017b). Evaluation of soil analytical results from discrete samples was performed in accordance with comments in the second disapproval by the NMED (NMED, 2019a) and the RA Guidance (NMED, 2019b). NASA developed the enclosed RAR (NASA, 2020b), to satisfy NMED requirements stated in the second disapproval of the RCR.

Results of the RAR indicate that toxicity hazards to both human and ecological receptor populations are less than the NMED target, which indicates concentrations at the firing ranges are unlikely to result in adverse impacts to human and ecological receptors; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations at each firing range were likewise less than the respective NMED SL-SSLs, which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted. Corrective actions completed at each firing range have effectively removed COPC constituents originating from historical use as firing ranges, and no further corrective action is warranted.

7.0 Conclusions

The objective of the ACM to remove known and suspected COPCs related to ammunition scraps from the shallow soil at the STGT (SWMU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges was successfully achieved. The strategy included the manual removal of ammunition scrap and fragments from surface soil of the range floor and fallout areas, as well as the excavation and off-site disposal of ammunition scrap and fragments with soil from the impact berms. Concentrations of metals reflected in chemical analytical results from discrete soil samples were either representative of WSTF background concentrations or did not exceed applicable regulatory criteria as detailed in the enclosed RAR (NASA, 2020b). Most of the target metals were determined to be consistent with WSTF background concentrations, are known to occur naturally at concentrations above regulatory levels in WSTF soils, and are not considered to be the direct result of historical activities at the firing ranges (SWMUs 29-31).

Project DQOs were met as follows: ACM activities continued until cleanup levels as described in Permit Attachment 15 for direct exposure routes under the ISSL and CWSSL scenario were achieved for site

soils as determined by field and analytical testing. NASA also completed a screening risk assessment in accordance with NMED requirements (NMED, 2019a) and procedures in the RA Guidance (NMED, 2019b) and developed the enclosed RAR (NASA, 2020b). At each firing range, the calculated toxicity hazard from all COPC concentrations was less than the NMED target hazard of 1, which indicates concentrations at these sites are unlikely to result in adverse health impacts; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations were likewise less than respective NMED SL-SSL concentrations, which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted at the firing ranges.

8.0 Recommendations

8.1 Site Restoration

Following review and approval of the final updated RCR and the completed RAR by NMED, NASA recommends that the remaining site restoration activities be performed. NASA will complete site restoration and grading activities at the STGT (SWMU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges following NMED approval of the final updated RCR and RAR. Unexcavated impact berm soil from the WB-2 and STGT firing ranges will be spread and graded to approximate the natural contours of the sites. Site grading will be completed to prevent ponding of water at each site location. Site restoration and grading activities may also include the installation of best management controls (e.g., diversion culverts, temporary berms, silt fences, etc.) to direct storm water away from the site locations to prevent storm water runoff impacts. Site restoration activities will not include any efforts to reseed the areas, though the sites may be mechanically enhanced to facilitate the natural return of vegetation.

8.2 Remedy Completion

Submittal of this report for NMED review satisfies the requirements of Permit Section VII.L, Accelerated Cleanup Process. Because final site restoration is not planned until NMED concurrence is provided, NASA recommends site restoration activities be initiated following final NMED approval of the RCR. At that point, NASA will consult with NMED to determine the process, if not previously established, to develop and submit a petition for ~~a~~ "Corrective Action Complete" status determination for the STGT (SMWU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges.

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Figures

Figure 1.1 **WSTF Location Map**

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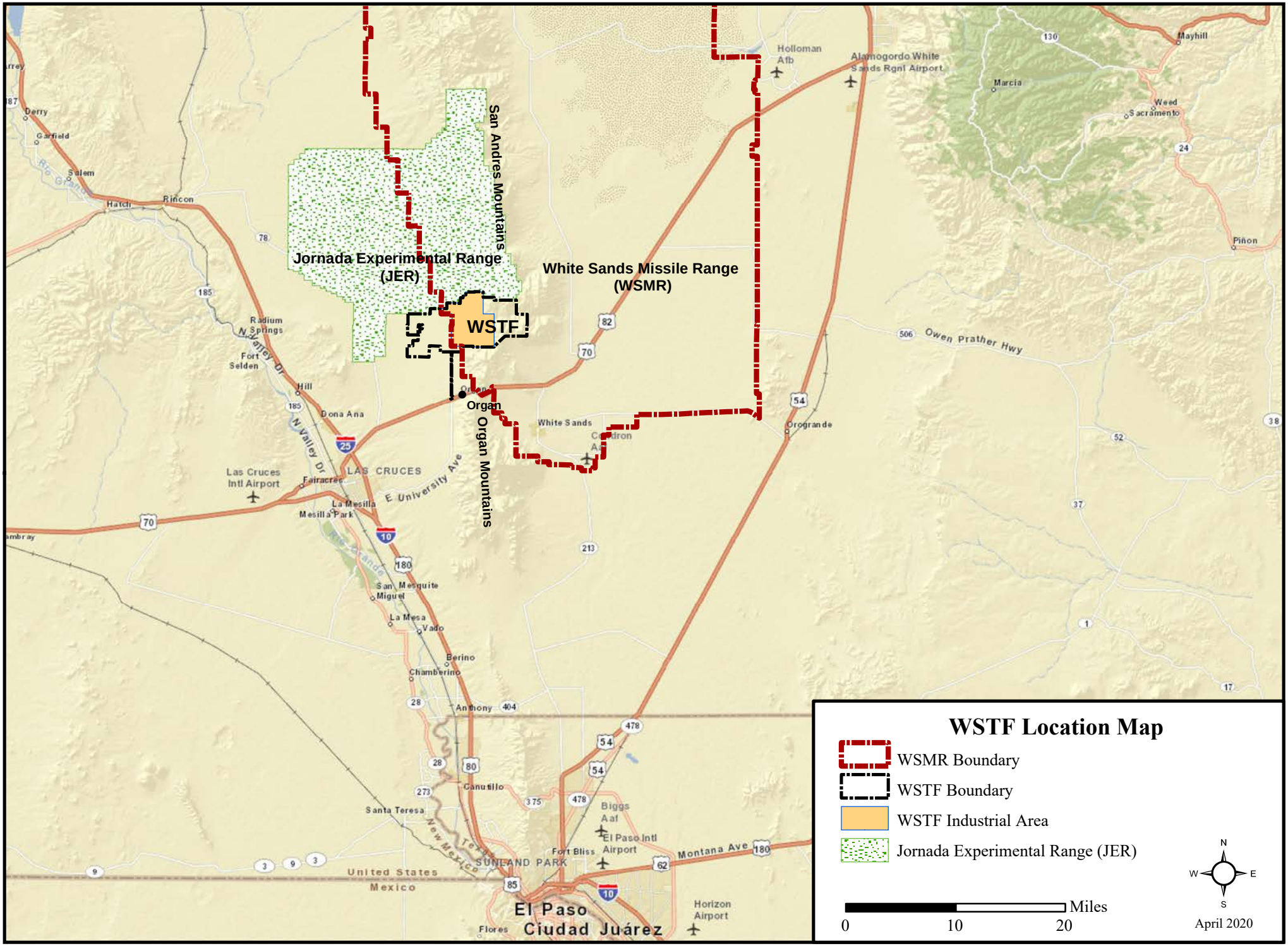
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Marcia
Weed
Sacramento
Piñon
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Orogrande
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Salem
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Las Cruces Intl Airport
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Rio Grande
San Miguel
Mesquite
La Mesa
Vado
Berino
Chamberino
Anthony
Canutillo
Santa Teresa
New Mexico
Texas
United States
Mexico
SUNLAND PARK
Fort Bliss
Biggs Aaf
El Paso Intl Airport
Montana Ave
El Paso
Ciudad Juárez
Flores
Horizon Airport
WSTF Location Map
WSMR Boundary
WSTF Boundary
WSTF Industrial Area
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Figure 1.2 **Firing Ranges Location Map**

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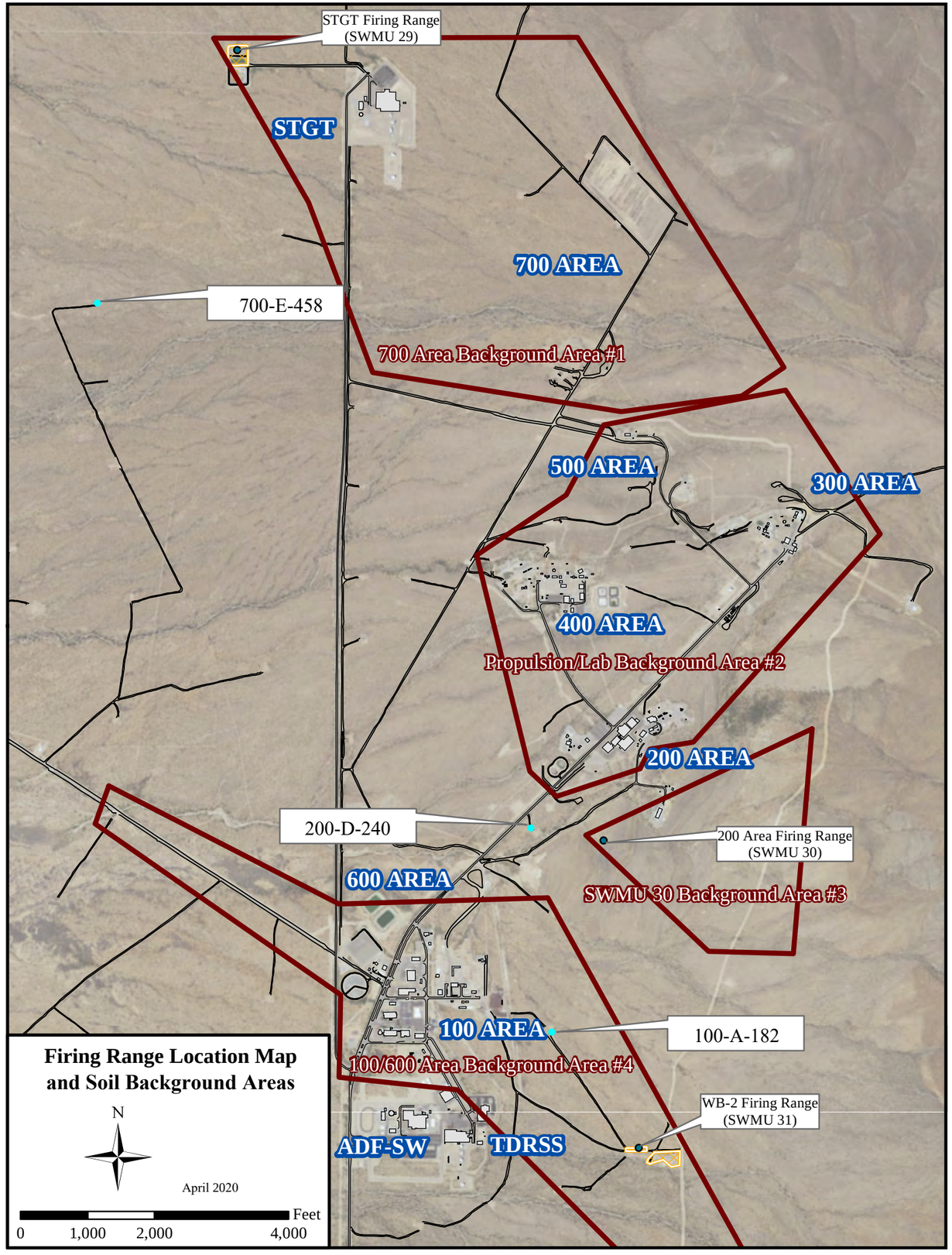
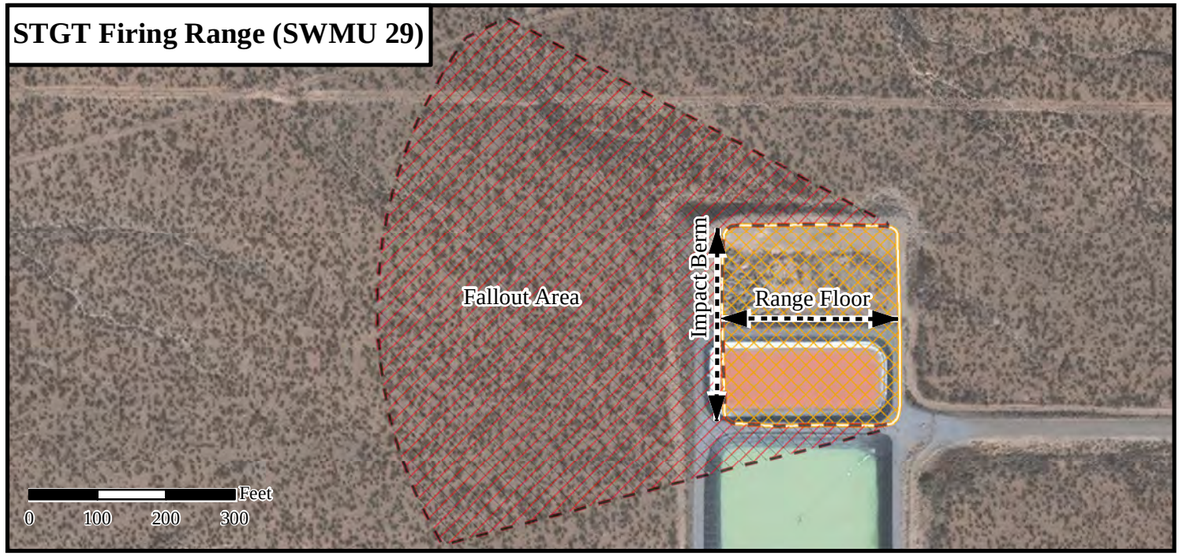
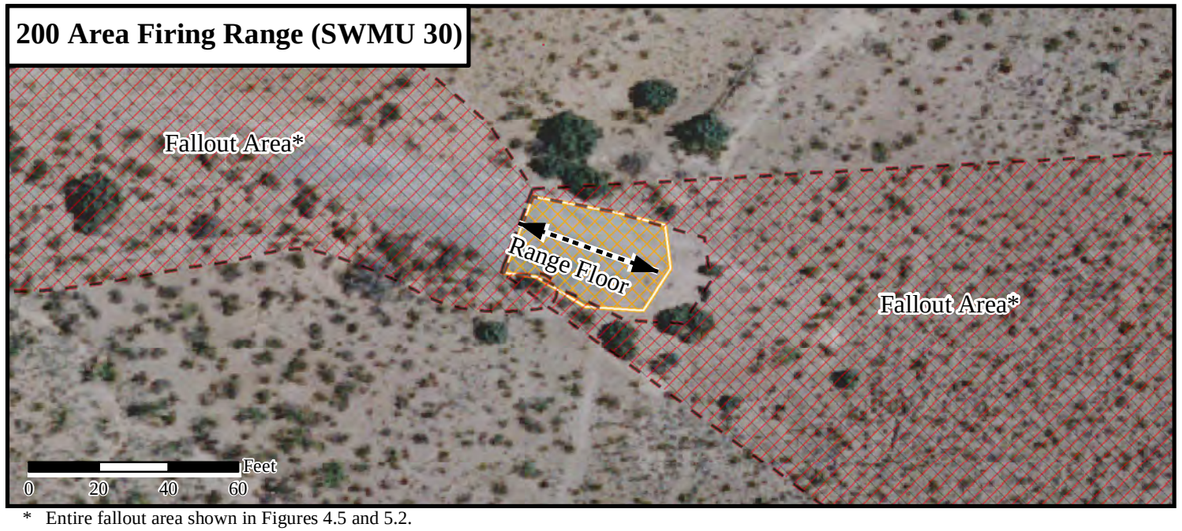






* Entire fallout area shown in Figures 4.5 and 5.2.

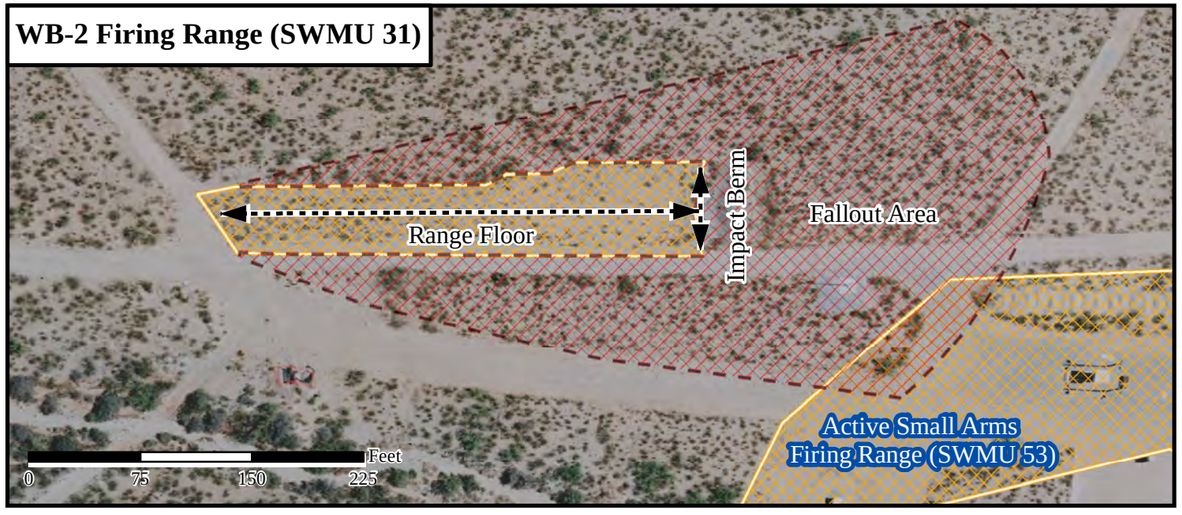
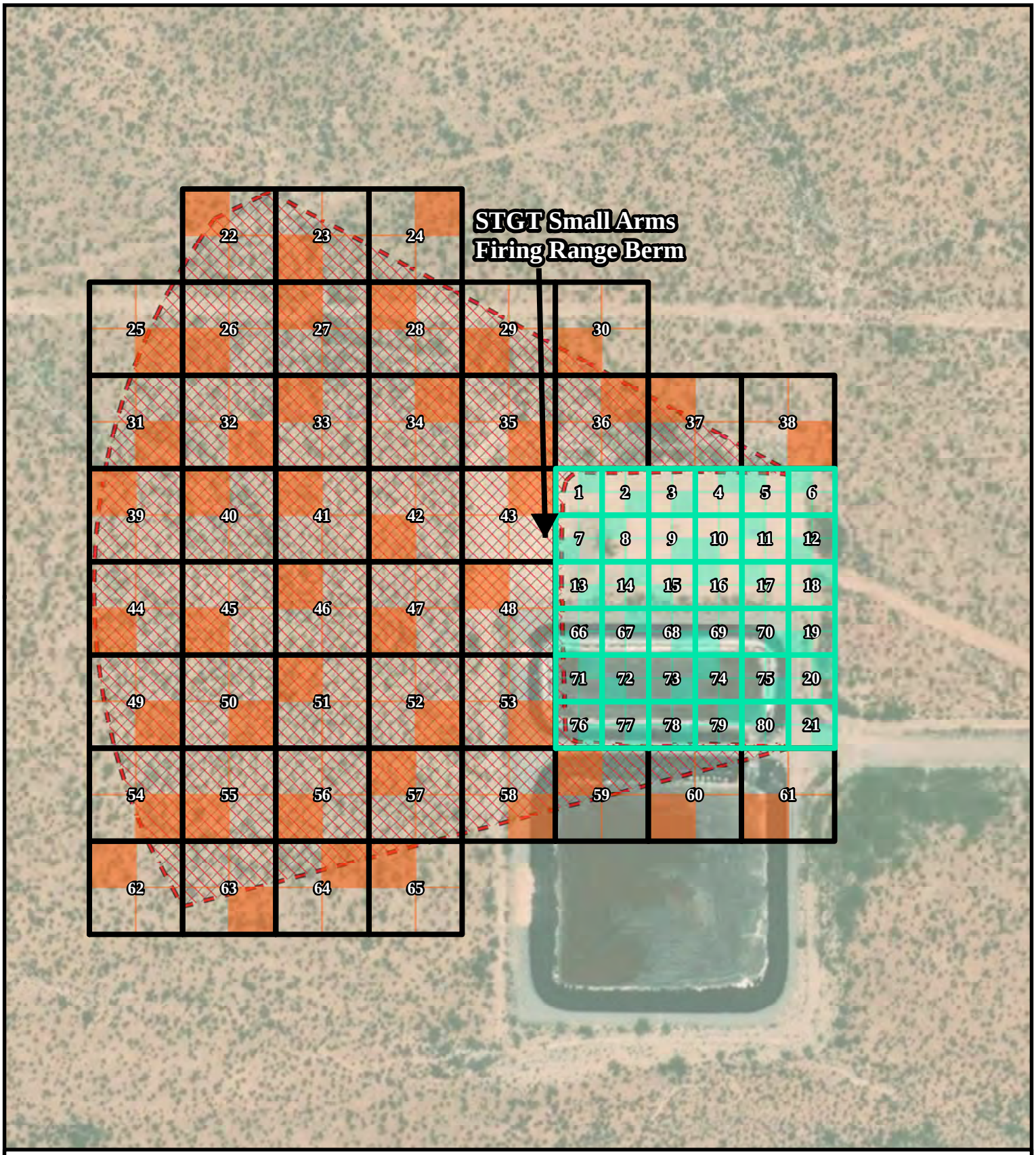


Figure 4.1 STGT (SWMU 29) Range Floor and Impact Berm Sampling

(SEE NEXT PAGE)



STGT (SWMU 29): Discrete Sample Locations

- Range Floor Sampling Grid (50' x 50')
- Range Floor Qaudrant
- Range Floor Sampling Qaudrant
- Fallout Area Sampling Grid (100' x 100')
- Fallout Area Qaudrant
- Fallout Area Sampling Qaudrant
- Fallout Extent

0 70 140 280 Feet

N
W E
S

April 2020

Figure 4.2 200 Area (SWMU 30) Range Floor Sampling

(SEE NEXT PAGE)

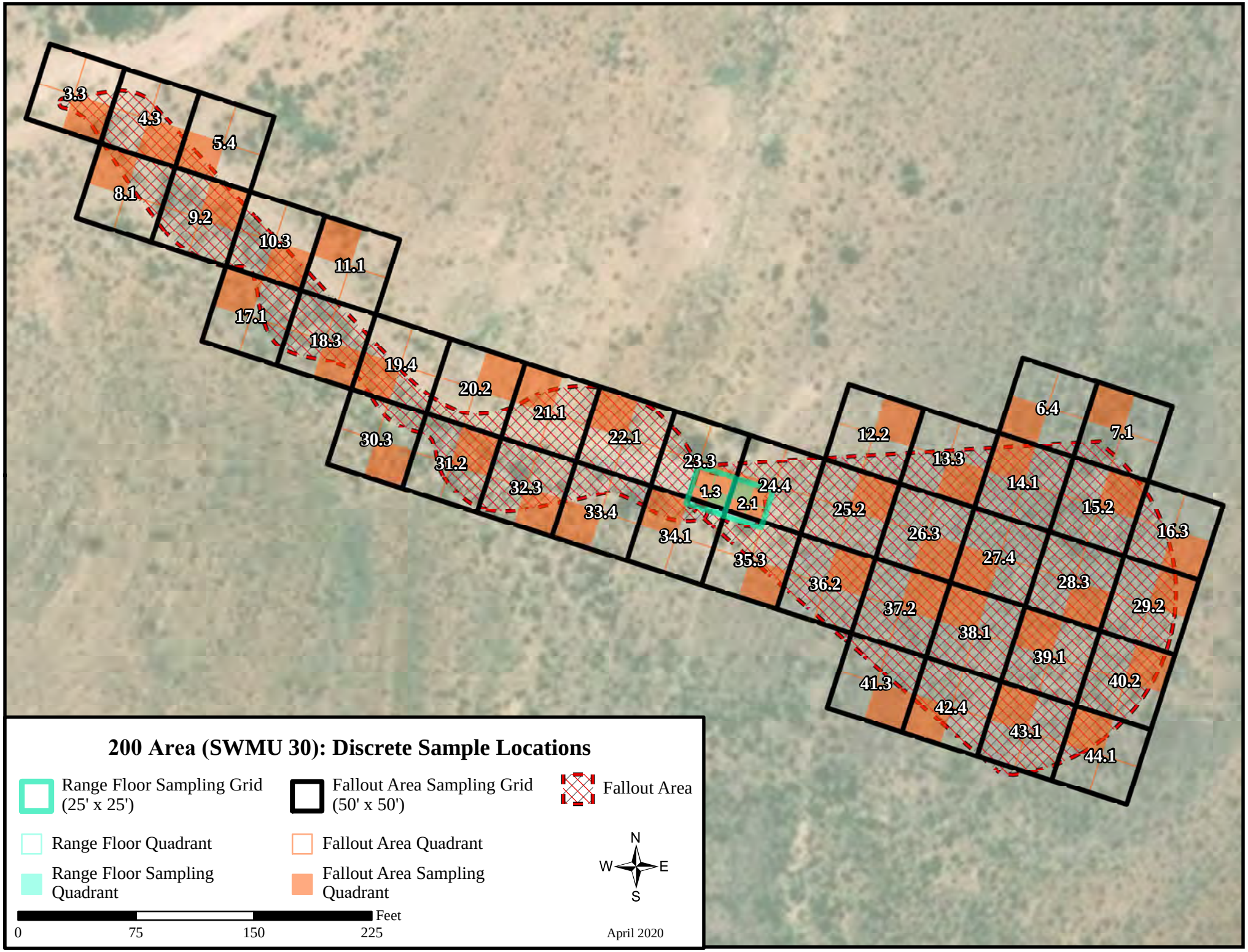

3.3
4.3
5.4
8.1
9.2
10.3
11.1
17.1
18.3
19.4
20.2
21.1
22.1
30.3
31.2
32.3
33.4
34.1
35.3
36.2
37.2
38.1
39.1
40.2
41.3
42.4
43.1
44.1
1.3
2.1
23.3
24.4
25.2
26.3
27.4
28.3
29.2
12.2
13.3
14.1
15.2
16.3
6.4
7.1
200 Area (SWMU 30): Discrete Sample Locations
Range Floor Sampling Grid (25' x 25')
Fallout Area Sampling Grid (50' x 50')
Fallout Area
Range Floor Quadrant
Fallout Area Quadrant
Range Floor Sampling Quadrant
Fallout Area Sampling Quadrant
N
W
E
S
Feet
0
75
150
225
April 2020

Figure 4.3 WB-2 (SWMU 31) Range Floor and Impact Berm Sampling

(SEE NEXT PAGE)

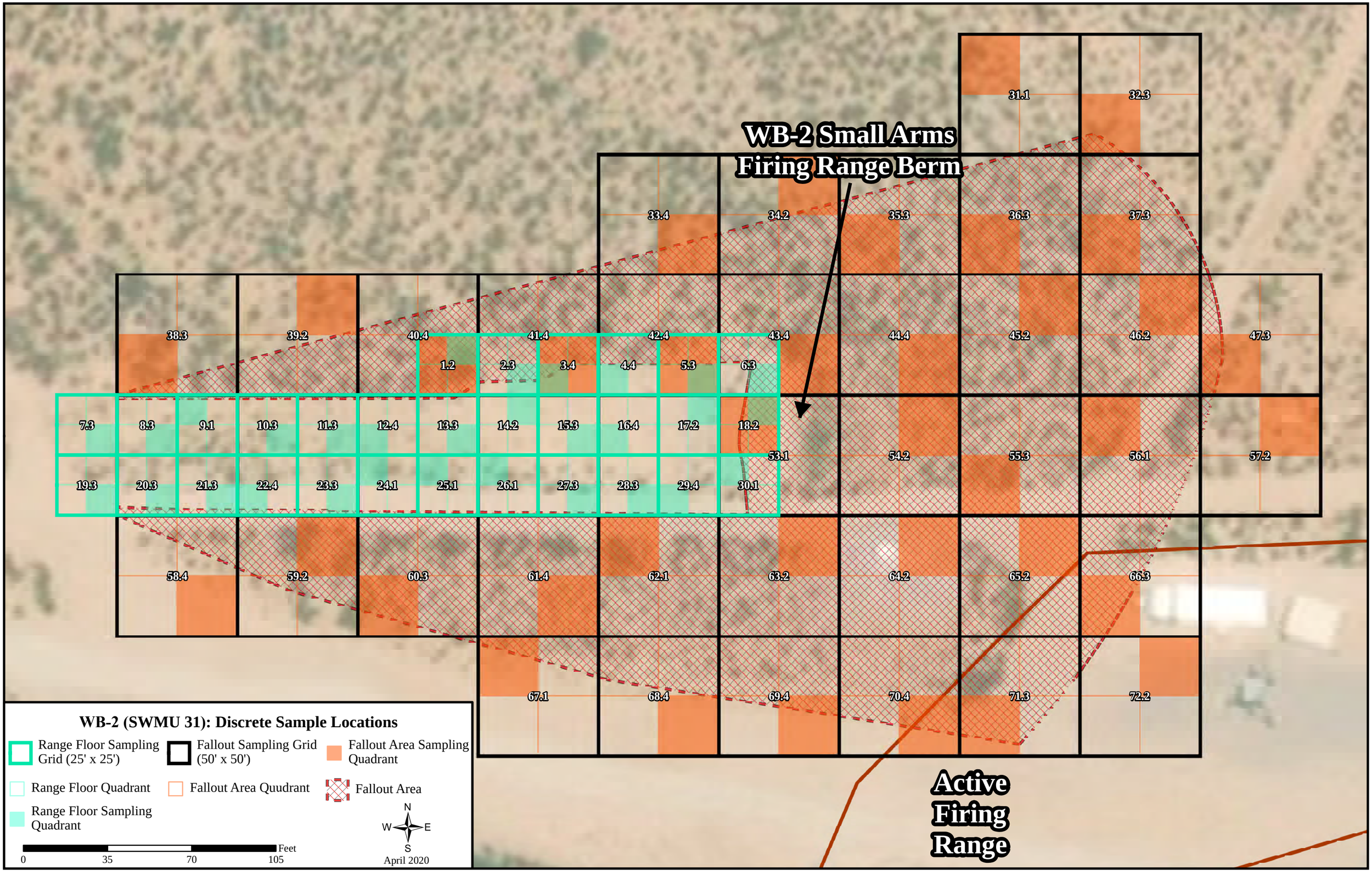
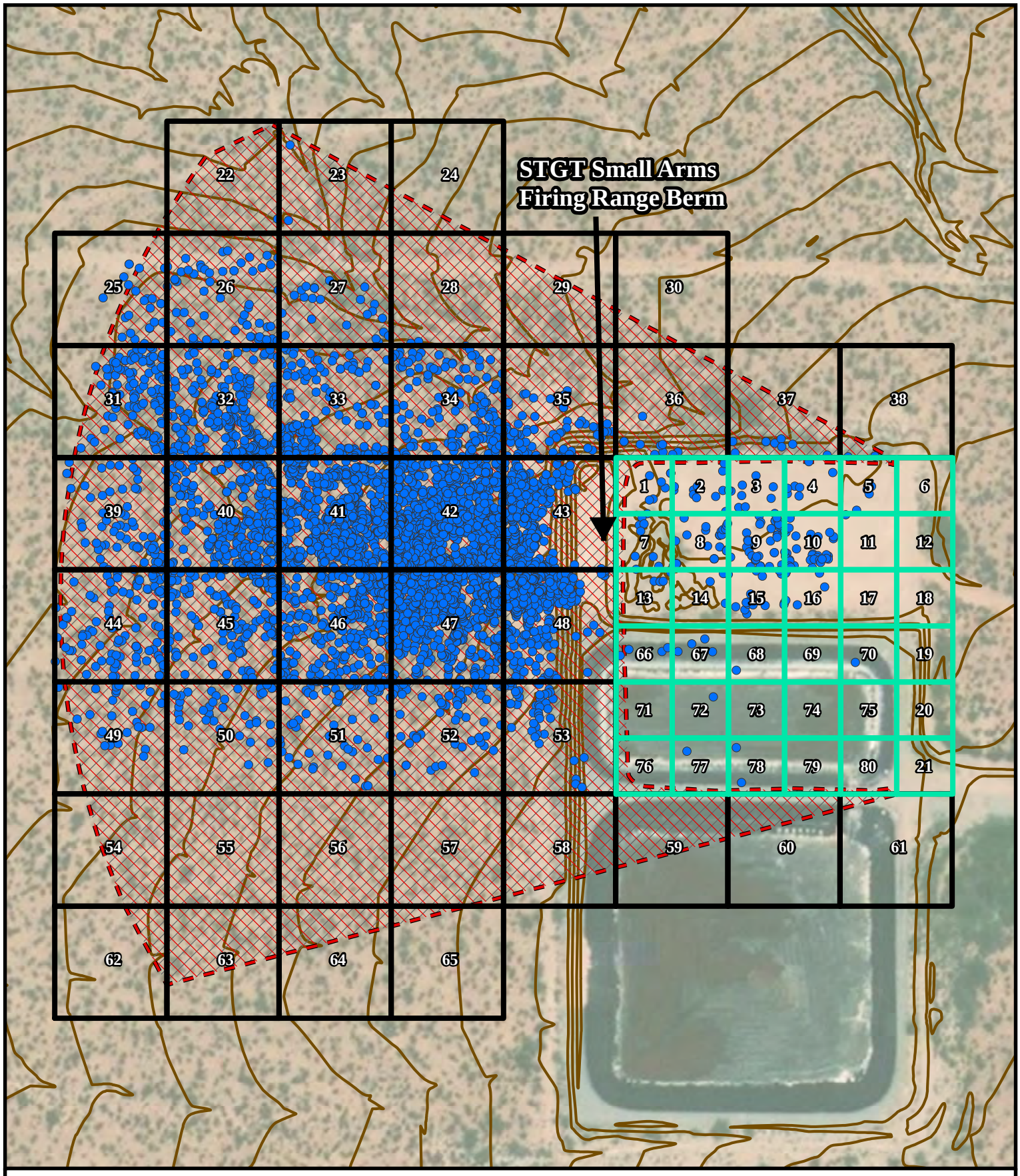

WB-2 Small Arms
Firing Range Berm
31.1
32.3
33.4
34.2
35.3
36.3
37.3
38.3
39.2
40.4
41.4
42.4
43.4
44.4
45.2
46.2
47.3
1.2
2.3
3.4
4.4
5.3
6.3
7.3
8.3
9.1
10.3
11.3
12.4
13.3
14.2
15.3
16.4
17.2
18.2
19.3
20.3
21.3
22.4
23.3
24.1
25.1
26.1
27.3
28.3
29.4
30.1
53.1
54.2
55.3
56.1
57.2
58.4
59.2
60.3
61.4
62.1
63.2
64.2
65.2
66.3
67.1
68.4
69.4
70.4
71.3
72.2
WB-2 (SWMU 31): Discrete Sample Locations
Range Floor Sampling Grid (25' x 25')
Fallout Sampling Grid (50' x 50')
Fallout Area Sampling Quadrant
Range Floor Quadrant
Fallout Area Quudrant
Fallout Area
Range Floor Sampling Quadrant
N
W
E
S
Feet
0
35
70
105
April 2020
Active Firing Range

Figure 4.4 STGT (SWMU 29) Fallout Grid and Bullet Recovery (updated)

(SEE NEXT PAGE)



STGT (SWMU 29) Fallout Area Grid and Bullet Recovery

- Recovered Bullet Location
- Range Floor Sampling Grid (50' x 50')
- Fallout Area Sampling Grid (100' x 100')
- Clean-Up Extent
- Topographic Contour (2 ft. Interval)

N
W E
S

0 60 120 240 Feet

April 2020

Figure 4.5 200 Area (SWMU 30) Fallout Grid and Bullet Recovery

(SEE NEXT PAGE)

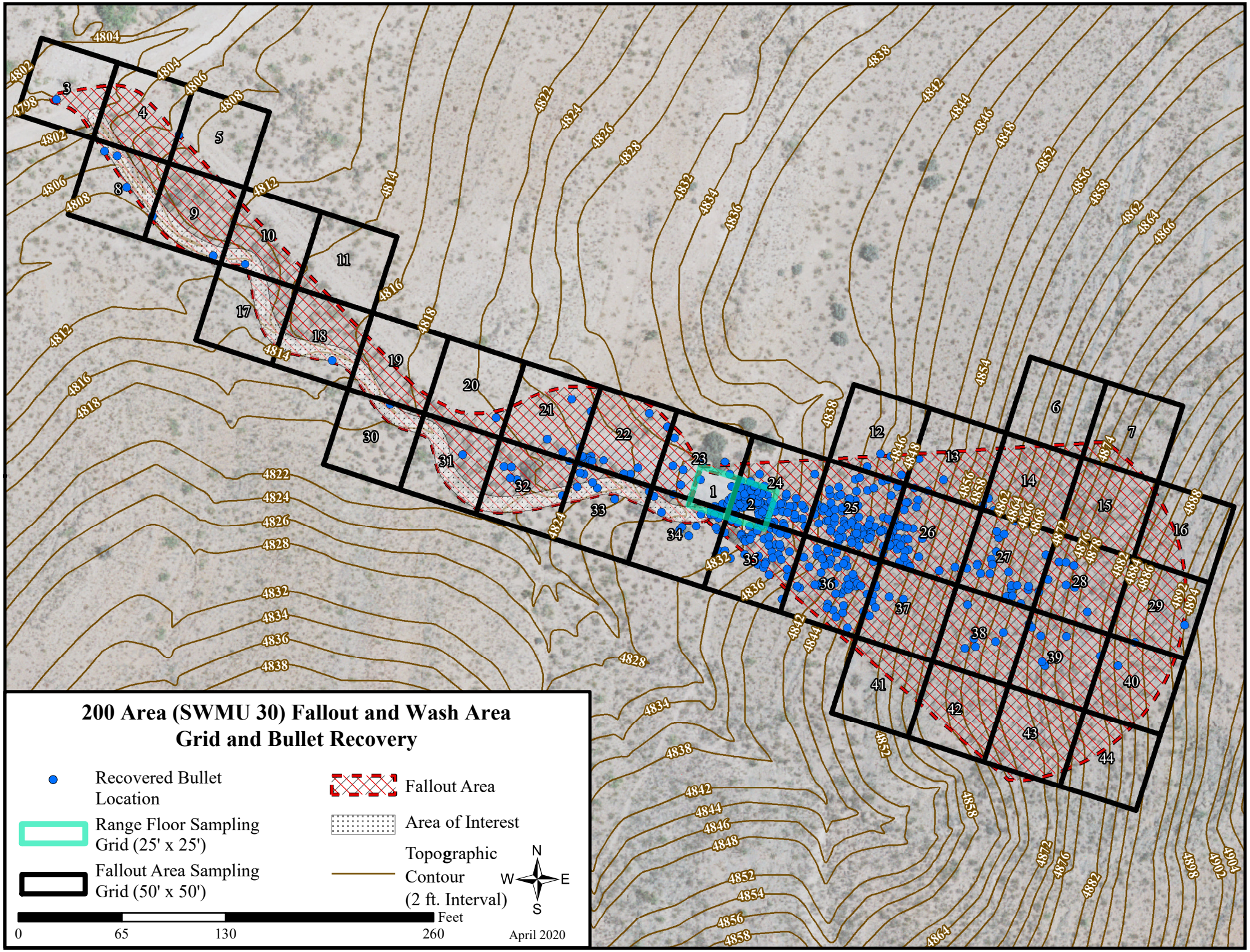
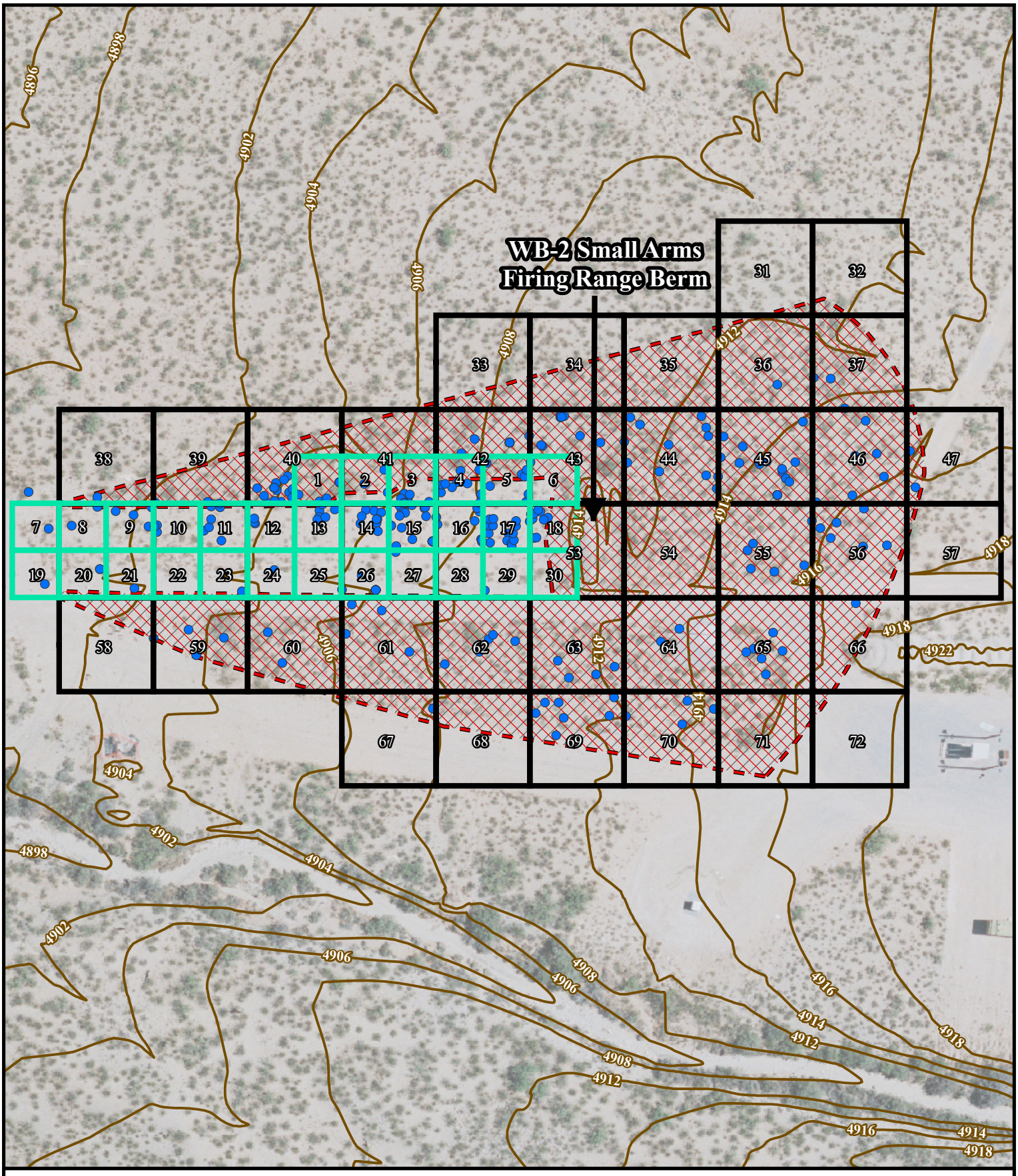

200 Area (SWMU 30) Fallout and Wash Area
Grid and Bullet Recovery
Recovered Bullet Location
Range Floor Sampling Grid (25' x 25')
Fallout Area Sampling Grid (50' x 50')
Fallout Area
Area of Interest
Topographic Contour (2 ft. Interval)
N
W
E
S
Feet
0
65
130
260
April 2020

Figure 4.6 WB-2 (SWMU 31) Fallout Grid and Bullet Recovery

(SEE NEXT PAGE)



WB-2 (SWMU 31) Fallout Grid and Bullet Recovery

- Recovered Bullet Location
- Range Floor Sampling Grid (25' x 25')
- Fallout Area Sampling Grid (50' x 50')
- Fallout Area
- Topographic Contour (2 ft. Interval)

N
W E
S

0 30 60 120 Feet

April 2020

Figure 5.1 STGT (SWMU 29) COPC Concentrations in Surface Soils

(SEE NEXT PAGE)

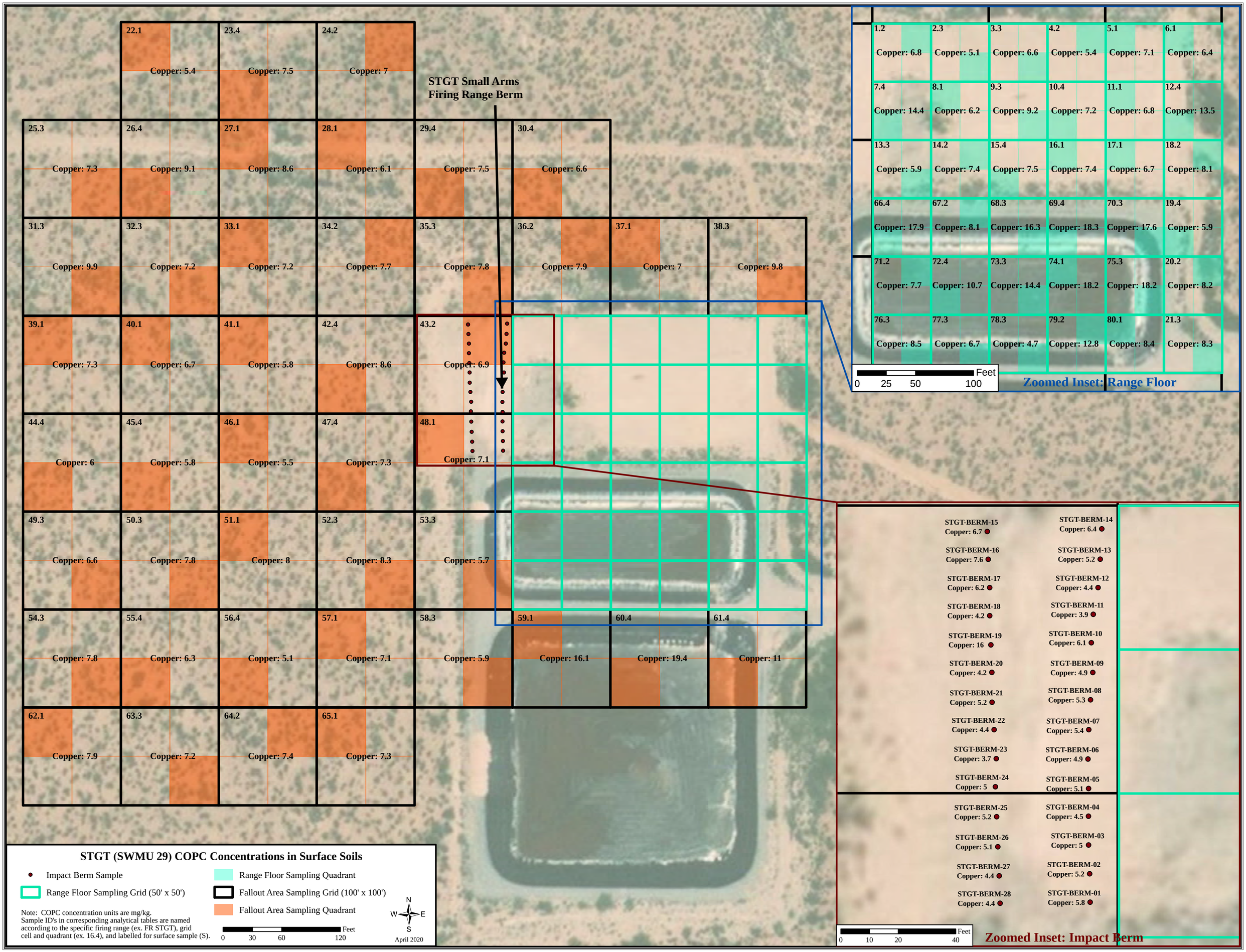

22.1
Copper: 5.4
23.4
Copper: 7.5
24.2
Copper: 7
STGT Small Arms
Firing Range Berm
25.3
Copper: 7.3
26.4
Copper: 9.1
27.1
Copper: 8.6
28.1
Copper: 6.1
29.4
Copper: 7.5
30.4
Copper: 6.6
31.3
Copper: 9.9
32.3
Copper: 7.2
33.1
Copper: 7.2
34.2
Copper: 7.7
35.3
Copper: 7.8
36.2
Copper: 7.9
37.1
Copper: 7
38.3
Copper: 9.8
39.1
Copper: 7.3
40.1
Copper: 6.7
41.1
Copper: 5.8
42.4
Copper: 8.6
43.2
Copper: 6.9
44.4
Copper: 6
45.4
Copper: 5.8
46.1
Copper: 5.5
47.4
Copper: 7.3
48.1
Copper: 7.1
49.3
Copper: 6.6
50.3
Copper: 7.8
51.1
Copper: 8
52.3
Copper: 8.3
53.3
Copper: 5.7
54.3
Copper: 7.8
55.4
Copper: 6.3
56.4
Copper: 5.1
57.1
Copper: 7.1
58.3
Copper: 5.9
59.1
Copper: 16.1
60.4
Copper: 19.4
61.4
Copper: 11
62.1
Copper: 7.9
63.3
Copper: 7.2
64.2
Copper: 7.4
65.1
Copper: 7.3
1.2
Copper: 6.8
2.3
Copper: 5.1
3.3
Copper: 6.6
4.2
Copper: 5.4
5.1
Copper: 7.1
6.1
Copper: 6.4
7.4
Copper: 14.4
8.1
Copper: 6.2
9.3
Copper: 9.2
10.4
Copper: 7.2
11.1
Copper: 6.8
12.4
Copper: 13.5
13.3
Copper: 5.9
14.2
Copper: 7.4
15.4
Copper: 7.5
16.1
Copper: 7.4
17.1
Copper: 6.7
18.2
Copper: 8.1
66.4
Copper: 17.9
67.2
Copper: 8.1
68.3
Copper: 16.3
69.4
Copper: 18.3
70.3
Copper: 17.6
19.4
Copper: 5.9
71.2
Copper: 7.7
72.4
Copper: 10.7
73.3
Copper: 14.4
74.1
Copper: 18.2
75.3
Copper: 18.2
20.2
Copper: 8.2
76.3
Copper: 8.5
77.3
Copper: 6.7
78.3
Copper: 4.7
79.2
Copper: 12.8
80.1
Copper: 8.4
21.3
Copper: 8.3
Feet
0 25 50 100
Zoomed Inset: Range Floor
STGT-BERM-15
Copper: 6.7
STGT-BERM-14
Copper: 6.4
STGT-BERM-16
Copper: 7.6
STGT-BERM-13
Copper: 5.2
STGT-BERM-17
Copper: 6.2
STGT-BERM-12
Copper: 4.4
STGT-BERM-18
Copper: 4.2
STGT-BERM-11
Copper: 3.9
STGT-BERM-19
Copper: 16
STGT-BERM-10
Copper: 6.1
STGT-BERM-20
Copper: 4.2
STGT-BERM-09
Copper: 4.9
STGT-BERM-21
Copper: 5.2
STGT-BERM-08
Copper: 5.3
STGT-BERM-22
Copper: 4.4
STGT-BERM-07
Copper: 5.4
STGT-BERM-23
Copper: 3.7
STGT-BERM-06
Copper: 4.9
STGT-BERM-24
Copper: 5
STGT-BERM-05
Copper: 5.1
STGT-BERM-25
Copper: 5.2
STGT-BERM-04
Copper: 4.5
STGT-BERM-26
Copper: 5.1
STGT-BERM-03
Copper: 5
STGT-BERM-27
Copper: 4.4
STGT-BERM-02
Copper: 5.2
STGT-BERM-28
Copper: 4.4
STGT-BERM-01
Copper: 5.8
Feet
0 10 20 40
Zoomed Inset: Impact Berm
STGT (SWMU 29) COPC Concentrations in Surface Soils
Impact Berm Sample
Range Floor Sampling Grid (50' x 50')
Range Floor Sampling Quadrant
Fallout Area Sampling Grid (100' x 100')
Fallout Area Sampling Quadrant
Note: COPC concentration units are mg/kg.
Sample ID's in corresponding analytical tables are named according to the specific firing range (ex. FR STGT), grid cell and quadrant (ex. 16.4), and labelled for surface sample (S).
Feet
0 30 60 120
N
W E
S
April 2020

Figure 5.2 200 Area (SWMU 30) COPC Concentrations in Surface Soils

(SEE NEXT PAGE)

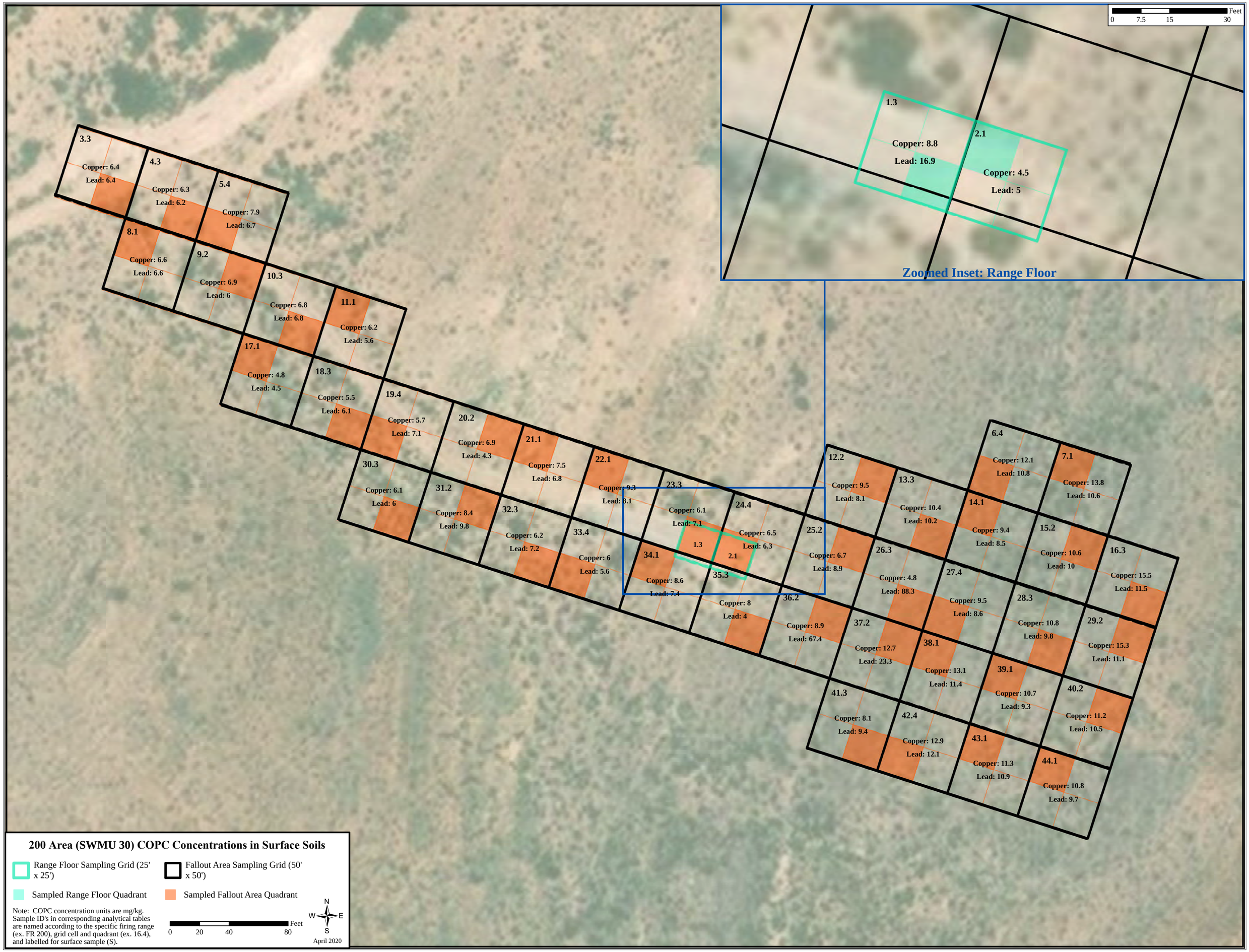

Feet
0 7.5 15 30
Zoomed Inset: Range Floor
1.3
Copper: 8.8
Lead: 16.9
2.1
Copper: 4.5
Lead: 5
3.3
Copper: 6.4
Lead: 6.4
4.3
Copper: 6.3
Lead: 6.2
5.4
Copper: 7.9
Lead: 6.7
8.1
Copper: 6.6
Lead: 6.6
9.2
Copper: 6.9
Lead: 6
10.3
Copper: 6.8
Lead: 6.8
11.1
Copper: 6.2
Lead: 5.6
17.1
Copper: 4.8
Lead: 4.5
18.3
Copper: 5.5
Lead: 6.1
19.4
Copper: 5.7
Lead: 7.1
20.2
Copper: 6.9
Lead: 4.3
21.1
Copper: 7.5
Lead: 6.8
22.1
Copper: 9.3
Lead: 8.1
23.3
Copper: 6.1
Lead: 7.1
24.4
Copper: 6.5
Lead: 6.3
25.2
Copper: 6.7
Lead: 8.9
30.3
Copper: 6.1
Lead: 6
31.2
Copper: 8.4
Lead: 9.8
32.3
Copper: 6.2
Lead: 7.2
33.4
Copper: 6
Lead: 5.6
34.1
Copper: 8.6
Lead: 7.4
35.3
Copper: 8
Lead: 4
36.2
Copper: 8.9
Lead: 67.4
12.2
Copper: 9.5
Lead: 8.1
13.3
Copper: 10.4
Lead: 10.2
26.3
Copper: 4.8
Lead: 88.3
27.4
Copper: 9.5
Lead: 8.6
37.2
Copper: 12.7
Lead: 23.3
38.1
Copper: 13.1
Lead: 11.4
41.3
Copper: 8.1
Lead: 9.4
42.4
Copper: 12.9
Lead: 12.1
6.4
Copper: 12.1
Lead: 10.8
7.1
Copper: 13.8
Lead: 10.6
14.1
Copper: 9.4
Lead: 8.5
15.2
Copper: 10.6
Lead: 10
16.3
Copper: 15.5
Lead: 11.5
28.3
Copper: 10.8
Lead: 9.8
29.2
Copper: 15.3
Lead: 11.1
39.1
Copper: 10.7
Lead: 9.3
40.2
Copper: 11.2
Lead: 10.5
43.1
Copper: 11.3
Lead: 10.9
44.1
Copper: 10.8
Lead: 9.7
200 Area (SWMU 30) COPC Concentrations in Surface Soils
Range Floor Sampling Grid (25' x 25')
Fallout Area Sampling Grid (50' x 50')
Sampled Range Floor Quadrant
Sampled Fallout Area Quadrant
Note: COPC concentration units are mg/kg. Sample ID's in corresponding analytical tables are named according to the specific firing range (ex. FR 200), grid cell and quadrant (ex. 16.4), and labelled for surface sample (S).
Feet
0 20 40 80
N
W E
S
April 2020

Figure 5.3 WB-2 (SWMU 31) COPC Concentrations in Surface Soils

(SEE NEXT PAGE)

Feet
0 10 20 40

Zoomed Inset: Range Floor

1.3 Antimony: ND Copper: 11.6 Lead: 11.4 Tin: ND
2.4 Antimony: ND Copper: 10.1 Lead: 10.4 Tin: ND
3.1 Antimony: ND Copper: 9.6 Lead: 22.5 Tin: ND
4.1 Antimony: ND Copper: 11.7 Lead: 9.4 Tin: ND
5.4 Antimony: ND Copper: 12.5 Lead: 16.5 Tin: ND
6.3 Antimony: ND Copper: 11 Lead: 33.2 Tin: ND

7.3 Antimony: ND Copper: 10.7 Lead: 9 Tin: ND
8.1 Antimony: ND Copper: 10.9 Lead: 9.4 Tin: ND
9.2 Antimony: ND Copper: 10.4 Lead: 9.8 Tin: ND
10.3 Antimony: ND Copper: 14.8 Lead: 10 Tin: ND
11.1 Antimony: ND Copper: 7.7 Lead: 7.4 Tin: ND
12.1 Antimony: ND Copper: 9.4 Lead: 8.4 Tin: ND
13.1 Antimony: ND Copper: 7.8 Lead: 12.8 Tin: ND
14.1 Antimony: ND Copper: 8.1 Lead: 7.2 Tin: ND
15.1 Antimony: ND Copper: 7.4 Lead: 7.4 Tin: ND
16.1 Antimony: ND Copper: 8.3 Lead: 7.3 Tin: ND
17.4 Antimony: ND Copper: 7.9 Lead: 16.4 Tin: ND
18.4 Antimony: 1.2 Copper: 6.8 Lead: 107 Tin: ND

19.1 Antimony: ND Copper: 5.2 Lead: 7.7 Tin: ND
20.2 Antimony: ND Copper: 8.2 Lead: 8 Tin: ND
21.3 Antimony: ND Copper: 7.7 Lead: 16.6 Tin: ND
22.2 Antimony: ND Copper: 6.8 Lead: 8.1 Tin: ND
23.3 Antimony: ND Copper: 9.2 Lead: 8.8 Tin: ND
24.2 Antimony: ND Copper: 12.6 Lead: 11.9 Tin: ND
25.1 Antimony: ND Copper: 9.4 Lead: 8.6 Tin: ND
26.4 Antimony: ND Copper: 9.8 Lead: 10.4 Tin: ND
27.4 Antimony: ND Copper: 8 Lead: 7.5 Tin: ND
28.4 Antimony: ND Copper: 9.3 Lead: 8.4 Tin: ND
29.2 Antimony: ND Copper: 8.9 Lead: 11.3 Tin: ND
30.4 Antimony: ND Copper: 10.6 Lead: 17.8 Tin: ND

Feet
0 7 14 28

WB-2-BERM-01 Antimony: ND Copper: 5.6 Lead: 11 Tin: 0.35
WB-2-BERM-010 Antimony: ND Copper: 5.7 Lead: 6.7 Tin: 0.44
WB-2-BERM-02 Antimony: ND Copper: 5.8 Lead: 4 Tin: 0.46
WB-2-BERM-09 Antimony: ND Copper: 5.9 Lead: 15 Tin: 0.57
WB-2-BERM-03 Antimony: ND Copper: 6.2 Lead: 4.8 Tin: 0.55
WB-2-BERM-08 Antimony: ND Copper: 5.3 Lead: 3.5 Tin: 0.42
WB-2-BERM-04 Antimony: ND Copper: 5.6 Lead: 4.3 Tin: 0.42
WB-2-BERM-07 Antimony: ND Copper: 5.3 Lead: 6.1 Tin: 0.49
WB-2-BERM-05 Antimony: ND Copper: 5.9 Lead: 5 Tin: 0.58
WB-2-BERM-06 Antimony: ND Copper: 6.1 Lead: 5.2 Tin: 0.43

Zoomed Inset: Impact Berm

31.1 Antimony: ND Copper: 7.3 Lead: 7.3 Tin: ND
32.3 Antimony: ND Copper: 9.3 Lead: 10.2 Tin: ND

33.4 Antimony: ND Copper: 8.8 Lead: 8.9 Tin: ND
34.2 Antimony: ND Copper: 8.2 Lead: 8.4 Tin: ND
35.3 Antimony: ND Copper: 9.5 Lead: 10.5 Tin: ND
36.3 Antimony: ND Copper: 10.6 Lead: 10.5 Tin: ND
37.3 Antimony: ND Copper: 10.1 Lead: 9.1 Tin: ND

38.3 Antimony: ND Copper: 9.7 Lead: 9.9 Tin: ND
39.2 Antimony: ND Copper: 13.2 Lead: 12 Tin: ND
40.4 Antimony: ND Copper: 12.7 Lead: 11.3 Tin: ND
41.4 Antimony: ND Copper: 9.1 Lead: 12.3 Tin: ND
42.4 Antimony: ND Copper: 12 Lead: 13.8 Tin: ND
43.4 Antimony: ND Copper: 9 Lead: 66.5 Tin: ND
44.4 Antimony: ND Copper: 11.8 Lead: 11.6 Tin: ND
45.2 Antimony: ND Copper: 10.5 Lead: 10.2 Tin: ND
46.2 Antimony: ND Copper: 9.9 Lead: 9.8 Tin: ND
47.3 Antimony: ND Copper: 8.7 Lead: 8 Tin: ND

53.1 Antimony: ND Copper: 7.2 Lead: 8.1 Tin: ND
54.2 Antimony: ND Copper: 9.2 Lead: 8.9 Tin: ND
55.3 Antimony: ND Copper: 9.1 Lead: 8.2 Tin: ND
56.1 Antimony: ND Copper: 7.5 Lead: 7.5 Tin: ND
57.2 Antimony: ND Copper: 8.2 Lead: 8.7 Tin: ND

58.4 Antimony: ND Copper: 8.2 Lead: 9.5 Tin: ND
59.2 Antimony: ND Copper: 12.3 Lead: 13.1 Tin: ND
60.3 Antimony: ND Copper: 7.4 Lead: 10 Tin: ND
61.4 Antimony: ND Copper: 10.5 Lead: 9.6 Tin: ND
62.1 Antimony: ND Copper: 10.9 Lead: 11.3 Tin: ND
63.2 Antimony: ND Copper: 8.4 Lead: 10.5 Tin: ND
64.2 Antimony: ND Copper: 6.3 Lead: 7.2 Tin: ND
65.2 Antimony: ND Copper: 7.8 Lead: 7.7 Tin: ND
66.3 Antimony: ND Copper: 7.3 Lead: 8.1 Tin: ND

67.1 Antimony: ND Copper: 9.8 Lead: 10.7 Tin: ND
68.4 Antimony: ND Copper: 12.1 Lead: 9 Tin: ND
69.4 Antimony: ND Copper: 9.6 Lead: 8 Tin: ND
70.4 Antimony: ND Copper: 7.7 Lead: 7.7 Tin: ND
71.3 Antimony: ND Copper: 8.7 Lead: 8.8 Tin: ND
72.2 Antimony: ND Copper: 8.5 Lead: 10.4 Tin: ND

WB-2 Small Arms Firing Range Berm

Active Firing Range

WB-2 (SWMU 31) COPC Concentrations in Surface Soils

- Impact Berm Sample
- Range Floor Sampling Grid (25' x 25')
- Sampled Range Floor Quadrant
- Proposed Fallout Sampling Grid (50' x 50')
- Sampled Fallout Area Quadrant

Note: COPC concentration units are mg/kg. Sample ID's in corresponding analytical tables are named according to the specific firing range (ex. FR WB-2), grid cell and quadrant (ex. 16.4), and labelled for surface sample (S).

Feet
0 15 30 60

N W E S

April 2020

Tables

Table 1.1 Contaminants of Potential Concern and Soil Screening Levels

COPC	Residential Soil, Cancer (mg/kg)	Residential Soil, Noncancer (mg/kg)	Industrial/ Occupational Soil, Cancer (mg/kg)	Industrial/ Occupational Soil, Noncancer (mg/kg)	Construction Worker Soil, Cancer (mg/kg)	Construction Worker Soil, Noncancer (mg/kg)	SL-SSL, DAF 20 (mg/kg)	Analytical Method
Antimony		3.13E+01		5.19E+02		1.42E+02	6.56E+00	SW 846 Method 6010C
Arsenic	7.07E+00	1.30E+01	3.59E+01	2.08E+02	2.16E+02	4.12E+01	5.83E+00	SW 846 Method 6010C
Copper		3.13E+03		5.19E+04		1.42E+04	9.15E+02	SW 846 Method 6010C
Iron		5.48E+04		9.08E+05		2.48E+05	6.96E+03	SW 846 Method 6010C
Lead		4.00E+02		8.00E+02		8.00E+02	2.70E+02	SW 846 Method 6010C
Tin		4.70E+04		7.00E+05			3.0E+03	SW 846 Method 6010C
Zinc		2.35E+04		3.89E+05		1.06E+05	7.41E+03	SW 846 Method 6010C

Notes:
Antimony, arsenic, copper, iron lead and zinc soil screening levels (SSL) and soil leachate SSLs (SL-SSL) obtained from NMED Guidance (NMED, 2019b).
Tin SSL and SL-SSL obtained from EPA Regional Screening Levels (RSL), November 2019 update viewed at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.
Null entries signify that a screening level has not been established for the COPC and exposure scenario.

Table 5.1 STGT (SWMU 29) Analytical Results – Discrete and Confirmation Samples

Soil Sample Location	Analyte	Detections / Total Samples	Concentration Range (mg/kg)		Area 1 BTV[1] 0'-4' Soils (mg/kg)
			Min	Max	
STGT Firing Range Floor Grids 1-21, 66-80	Antimony, Total	0/36	--	--	1.76E+00
	Arsenic, Total	36/36	2.77E+00	1.66E+01	1.2E+01
	Copper, Total	36/36	4.7E+00	1.83E+01	1.1E+01
	Iron, Total	36/36	7.24E+03	1.81E+04	3.32E+04
	Lead, Total	36/36	6.4E+00	2.3E+01	1.2E+01
	Tin, Total	0/36	--	--	NE
	Zinc, Total	36/36	2.1E+01	7.77E+01	4.56E+01
STGT Firing Range Fallout Area Grids 22-65	Antimony, Total	0/44	--	--	1.76E+00
	Arsenic, Total	43/44	2.2E+00	5.25E+00	1.2E+01
	Copper, Total	44/44	5.1E+00	1.94E+01	1.1E+01
	Iron, Total	44/44	6.33E+03	1.75E+04	3.32E+04
	Lead, Total	44/44	4.9E+00 J	1.5E+01	1.2E+01
	Tin, Total	0/44	--	--	NE
	Zinc, Total	44/44	1.73E+01	6.18E+01	4.56E+01
STGT Firing Range Impact Berm	Antimony, Total	0/28	--	--	1.76E+00
	Arsenic, Total	28/28	3.0E+00	7.1E+00 SP	1.2E+01
	Copper, Total	28/28	3.7E+00	1.6E+01 SP	1.1E+01
	Iron, Total	28/28	1.2E+04	1.5E+04	3.32E+04
	Lead, Total	28/28	2.4E+00	1.1E+01 SP	1.2E+01
	Tin, Total	0/28	--	--	NE
	Zinc, Total	28/28	1.8E+01	2.6E+01	4.56E+01

Notes:
[1] Background Threshold Value
J = the result is an estimated value less than the quantitation limit but greater than or equal to the detection limit.
SP = The matrix spike recovery and/or the relative percent difference for matrix spike duplicates was outside standard limits.

Table 5.2 200 Area (SWMU 30) Analytical Results – Discrete Samples

Soil Sample Location	Analyte	Detections / Total Samples	Concentration Range (mg/kg)		Area 3 BTV[1] 0'-4' Soils (mg/kg)
			Min	Max	
200 Area Firing Range Floor Grids 1-2	Antimony, Total	0/2	--	--	2.84E+00
	Arsenic, Total	2/2	5.2E+00	1.03E+01	2.53E+01
	Copper, Total	2/2	4.5E+00	8.8E+00	1.29E+01
	Iron, Total	2/2	5.11E+03	9.46E+03	1.89E+04
	Lead, Total	2/2	5.0E+00 J	1.69E+01	1.36E+01
	Tin, Total	0/2	--	--	NE
	Zinc, Total	2/2	1.53E+01	3.01E+01	5.43E+01
200 Area Firing Range Fallout Area Grids 3-44	Antimony, Total	1/42	6.0E-01	7.0E-01	2.84E+00
	Arsenic, Total	42/42	2.7E+00	2.13E+01	2.53E+01
	Copper, Total	42/42	4.8E+00	1.55E+01	1.29E+01
	Iron, Total	42/42	5.32E+03	1.7E+04	1.89E+04
	Lead, Total	42/42	4.0E+00 J	8.83E+01	1.36E+01
	Tin, Total	0/42	--	--	NE
	Zinc, Total	42/42	1.62E+01	4.29E+01	5.43E+01

Notes:
[1] Background Threshold Value
J = the result is an estimated value less than the quantitation limit but greater than or equal to the detection limit.

Table 5.3 WB-2 (SWMU 31) Analytical Results – Discrete and Confirmation Samples

Soil Sample Location	Analyte	Detections / Total Samples	Concentration Range (mg/kg)		Area 4 BTV[1] 0'-4' Soils (mg/kg)
			Min	Max	
WB-2 Firing Range Floor Grids 1-30	Antimony, Total	1/30	1.2E+00	--	NE
	Arsenic, Total	30/30	3.61E+00	6.8E+00	1.11E+01
	Copper, Total	30/30	5.2E+00	1.48E+01	1.17E+01
	Iron, Total	30/30	8.81E+03	1.48E+04	3.99E+04
	Lead, Total	30/30	7.2E+00	1.07E+02	1.59E+01
	Tin, Total	0/30	--	--	NE
	Zinc, Total	30/30	1.97E+01	3.9E+01	5.97E+01
WB-2 Firing Range Fallout Area Grids 31-47, 53-72	Antimony, Total	0/37	--	--	NE
	Arsenic, Total	37/37	2.96E+00	1.11E+01	1.11E+01
	Copper, Total	37/37	6.3E+00	1.32E+01	1.17E+01
	Iron, Total	37/37	7.71E+03	1.65E+04	3.99E+04
	Lead, Total	37/37	7.2E+00	6.65E+01	1.59E+01
	Tin, Total	0/37	--	--	NE
	Zinc, Total	37/37	2.47E+01	3.91E+01	5.97E+01
WB-2 Firing Range Impact Berm	Antimony, Total	0/10	--	--	NE
	Arsenic, Total	10/10	5.5E+00	3.0E+01	1.11E+01
	Copper, Total	10/10	5.3E+00	6.2E+00	1.17E+01
	Iron, Total	10/10	1.1E+04	1.5E+04	3.99E+04
	Lead, Total	10/10	3.5E+00	1.5E+01	1.59E+01
	Tin, Total	10/10	3.5E-01	5.8E-01	NE
	Zinc, Total	10/10	2.5E+01	2.9E+01	5.97E+01

Notes:
[1] Background Threshold Value

Appendix A
Field Documentation

Aug 26, 2015

Weather: Sunny, Clouds, high of 88°F

Personnel: P. Egan, R. Burrows, F. Gallegos

Task: Prep work for firing ranges field work.

Location: 100 Area, then mob to WB-2

Equipment: Only field vehicles

PPE in Use: None today, just work clothes

Safety Meeting: Kick-off meeting in Bldg. 101

0700 At office. Prep for safety meeting

0730 Start Kick-off meeting in Gemini CR. Navarro folks present:

P. Egan	R. Burrows	S. Portillo
T. Wiebe	M. Englert	G. Giles
J. Roland	F. Gallegos	C. Nichols (Labs)

0900 Kickoff meeting completed. Meet w/ techs to discuss plan for day.

- collect supplies
- Break for lunch
- meet up to deliver equip to WB-2 range, check out 200 Area Firing Range access, then P95 mask fit test

1230 Met w/ techs after lunch. P/u supplies from warehouse, drop off maps at Fire department, do some access recon @ 200 Area firing range. Head to STGT to show techs sample site. Drop drums off at WB-2 for IDW.

1445 Meet Marie, Wade, Elvia at Cafeteria training room for P95 fit test.

1505 Complete fit test. Done for day.

Summary: Prep

Tomorrow: Start sampling @ WB-2

Continued on Page 2

Read and Understood By

Pamela Egan 8/26/15
Signed Date

Signed 9/2/15
Date

August 27, 2015

Weather: Cloudy, 80°s
Personnel: P. Egan, R. Burrows, F. Gallegos
Task: Soil sampling
Location: WB-2
Equipment: Soil sampling equipment, Field Vehicles → Carboy #5
PPE in Use: Level D w/ hi Vis; Ex. Zone = Dust mask, poly apron/sleeves, safety glasses
Safety Meeting: Yes, see daily tailgate

0700 Egan collecting sample jars + other equipment. Stop @ Fire Dept. to check in for day. Head to WB-2 FR

0720 Meet techs. Techs are set up + ready to go. Go over SHP, sign 491, training roster, daily tailgate. Discuss plan for day.

We will use odd numbers in sample IDs so we don't duplicate any sample ID #s that other crews will use.

0820 Robert dons PPE + starts sampling in cell #7

Cell #7 — WSTF Labs XRF — 1508270827 - unprepared (u)
0829 - prepared (p), means sieved + ground
Frankie Decons equip
Robert Doffs PPE. Frankie Dons

0850 WSTF labs 1508270857 - u XRF
Hall " 0859 - u 6010C
Cell #19 WSTF labs " 0901 - p XRF
Frankie Doffs PPE. Robert Decons

We don't have lot #s for the Hall jars. Matt is going to see if he can track it down

Continued on Page 3

Read and Understood By

Pamela Egan 8/27/15 — Signed / Date
[redacted] 8/31/15 — Signed / Date

0930 Cell #20 - Robert Dons PPE Aug 27, 2015

Sample ID	Analysis	Lab	U/P
1508270935	XRF	WSTF	U
" 0937	"	"	P

Robert doffs Frankie Decons equipment.

0950 Cell #8. Frankie Dons PPE

Sample ID	Analysis	Lab	U/P
1508270955	XRF	WSTF	U
" 0957	6010C	Hall	U
" 0959	XRF	WSTF	P

Frankie Doffs. Robert decons

1015 Cell #9 Don PPE - Robert

Sample ID	Analysis	Lab	U/P
150827 1025	XRF	WSTF	U
" 1027	6010C	Hall	U
" 1029	XRF	WSTF	P

Robert Doff PPE. Frankie decons

1040 Cell #21 Frankie Dons PPE

Sample I.D	Analysis	Lab	U/P
1508271045	XRF	WSTF	U
" 1047	6010C	Hall	U
" 1049	XRF	WS	P

1050 J. Lawrence on site to run metal detector. Signs tailgate after getting safety briefing.

Frankie doffs PPE. Robert decons equip.

Start clean up before breaking for lunch. Decon water + contaminated debris into IDW Drums. Secure site. Set up barrier.

Continued on Page 4

Read and Understood By

Pamela Egan Signed 8/27/15 Date

Signed 8/31/15 Date

Lawrence leaves site with us. Aug 27, 2015

11:20 Break for lunch

12:30 Egan / Lawrence @ WB-2 FR

12:45 Techs arrive

Prep for next sampling event. Lawrence heads out w/ metal detector.

12:50 Cell #22 Robert Dons PPE

Sample ID	Analysis	Lab	U/P
150827 1301	XRF	WSTF	U
1303	6010C	Hall	U
1305	XRF	WSTF	P

Robert doffs PPE, Frankie decons

1320 Cell #~~18~~ 21 Frankie dons PPE

Sample ID	Analysis	Lab	U/P
~~150827 1330 3345~~			
~~10 3547~~			
~~+ 49~~			
150827 1333	XRF	WSTF	U
" 35	6010C	Hall	U
" 37	XRF	WSTF	P

Frankie doffs, Robert decons

~~PPE~~
~~1335~~
1355 Cell #23 Robert Dons PPE

Sample ID	Analysis	Lab	U/P
150827 1405	XRF	WSTF	U
1407	6010C	Hall	U
1409	XRF	WSTF	P

Continued on Page 5

Read and Understood By

Pamela Egan Signed 8/27/15 Date

~~MPC~~ Signed 8/31/15 Date

Aug 27, 2015

1410 Robert doffs PPE, Frankie decons

14:20 Start clearing up site. Secure for long weekend.

14:30 Head to WSTF Met lab to drop off XRF samples.

1500 Relinquish samples to Charles Nichols.
Techs leave for 637 to chain Hall samples to fridge + unload for day.

Egan to office

Daily Summary:

- Mobilized to WB-2
- Sampled grid cells 7, 19, 8, 20, 9, 21, 10, 22, 23
- Applied all PPE + decon procedures
- Checked in + out w/ WSTF Fire Dept.

Next Week:

- Continue w/ soil sampling.
- Put "contact" info on HazWoper sign.

8.27.15

Continued on Page

Pamela Egan
Signed

8.27.15
Date

Read and Understood By

Signed

8/31/15
Date

Weather: Sunny, slight breeze (<5 mph), ≈85°
Personnel: S. Portillo, F. Gallegos, R. Burrows, G. Giles (metal Detector)
Task: Soil Sampling @ WB-2 Firing Rrange
Location: WB-2 Firing Range
Equipment: Soil Sampling equipment, Carboy GS, Field Vehicles
PPE in Use: Level D w/high vis clothing; Ex zone = Dust mask, poly apron, sleeves, safety glasses
Safety Tailgate Briefing: UXOs discussed - Do not touch, flag them for removal.

0700: Technicians prep for field day. ~~SMP~~ Delayed start of sampling till S. Portillo on site
0750: S. Portillo Conducts Safety Tailgate briefing.
0815: Techinicians begin soil sampling. G. Giles and J. Lawerence on site for metal detecting. J. Lawrence signed visitor Log and G. Giles signed safety tailgate briefing. Checked in with WSTF Dispatch

Cell #11: Frankie dons PPE

Sample ID	Analysis	Lab	U/P
150831 0815	XRF	WSTF	U
" 0817	XRF	WSTF	P
" 0819	Total Metals	Hall	U

0835: A. Zavala on site to pick up J. Lawrence. Had him sign ~~tailgate~~ SMP visitors log
0839: Zavala & Lawrence leave site.

Cell #12: Robert dons PPE

Sample ID	Analysis	Lab	U/P
150831 0841	XRF	WSTF	U
" 0845	XRF	WSTF	P
" 0843	Total metals	Hall	U

0840: G. Giles begins metal detecting

Continued on Page 7

Read and Understood By

MP — Signed
8/31/15 — Date
Pamela Egan — Signed
9.2.15 — Date

0857: Cell #24 Frankie Dons PPE

Sample ID	Analysis	Lab	U/P
150831 0857	XRF	WSTF	U
" 0901	XRF	WSTF	P
" 0859	Total Metals	Hall	U

0920 Cell #25 Robert Dons PPE

Sample ID	Analysis	Lab	U/P
150831 0921	XRF	WSTF	U
" 0925	XRF	WSTF	P
" 0923	Total Metals	Hall	U

0945 Cell #13 Frankie Dons PPE

Sample ID	Analysis	Lab	U/P
150831 0945	XRF	WSTF	U
" 0949	XRF	WSTF	P
" 0947	Total Metals	Hall	U

0950 Take Water break

Cell #1 Robert dons PPE

Sample ID	Analysis	Lab	U/P
150831 1011	XRF	WSTF	U
" 1015	XRF	"	P
" 1013	Total Metals	Hall	U

Cell #2 Frankie dons PPE

1030

Sample ID	Analysis	Lab	U/P
150831 1033	XRF	WSTF	U
" 1035	XRF	WSTF	P

No Total Metals for this Cell

1100 Break down for lunch and Prep for afternoon samples.
1115 S. Portillo & Technicians leave, G. Giles left 10 min prior.
1245 S. Portillo arrives back at WB-2 Firing Range
1258 Technicians arrive onsite

Continued on Page 8

Read and Understood By

Signed — Date 8/31/15 — Signed Pamela Egan — Date 9.2.15

1305 Cell 14 - Robert dons PPE

Sample ID	Analysis	Lab	U/P
150831 1305	XRF	WSTF	U
1309	XRF	WSTF	P
1307	Total Metals	Hall	U

1315 Geoff arrives to continue metal detecting.

1330 Cell 26 - Frankie dons PPE

Sample ID	Analysis	Lab	U/P
150831 1331	XRF	WSTF	U
" 1335	XRF	WSTF	P
" 1333	Total Metals	Hall	U

1350 Cell 27 - Robert dons PPE

Sample ID	analysis	Lab	U/P
150831 1351	XRF	WSTF	U
" 1355	XRF	WSTF	P
" 1353	Total Metals	Hall	U

1405 Cell 15 - Frankie dons PPE

Sample ID	analysis	Lab	U/P
150831 1409	XRF	WSTF	U
" 1413	XRF	WSTF	P
" 1411	Total Metals	Hall	U

14 SP
~~13~~ 30 Proceed to clean up soil sampling equipment. Tech's to break down field equipment and take samples to Metalurgy Lab. S. Portillo to assist G. Giles in metal detecting.

14 SP
~~13~~ 45 Tech's leave for WSTF Metalurgy Lab

1313 G. Giles and S. Portillo leave site.

Summary
- Soil Sampling in Grid Cells 11, 12, 24, 25, 13, 1, 2, 14, 26, 27, & 15
- Conducted metal detecting and flagged point locations and cluster locations along the fallout fan and East of the berm. SP

Tomorrow - continue sampling and metal detecting

Continued on Page →

Read and Understood By

Signed [signature] Date 8/31/15

Signed Pamela Egan Date 9.2.15

WX: SUNNY, V LIGHTH BREEZE ~ 70°F FOG
PERSONNEL: J LAWRENCE, G. GILES, R BURROUGHS, F. GALLEGOS (UNARMED)
TASK: SOIL SAMPLING WOB-2 FIRING RANGE
LOCATION: WSTF FORMER WOB-2 FIRING RANGE
EQPT: SOIL SAMPLING EQPT, CARBOY, FIELD VEHICLES
TAILGATE SAFETY MEETING CONDUCTED
0730: F. GALLEGOS DONS PPE, PREPARES TO SAMPLE CELL #3

CELL #3

SAMPLE ID	ANALYSIS	LAB	U/P
150901 0735	XRF	WSTF	U
0739	XRF	WSTF	P
0737	TOTAL METALS	HALL	U

0750 CELL #4 R BURROUGHS DONS PPE

150901 0751	XRF	WSTF	U
0755	XRF	WSTF	P
0753	TOTAL METALS	HALL	U

0804 G GILES DEPARTS TO 100 AREA
0805 CELL #16 F GALLEGOS DONS PPE

150901 0809	XRF	WSTF	U
~~0811~~ 0813 JAC	XRF	WSTF	P
~~0813~~ 0811 JAC	TOTAL METALS	HALL	U

0812 F GALLEGOS FINDS "BRASS" (SPENT CASING) IN CELL #16
~~0815~~ JAC CELL #28 F GALLEGOS OBTAINS SAMPLE SET
0822

150901 0831	XRF	WSTF	U
0835	XRF	WSTF	P
0833	TOTAL METALS	HALL	U

0835 G GILES ARRIVES @ WOB-2 FR SITE
0840 CELL #29 R BURROUGHS DONS PPE

150901 0847	XRF	WSTF	U
0851	XRF	WSTF	P
0849	TOTAL METALS	HALL	U

CELL #17 F GALLEGOS DONS PPE

150901 0905	XRF	WSTF	U ←
0919	XRF	WSTF	P
0917	TOTAL METALS	HALL	U

Continued on Page 10

Read and Understood By

Jim Lawrence
Signed

9.2.2015
Date

Pamela Egan
Signed

9.2.15
Date

~~Cell # 5~~ JAL

	Sample #	Analysis	Lab	Prep/Unprep
0928	Cell # 5	F Gallegos Does APE		
	150901 0931	XRF	WSTF	U
	0935	XRF	WSTF	P
	0933	Total Metal	Hall	U
0949	Cell # 6	R Burroughs Does APE		
	150901 0951	XRF	WSTF	U
	0953	XRF	WSTF	P
1002	Cell # 18	F Gallegos Does APE		
	150901 1007	XRF	WSTF	U
	1011	XRF	WSTF	P
	1009	Total Metals	Hall	U
1020	Cell # 30	R Burroughs Does APE		
	150901 1025	XRF	WSTF	U
	1029	XRF	WSTF	P
	1027	Total Metals	Hall	U

1022 Twiebe arrives @ site Sampling of grids complete
1105 Twiebe, G Giles, J Lawrence, R Burroughs & F Gallegos confer; re: afternoon sampling.
1107 Twiebe departs; R Burroughs & F Gallegos depart
1138 G Giles & J Lawrence
1302 J Lawrence & G Giles Arrive @ WB-2 Firing Range Area
1310 R Burroughs & F Gallegos Arrive & Begin Excavation
1320 G Giles departs
1500 J Lawrence, R Burroughs & F Gallegos depart.

Summary

- Completed Grid-Sampling for Soils
- Continued Metal Detector Screening of "Out-lier" Area

Tomorrow

- Continue according to Plan!

Continued on Page

Read and ~~Understood~~ By

Signed — 1 Sept 2015 Date — Pamela Egan Signed — 9-2-15 Date

Weather: mostly sunny, 68°F a.m., 95°F p.m.
Personnel: P. Egan, J. Lawrence, R. Burrows, F. Gallegos
Task: Pick up lead bullets, metal detecting
Location: WB-2
Equipment in Use: Metal detector. Field vehicles
PPE in Use: Level D, gloves, high vis
Safety Tailgate: Yes, see form (snake, dust minimization, hydration.

0700 Egan at office. Call fire dept to check in for day. Get Lawrence. Head to WB-2.

0715 Conduct safety tailgate meeting @ WB-2. Discuss plan for day.

0730 Techs head off to do bullet cleanup of areas marked with pin flagging.

J. Lawrence trains Egan on metal detector.

0820 R Burrow leaves w/ F. Gallegos to take Gallegos to appt. @ clinic for physical.

0830 R. Burrows returns

1015 R. Burrows leaves to p/u F. Gallegos from clinic. Burrows + Gallegos return. Egan leaves to take J. Lawrence back to office.

10 40 Egan back on site.

Continue w/ metal detector & cleanup of flagged sites.

11:30 Break for lunch

Continued on Page 12

Pamela Egan Signed 9.2.15 Date
Read and Understood By
Jeff Lawrence. Signed 9/2/15 Date

1245 Back at site

Start detecting/cleanup again.

1500 Stop for day. Techs leave site. Egan leaves site. WSTF Fire Dept has been contacted about our departure.

Summary:

- Continued with metal detector and flagging findings.

Tomorrow:

- Continue as above. Might finish w/ WB-2FR

Pamela Egan 9.2.15

Continued on Page N/A

Pamela Egan
Signed

9.2.15
Date

Read and Understood By

Signed

9/2/15
Date

Weather: Cloudy, few rain drops
Personnel: P. Egan, G. Giles, F. Gallegos, R. Burrows
Location: WB-2 Firing Range
Task: metal detecting, flagging findings, sifting for bullets
Equipment: metal detector, computer tablet for data collection
PPE in use: Level D w/ Hi Vis
Safety: Hold safety tailgate meeting, see form.

0700 Egan @ office. Meet w/ Chuck Herd who is doing a safety check.

Head to WSTF FD to check in, then WB-2 FR work site.

0720 Hold tailgate safety meeting.

0800 Start sweeping w/ metal detector, flagging findings, and sifting for bullets.

1050 Finished sweeping WB-2 firing range.

1100 Clean up site and break for lunch.

1245 Return from lunch and start p/u equipment + IDW drums.

1330 Move Equip to STGT range (and IDW drums)

1430 Check road going to 200 Area FR. Rough road in arroyo – Need 4WD. Set up string in 1st cell.

1500 Road is clear for tomorrow. Head back to office Check out for day w/ WSTF F.D.

Summary: Finished metal detecting + p/u bullets @ WB-2 Mob to STGT/200A

Tomorrow: XRF sampling at 200A & STGT Ranges

Continued on Page N/A

Read and Understood By

Pamela Egan 9.3.15
Signed Date

Signed Date 9/4/15

PROJECT FIRING RANGES / 200 AREA FIRING RANGE — USEAT 2015 — Notebook No. 1

Continued from Page N/A

WX: CLOUDY, CALM TO VERY LT BREEZE, T~ 70°F FORECAST HI ~90°F; POSSIBILITY OF RAIN
PERSONNEL: G. GILES, J LAWRENCE, R BURROUGHS, F GALLEGOS (NAVARRO)
EQUIP: SOIL SAMPLING EQUIP, CARBOY, METAL DETECTOR
TASK: METAL DETECTING; SAMPLING OF 2 GRIDS
PPE: LEVEL D - MODIFIED W/ HI-VIZ TECHS: ARMS, EYEWEAR, SLEEVES, MASKS.
SAFETY: TAILGATE SAFETY MEETING — SEE TAILGATE FORM
0810 R BURROUGHS DONS PPE; PREPARES TO OBTAIN SOIL SAMPLES. G GILES SCREENS W/ METAL DET.

SAMPLE NUMBER	ANALYSIS	LAB	PRES/UNPRES	PRES 9.16.15
CELL #1				
150904 0815	XRF	WSTF	U	
" 0819	XRF	WSTF	P	
" 0817	TOTAL METALS	HALL	U	

0830 F GALLEGOS DONS PPE; PREPARES TO OBTAIN SOIL SAMPLES, G GILES CONTINUES SCREEN W/ METAL DETECTOR

CELL #2				
150904 0835	XRF	WSTF	U	
" 0839	XRF	WSTF	P	
" 0837	TOTAL METALS	HALL	U	

0840 G GILES CONTINUING TO SCREEN W/ METAL DETECTOR.
1045 G. Giles, T. Lawrence, F. Gallegos, R. Burrows complete screening with metal detector for the morning. 90 points flagged & excavated total.

1300 F. Gallegos, R. Burrows & G. Giles return to field screen with the metal detector. Located points from #91 to #155. Flagged on ground, located on georeferenced map on tablet, and excavated bullets.
1500 Complete lead screening for the day. All depart for Bldg. 637 & 638.

SUMMARY: Worked on 200 Area FR Project.
: Sampled 2 x sample grids.
: Performed lead screening at #155 point locations.

Continued on Page N/A

Read and Understood By

Signed: [signature] Date: 9/4/15

Signed: Pamela Egan Date: 9.16.15

0930 F. Gallegos & R. Burrows have finished their training with M. Jones.

1000 G. Giles (G62 30326) F. Gallegos & R. Burrows (pickup) arrive @ 200 Area Firing Range. Perform Tailgate Safety Briefing (Heat Stress & Wildlife). Frank has checked in W. Dr Hedgson @ 800 Area.

WEATHER: 82°F, forecast 93°F, partly cloudy, slight breeze from the south

PERSONNEL: G. Giles, F. Gallegos, R. Burrows — Nonrad Res & Eng.

OBJECTIVE: Continue with 200 Area Firing Range bullet flagging / GPS locating / recovery.

1015 Start flagging bullet locations using metal detector @ #156. Flag & recover bullets #158 – #189. South side of Scatter apron.

1100 Depart for lunch.

1245 Return from lunch. Start flagging bullet locations with metal detector @ #190. Flag & recover bullets #190 – #251. Central part of Scatter apron.

1510 Depart for office.

SUMMARY

- Scanned w/ metal detector @ 200 Area Firing Range.
- Located, flagged, GPS'd, and recovered bullets at locations #156 – #251. Total 96 locations on south and central sides of bullet Scatter apron.

Continued on Page N/A

Read and Understood By

Jeff Giles — Signed — 9/8/15 — Date

Pamela Egan — Signed — 9.16.15 — Date

0700 R. Burrows, F. Gallegos, G. Giles @ 200 Area FR. Set up equipment.

0715 Tailgate safety briefing. Slightly cooler weather → watch out for snakes: NOTE Technicians having problems wearing snake guards → legs sweat & dust is creating a rash. Need to address.

WEATHER: Cloudy (80%), hot but cooler than previous summer days. Forecast to be first day that stays under 90 degrees since May. Forecast high ≈ 85° F.

0730 Commence locating & flagging bullets. Log onto georeferenced maps using tablet (ASUS). Record points #252 - 345. Concentrating on areas upslope of the designated catchment apron.

1100 Depart for lunch.

1245 Return from lunch. Flag, log, and recover stations #346 - #401. Worked down hill from upslope areas back to firing line and started coverage in the washout/arroyo to the Southwest of the firing range floor.

1500 Departing site. Technicians truck will not start.

1510 Run to B. 637 w/ Robert to get jumper cables & charger.

1520 Back @ 200 Area Firing Range. Truck starts.

1530 All back to B. 101 Parking lot.

SUMMARY
- Flagged, logged, and recovered bullets from locations #252 - #401.

FOR MONDAY
- Finish flagging, logging, & recovery in arroyo Southwest of the 200 Area Firing Range.
- Move over to TDRSS Firing Range.

Continued on Page N/A

Read and Understood By

Signed — Date 9/10/15

Signed — Date 9-14-2015

0700 G. Giles, R. Burrows, F. Gallegos @ 200 Area setting up equipment.

0730 Tailgate safety briefing: Topics – Heat stress, rattlesnakes, spiders.

WEATHER: Partly cloudy skies (30%), 72°F, forecast high 92°F, slight breeze from Northeast <5 mph.

PERSONNEL: G. GILES
F. GALLEGOS
G. GILES
] NOVARO.

0745 Commence survey on the arroyo to the southwest of the 200 Area Firing Range which had been flagged as a potential area of interest and is shaded on the geo-referenced base map. Start with metal detector, flagging, and locating points at #402.

0930 Complete flagging points at #447. All points have been added to the geo referenced base map

0940 Take break.

0950 Start excavating and bagging bullets, casing shells, & MISCELLANEOUS.

1100 Complete excavating and bagging bullets. 200 Area Complete. Return to B.101 Parking Lot ~~for lunch~~. Recorded points #402-447 today.

1320 R BURROUGHS CALLS J LAWRENCE (NAVARRO) . JAL PREPARES TO MEET R BURROUGHS & F GALLEGOS.

1330 JAL MEETS R BURROUGHS & F GALLEGOS @ 637/638 YARD

1335 ALL DEPART TO TARSS FIRING RANGE

1350 ALL ARRIVE @ FIRING RANGE AREA. R BURROUGHS HAS FORGOTTEN SOME SAMPLING SUPPLIES. BURROUGHS & GALLEGOS DEPART. JAL STAYS w/ TRUCK (3039 G).

1422 BURROUGHS & GALLEGOS RETURN TO SITE.

1430 BURROUGHS & GALLEGOS SET-UP ON GRID-CELL # 6 TO PREPARE TO STAPLE: REMOVING STRING/TWINE TO DEMARCATE THE GRID BOUNDARY. NOTE: GRIDS AS-STAKED ARE 70 FEET! measured on 9.16.15 at 50 ft

Continued on Page 18

Read and Understood By

Signed — 9-14-2015 Date

Signed — 9.16.15 Date

1439 F. GALLEGOS DOAS PPE

SAMPLE #	ANALYSIS	LAB	PRESP/UNPRESP
CELL # 6			
150914 1441	XRF	WSTF	U
1445	XRF	WSTF	P
1443	TOTAL METALS	HALL	U

1458 R BURROUGHS DECONS SAMPLING IMPLEMENTS & DOAS PPE.

CELL # 5			
150914 1515	XRF	WSTF	U
1519	XRF	WSTF	P
1517	TOTAL METALS	HALL	U

SG 9.16.15

SUMMARY

- COMPLETED ZOO AREA FIRING RANGES
- RELOCATED TO STGT FIRING RANGE
- COLLECTED SOIL SAMPLES FROM CELLS 5,6 @ STGT FIRING RANGE

TOMORROW

- CONTINUE SAMPLE COLLECTION
- BEGIN PERIPHERY SCAN W/ METAL DETECTOR

Continued on Page

Read and Understood By

Jim Lemmon — Signed — 9-14-2015 — Date

Pamela Egan — Signed — 9.16.15 — Date

~~HGJAC~~
15 SEPT 2015

Notebook No. 1 — 19

PROJECT FIRING RANGES: STGT

Continued from Page N/A

WDX CLDY, BREEZY TEMP ~ 70°F PROJECTED HI TEMP ~ 90°F
0720 JLACORNICK (ADVARRO) DEPARTS OFFICE. WAS WAITING ON AAD'L GEO
0745 JAC ARRIVES @ STGT FIRING RANGE AREA. R BURROUGHS & F GALLEGOS PRESENT. BURROUGHS & GALLEGOS SET-UP EQUIPMENT.
0805 TAILGATE SAFETY BRIEFING CONDUCTED.
0810 F. GALLEGOS DONS PPE. BEGINS COLLECTING SOIL

SBL 9.16.15

SAMPLE #	ANALYSIS	LAB	PRESP/UNPRESP
CELL # 11			
150915 0819	XRF	WSTF	U
~~0823~~ JAC	~~XRF~~ JAC XRF	~~WSTF~~ JAC WSTF	~~P~~ P JAC
0821	~~TOTAL METALS~~ JAC	~~HALL~~ JAC	~~U~~ JAC

0835 R BURROUGHS DONS PPE & BEGINS SOIL SAMPLING

CELL # 12			
150915 0841	XRF	WSTF	U
0845	XRF	WSTF	P
0843	METALS	HALL	U

0900 F GALLEGOS DONS PPE & BEGINS SOIL SAMPLING. G. GILES ARRIVES @ SITE

CELL # 18			
150915 0903	XRF	WSTF	U
0907	XRF	WSTF	P
0905	TOTAL METALS	HALL	U

0940 R BURROUGHS DONS PPE & BEGINS SOIL SAMPLING.

CELL # 19			
150915 0945	XRF	WSTF	U
0949	XRF	WSTF	P
0947	TOTAL METALS	HALL	U

1002 G GILES BEGINS PERIPHERY SCAN W/ METAL DETECTOR.
1040 F GALLEGOS DONS PPE & BEGINS SOIL SAMPLING.

CELL # 20			
150915 1043	XRF	WSTF	U
1047	XRF	WSTF	P
1045	JAC ~~XRF~~ TOTAL METALS	HALL	U

CONTINUED ON NEXT PAGE

Continued on Page 20

Read and Understood By

Signed — 15 SEPT 2015 Date — Signed — 9.16.15 Date

15 SEPT 2015

20 Notebook No. 1

PROJECT FIRING RANGES: STGT Continued from Page 19

1055 F GALLEGOS & R BURROUGHS MOVING TO NEXT CELL: CELL #21 SGL 9-16-15

SAMPLE #	ANALYSIS	LAB	PRES/UNPRES
CELL # 21			
150915 1107	XRF	WSTF	U
1111	XRF	WSTF	P
1109	TOTAL METALS	HALL	U

1120 GATHERED TO DEPART FOR 100 AREA.
1125 ALL DEPART FOR 100 AREA.
1255 ALL BEGIN RETURN TO STGT FIRING RANGE AREA
1320 F GALLEGOS & R BURROUGHS LAY-OUT SAMPLING LINE. F. GALLEGOS DONS PPE

CELL # 17			
150915 1343	XRF	WSTF	U
1347	XRF	WSTF	P
1345	TOTAL METALS	HALL	U

1400 R BURROUGHS DONS PPE & BEGINS SOIL SAMPLING.

CELL # 16			
150915 1405	XRF	WSTF	U
1409	XRF	WSTF	P
1407	TOTAL METALS	JAL ~~WSTF~~ HALL	U

1425 F GALLEGOS DONS PPE & BEGINS SOIL SAMPLING

CELL #10	XRF	WSTF	U
150915 1433	XRF	WSTF	P
1437	TOTAL METALS	HALL	U
1435			

1445 R BURROUGHS & F GALLEGOS BEGIN POLICING SITE & BREAKING-DOWN EQUIPT.
1455 ALL DEPART FOR 100 AREA
1520 JAL & G GILES ARRIVE @ 100 AREA PARKING LOT

SUMMARY

- SAMPLED 11 CELLS FOR SOIL
- 93 POINTS IDENTIFIED w/ METAL DETECTOR & LOGGED w/ TABLET

TOMORROW

- CONTINUE ON W STGT FIRING RANGE AREA

Continued on Page

Read and Understood By

Signed 15 SEPT, 2015 Date Signed Pamela Egan 9-16-15 Date

Weather: 68°F/88°F, Partly cloudy, Breezy Sept. 16, 2015
Personnel: P. Egan, R. Burrows, F. Gallegos
Location: STGT Firing Range
task(s): XRF Sampling – 7 more cells.
Equipment: Shovels, sampling equipment, field vehicles, Carboy #5
PPE: In exclusion zone: P95 face mask, poly apron + sleeves, + Level D.
Safety: Tailgate meeting conducted, see form

0700 Egan in office. J. Lawrence says he's out of pin flags for marking bullet locations w/ metal detectors, so won't be metal detecting until we (techs) free up flags during cleanup. Maybe this afternoon.

0715 Informed techs (yesterday) that the easy-ups were in and ready to pick up from warehouse, so the techs are doing that this morning.

Techs say XRF scanner is at warehouse and they pick it up.

0745 Meet techs at 637 and head to labs. Deliver XRF scanner to Paul Spencer at Met Lab. Also let Charles Nichols + Troy Wiebe know the scanner is in and has been delivered.

0800 At STGT firing range. Hold tailgate safety meeting. Start setting up tables etc. and new E-Z ups, which are quite crappy (poor quality).

0908 Ready for sampling. Start with cell #4. Robert dons PPE.

Continued on Page 22

Read and Understood By

Pamela Egan — Signed — 9.16.15 — Date

Signed — 9/17/15 — Date

Cell #4 Robert dons PPE

u = unprepared
P = prepared

Sample #	Analysis	Lab	u/P
150916 0915	XRF	WSTF	u
" 0917	Tot. Metals	Hall	u
" 0919	XRF	WSTF	P

Frankie decons equip.

0930 Cell #3 Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 0933	XRF	WSTF	u
" 0935	Tot. Metals	Hall	u
" 0937	XRF	WSTF	P

Robert decons equip.

0950 Cell #9 Robert dons PPE

Sample #	Analysis	Lab	U/P
150916 0953	XRF	WSTF	u
" 0955	Tot. Metals	Hall	u
" 0957	XRF	WSTF	P

Frankie decons equip.

1010 Cell #15 Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 1013	XRF	WSTF	u
" 1015	Tot. Metals	Hall	u
" 1017	XRF	WSTF	P

Robert decons equip.

Continued on Page 23

Read and Understood By

Pamela Egan — Signed — 9.16.15 — Date

Jeff — Signed — 9/17/15 — Date

1030 Cell #14 Robert dons PPE

Sample #	Analysis	Lab	U/P
150916 1033	XRF	WSTF	U
" 1035	Tot. Metals	Hall	U
" 1037	XRF	WSTF	P

Frankie decons equip.

Set up to sample next cell then break for lunch.

1230 Burrows says Frankie has union business and will be delayed heading back out

1300 Head back out to firing range STGT. Crappy EZ-up is blown all over, pole bent :.

1330 Cell #8

Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 1339	XRF	WSTF	U
" 1341	Tot. Metals	Hall	U
" 1343	XRF	WSTF	P

Robert decons equip.

1350 Cell #2 Robert dons PPE

Sample #	Analysis	Lab	U/P
150916 1357	XRF	WSTF	U
	~~Tot. Metals~~	~~Hall~~	~~U~~
" 1359	XRF	WSTF	P

9.16.15

Frankie decons equip.

Continued on Page

Read and Understood By

Pamela Egan — Signed — 9.16.15 Date

Signed — 9/17/15 Date

1415 Cell #1 Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 1821	XRF	WSTF	U
" 1823	Tot. Metals	Hall	U
" 1825 PBS 9.16.15	XRF	WSTF	P

Robert decons equip.

Cell #7 Robert dons PPE.

Sample #	Analysis	Lab	U/P
150916 1443	XRF	WSTF	U
1445	XRF	WSTF	P

Frankie decons equip.

Clean up site. EZ-up fairly trashed.

Summary:

- XRF sample collection from 9 cells today.
- 1 cell remaining.

Tomorrow:

- xrf remaining cell
- metal detector in fallout area.

9.16.15

Continued on Page N/A

Read and Understood By

Pamela Egan
Signed

9.16.15
Date

Signed

9/17/15
Date

0700 F. Gallegos, R. Burrows, G. Giles @ office. Depart for STGT in 2 vehicles.

0720. @ STGT Firing Range. Checked in with guard @ gate.

WEATHER: Currently 68°F, Forcast 93°F, hot, clear skies ≈ 10% clouds, breeze 5-10 mph from the south.

PERSONNEL: F. GALLEGOS, R. BURROWS, G. GILES] Navarro Re ☒ E.

0730 Tailgate safety briefing. Heat stress e Wildlife, tripping hazards. We will take plenty of water breaks.

0745 Sun shade set up. Setting up sample lines on Final square Square cell # 13.

0800 Start sampling on cell # 13 located north of active lagoon on west side. This cell is marked for a duplicate sample for Hall Labs. Frank collecting sample, Robert working tech's notebook. Frank has all required PPE on.

10.22.15

SAMPLE #	ANALYSIS	LAB	U/P
150916 0819	WSTF XRF	WSTF	U
" 0823	WSTF XRF	WSTF	P
" 0821	TOTAL METALS	HALL	U

0845 Sampling complete. String pulled from Cell # 13.

0900 Start excavating bullet locations STGT # 1 - STGT # 93. Geoff re-loading bullets with metal detector, Frank & Robert digging, sieving, & bagging bullets

1015 All locations excavated. Start Screening & Flagging with metal detector and tablet

1100 We have completed locations through STGT # 137.

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Read and Understood By

Signed 9/17/15 Date

Signed 9.29.15 Date

1315 Back @ STGT Firing Range after weekly safety meeting (Thursday's).

1330 Setting up shade table blown down by wind in our absence.

1345 Move to back of firing berm (west side) to continue search for bullets with metal detector. Flag locations and record GPS locations in field tablet. Dig up and sieve dirt to recover bullets (Robert & Frank).

1500 Complete survey for the day. We located and excavated #STGT #138 through #STGT # 225 this afternoon.

1505 Fold down table, chairs & sunshade.

1515 Head back to B.637/100 Area Parking.

SUMMARY

- Completed sampling last STGT FR Grid Cell (#13).
- Located, flagged, recorded, & recovered bullets at stations STGT#94 through STGT #225.

Continued on Page

Read and Understood By

Signed — Date 9/17/15

Signed — Date 9.29.15

0700 G. Giles, R. Burrows, F. Gallegos arrive @ STGT FR.

WEATHER: Clear skies, 64°F right now, forecast 92°F, slight breeze from South.

PERSONNEL: F. GALLEGOS, R. BURROWS, G. GILES] Navarro Res & E.

0715 Tailgate safety briefing: heat stress, sunscreen, hats, UV protective eyewear, wildlife.

0730 Setting up sun shade & umbrellas.

0745 Start locating & flagging bullets # STGT # 226 – # STGT # 333.

0945 Take water break.

1000 Continue to locate & flag bullets # 333 – # 370.

1100 Break for lunch. Back to B.637 (Leeks) & 100 Area (Gaff).

1245 Return to STGT FR. Locate, flag, log, & collect bullets from STGT-371 to STGT-421.

1430 Secure site & depart for the day.

SUMMARY

- Located (metal detector) lead bullets, flagged locations, GPS'd to field tablet, & recovered bullets for locations:

  STGT-226 to STGT-421.

Continue on Monday 9/21/15

Continued on Page

Read and Understood By

Signed — Date 9/18/15

Signed — Date 9.29.15

0700 R. Burrows & F. Gallegos arrive @ STGT FR

0730 G. Giles arrives @ STGT FR.

0740 Tailgate safety briefing. Topics: heat stress, heat stroke, hydration, & wildlife.

WEATHER: PARTLY CLOUDY, ≈ 70°F, forecast 88°F, clouds ≈ 50%, slight breeze from the southwest.

PERSONNEL: G. GILES, R. BURROWS, F. GALLEGOS] NAVATTO R&E.

OBJECTIVE: Continue with bullet location, Flagging, Plotting (GPS), & excavation (at point STGT-422). Define length/distance) of the bullet scatter west of the main firing berm.

0800 Depart for fallout area to the west of the Firing Berm. Start with point STGT-422.

1005 Water break.

1100 Complete the mornings bullet location & Flagging activities. We covered points STGT-422 through STGT-528.

1115 Depart for lunch.

1245 Return from lunch.

1300 Resume bullet search at point STGT-529.

1510 Complete days bullet search at STGT-601. Secure site and all depart.

SUMMARY

- Located (Using metal detector) lead bullets, flagged bullets, logged bullets, and removed from the ground: STGT 422 to STGT 601

Continued on Page

Read and Understood By

Signed — Date 9/21/15 — Signed Pamela Egan — Date 9.29.15

GEOLOGISTS LB STOP

PROJECT FIRING RANGES - STGT (TUE 9/22/15)

Notebook No. FIRING RANGES 29

Continued from Page —

0700 R. Burrows & F. Gallegos arrive @ STGT Firing Range.

0715 G. Giles @ STGT Firing Range.

0730 Tailgate safety briefing. Topics: Berm slopes, rattlesnakes, hydration. Plan for the day.

WEATHER: Partly cloudy (20%) ≈ 70°F, forecast 92°F, slight breeze from the southeast. Ground is damp from yesterdays rain.

PERSONNEL: G. GILES, R. BURROWS, F. GALLEGOS] NAVARRO R&E

OBJECTIVE: Continue with location, flagging, plotting, and excavation of bullets. Will work from center line north and south to try and constrain bullet area. STGT has a much larger fallout area than originally speculated.

0800 Depart for fallout area west of the main firing berm. Start at STGT-602 and work north.

1030 Take a break. We have completed stations STGT-602 through STGT-721 to delineate the north side of the fallout area at a location where bullets can still be located within 3-5 feet of each other. This line is approximately 100 m west of the Firing Berm.

1105 Depart for lunch.

1245 Return from lunch.

1300 Resume bullet search at median point and head south this time to define the southern boundary. Start at STGT-722

1500 Complete the days bullet search at STGT-775.

1570 Secure site, all depart. We still have ≈100 flags to pick up due to damp soil that slows down the sifting process for bullets.

SUMMARY

- Located, flagged, logged, and excavated bullets at the STGT Firing Range: STGT-602 to STGT-775. A cost evaluation is now required prior to additional work.

Continued on Page

Read and Understood By

Signed 9/22/15 Date

Signed 9.29.15 Date

GEOLOGISTS LB START

PROJECT 100 AREA FIRING RANGE (WB-2) (TUESDAY 11/15/16)

D. FRB # 1

Page —

0645 R. Burrows & M. Garcia pulling together field sampling equipment for the 100 Area Firing Range (WB-2) Fallout area sampling. G. Giles working with Dustin teamed to get a Fallout Area grid map. Dustin flagged the cell centers in the field yesterday.

0715 We have a copy of the grid cell map and have discussed the approach with Troy Wiebe. Collecting additional field equipment, 50' tape, brushes, decon bucket.

0800 All arrive @ Cell #72 location. Security Department are out here for some short-range shooting this week. Should not affect us.

WEATHER: 45°F, forcast high 73°F, clear skies, no breeze.

PERSONNEL: G. GILES, R. BURROWS, M. GARCIA] Navarro.

0815 Perform Tailgate Safety Briefing. See form for details. PPE → Level D plus dust masks when agitating soil. No apron required for this effort as previously required for range floor. All metals samples came back at less than half of MTCA SSL's including lead.

0835 Steve Patterson passes by in truck. checks in with us.

OBJECTIVE Fallout sampling on designated grid at the 100 Area Firing Range (WB-2). Five grab samples per grid, composited in a 4oz jar for metals sample. Grid squares are 50'x50' for fallout sampling. Center location plus halfway toward each grid corner (25' median point). Start at SE cell (#72) so that we move away from bullet catcher ASAP.

0910 Collect metals rinsate 161115 0910 by pouring DI water over sampling equipment that has been decontaminated (Stainless steel trowel & bucket).

0915 G. Giles flags the 5 soil grab spots in cell #72.

0921 Sample Grid Cell #72 161115 0921 for metals by 6010C

Continued on Page

Read and Understood By

Signed — Date 11/15/16 — Signed Pamela Egan — Date 1/24/17

0948	Sample Grid Cell #71	1611150948	for metals by 6010C
0959	Sample Grid Cell #70	1611150959	for metals by 6010C
1006	Sample Grid Cell #69	1611151006	for metals by 6010C
1013	Sample Grid Cell #68	1611151013	for metals by 6010C
1020	Sample Grid Cell #67	1611151020	for metals by 6010C
1028	Sample Grid Cell #66	1611151028	for metals by 6010C
1034	Sample Grid Cell #65	1611151034	for metals by 6010C
1041	Sample Grid Cell #64	1611151041	for metals by 6010C
1048	Sample Grid Cell #63	1611151048	for metals by 6010C
1049	Sample Grid Cell #63 (DUP)	1611151049	for metals by 6010C
1056	Sample Grid Cell #62	1611151056	for metals by 6010C

1105 Securing site. Security still training a couple of new hires. Head back to B.101 for lunch.

1235 G. Giles back @ 100 Area Firing Range. R. Burrows is waiting for M. Garcia in the B.101 Parking Lot. Matt has required safety training. I will lay out sample location flags while I am waiting. Security Department are still here training (Firing). I have my Yellow Vest on.

1320 R. Burrows & M. Garcia arrive on-site at 100 Area Firing Range.

1328	Sample Grid Cell #61	1611151328	for metals by 6010C
1335	Sample Grid Cell #60	1611151335	for metals by 6010C
1343	Sample Grid Cell #59	1611151343	for metals by 6010C

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Read and Understood By

Signed 11/15/16 Date

Pamela Egan Signed 1/24/17 Date

1352 Sample Grid Cell #58 161115 1352 for metals by 6010C

1407 Sample Grid Cell #57 161115 1407 for metals by 6010C

1412 Sample Grid Cell #56 161115 1412 for metals by 6010C

1415 Security Guards & trainees depart for the day. Lower their Wind sock / flag.

1416 Sample Grid Cell #55 161115 1416 for metals by 6010C.

1421 Sample Grid Cell #54 161115 1421 for metals by 6010C

1427 Sample Grid Cell #53 161115 1427 for metals by 6010C

1428 Sample Grid Cell #53 (DUP) 161115 1428 for metals by 6010C

1438 Sample Grid Cell #47 161115 1438 for metals by 6010C

1439 Sample Grid Cell #47 (MS) 161115 1439 for metals by 6010C.

1445 We are out of 4 oz soil sample mason jars. Good stopping point for the day.

1450 Packing up equipment & securing site. All depart.

1500 Back @ B.101. Email daily report to interested parties.

SUMMARY

- Performed Fallout Grid sampling at the 100 Area / WB-2 / SWMU #31 Firing Range
- Collected 21 of 38 soil samples from designated Fallout sampling grid squares
- Collected two (2) duplicate samples and one (1) Matrix spike Sample.
- For tomorrow (Wednesday), collect soil samples from the remaining 17 Fallout grid squares and commence metal detector screening of the range floor, time permitting.

Continued on Page —

Read and Understood By

Signed — Date 11/15/16

Signed — Date 1/24/17

0700 G. Giles in office pulling together field equipment. R. Burrows & M. Garcia already out at 100 Area Firing Range preparing todays metals rinsate sample using DI water & our stainless steel field sampling equipment

0715 G. Giles out to 100 Area Firing Range. Perform Tailgate Safety Briefing. See Form for details. Covered the required PPE for sampling, Level D + dust mask when agitating soil during sample collection & latex gloves. Due to high temperatures, rattlesnakes & wildlife still an issue, also heat stress.

WEATHER: Currently 44°F, forecast high 75°F, partly cloudy, 20% cloud cover, NO breeze in the morning.

PERSONNEL: G. GILES, R. BURROWS, M. GARCIA] Navarro.

OBJECTIVE: Fallout sampling on designated grid at the 100 Area Firing Range (WB-2 / SWMU 31). Complete grid sampling today (We have 17 of 38 cells remaining). Commence range floor Screening with metal detector, time permitting.

0747 Collect metals rinsate 161116 0747 by running DI water over sampling equipment that has been decontaminated.

0750 Security Department & trainees arrive at Firing Range. We are out of their way by 500 ft plus, moving away to the northwest. Make contact with security Guard raising wired sock / flag.

0756	Sample Grid Cell	# 46	161116 0756	for metals by 6010C
0802	Sample Grid Cell	# 45	161116 0802	for metals by 6010C
0808	Sample Grid Cell	# 44	161116 0808	for metals by 6010C
0814	Sample Grid Cell	# 43	161116 0814	for metals by 6010C

Continued on Page 48

Read and Understood By

Signed 11/16/16 Date — Signed Pamela Egan 1/24/17 Date

0823	Sample Grid Cell	#42	1611160823 for metals by 6010C
0832	Sample Grid Cell	#41	1611160832 for metals by 6010C
0841	Sample Grid Cell	#40	1611160841 for metals by 6010C
0854	Sample Grid Cell	#39	1611160854 for metals by 6010C
0905	Sample Grid Cell	#38	1611160905 for metals by 6010C
0913	Sample Grid Cell	#37	1611160913 for metals by 6010C
0914	Sample Grid Cell	#37 (DUP)	1611160914 for metals by 6010C
0921	Sample Grid Cell	#36	1611160921 for metals by 6010C
0928	Sample Grid Cell	#35	1611160928 for metals by 6010C

0930 Checking out 100 Area Firing Range berm. Numerous bullets (thousands) on the west facing berm front. Could recover these with a sieve and shovel. Will check w/ Troy on excavation & disposal plan.

0937	Sample Grid Cell	#34	1611160937 for metals by 6010C
0947	Sample Grid Cell	#33	1611160947 for metals by 6010C
0954	Sample Grid Cell	#32	1611160954 for metals by 6010C
0955	Sample Grid Cell	#32 (DUP)	1611160955 for metals by 6010C
1002	Sample Grid Cell	#31	1611161002 for metals by 6010C
1003	Sample Grid Cell	#31 (MATRIX SPIKE)	1611161003 for metals by 6010C

1005 Cody & Mike stop by. Cody will likely cover the 100 Area Firing Range tomorrow (Thursday). Provide a quick update.

1015 Cody & Mike depart for 400 Area.

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Read and Understood By

Signed 11/16/16 Date

Signed Pamela Egan Date 1/24/17

1030 Fallout grid sampling at the 100 Area Firing Range is complete. Secure site. All depart. Robert & Matt have to take care of a leaking tire. I have to talk to JRH about loading up the 100 Area Firing Range basemap.

1230 JRH is working on loading the WB-2 basemap onto the field tablet. Pull together equipment for the field bullet recovery survey of the WB-2 range floor. Replace batteries in the metal detector.

1330 R. Burrows, M. Garcia, & G. Giles out at the 100 Area WB-2 Firing range. Perform bullet survey and recovery along the road area that coincides with the South strip along the range floor. Start at WB-2 113 and finish at WB-2 135 (23 points).

1300 We have flagged and GPS'd the bullet locations in the field. Need to recover these. We do not seem to have too many bullet locations on the range floor.

SUMMARY

- Performed Fallout Grid sampling at the 100 Area/WB-2/SWMU #31 Firing Range.
- Collected the remaining 17 soil samples (total 38 from yesterday and today).
- Collected 2 more duplicate samples and 1 more Matrix spike.
- We have a total of 4 duplicates and 2 matrix spikes for 38 samples.
- Commenced metal detector survey and recovery along the range floor.

THURSDAY

- Complete the metal detector survey & recovery along the range floor. That completes the 100 Area Firing Range.
- We will move onto the 200 Area Firing Range tomorrow & perform the same activities next week.
- Metal detector, keys, notebook in my office. Tablet in JR's office. Thanks!

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Continued on Page N/A

Read and Understood By

Signed 11/16/16 Date Signed 1/24/17 Date

0630 R. Burrows & G. Giles pulling together equipment for 200 Area Firing Range fallout grid sampling. Print out Task Mono & Tailgate Safety Briefing sheets. Pick up stainless steel bowls, trowels, pin flags, 50 ft measuring tape etc.

0700 We have most of the equipment collected. Head over to B. 637 to sort out sample jars, sample bottles, coolers etc. We need the clear 4oz jars for the soil samples & 500 ml poly containers with HNO_3 preservative for the rinsate samples. All samples will go to Hall laboratory.

0715 We have pulled together all the clear 4oz sampling jars and 500ml poly containers provided by Hall laboratory. Pack truck.

0745 Head out to 200 Area FR. Road has been washed out slightly by recent rains (this week) but we can still access the firing range.

0800 Arrive @ pullout adjacent to the 200 Area Firing Range. Perform Tailgate Safety Briefing. See sheet for details. Topics include lead dust PPE.

0815 Walk out all grid square flags to make sure they can still be located

WEATHER: Currently 38°F, forecast high 55°F, clear skies but hazy, cool, no significant breeze in the morning

PERSONNEL: G. GILES, R. BURROWS] NAVARRO

OBJECTIVE: 200 Area Fallout Grid Sampling for lead. Collect a rinsate for each sampling day. We have 42 grid squares to sample, 4 duplicates, 2 matrix spikes. Start with grid cell # 3. 5 sample locations in each cell, composited to 1 sample (center, plus ½ way from center to each corner).

0900 Preparing to sample rinsate.

0904 Collect rinsate sample 1701030904 for metals by 6010C

0910 We will start with the lowest numbered grid cell (#3) in the arroyo.

0925 Sample Grid Cell # 3 1701030925 for metals by 6010C

0938 Sample Grid Cell # 4 1701030938 for metals by 6010C

0952 Sample Grid Cell # 5 1701030952 for metals by 6010C

0955 Move up to Grid Cell # 6 on the side of the limestone hill NW of FR.

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1017 Sample Grid Cell #6 170103 1017 for metals by 6010C

1044 Sample Grid Cell #7 170103 1044 for metals by 6010C

1055 Depart for 100 Area. Break for lunch.

1230 R. Burrows & G. Giles head out to 200 Area Firing Range for afternoon sampling. We will start with Grid Cell #8

1305 Sample Grid Cell #8 170103 1305 for metals by 6010C.

1317 Sample Grid Cell #9 170103 1317 for metals by 6010C.

1320 Al Montes & M. Avalos stop by to check trip mileage on truck G63 06825

1328 Sample Grid Cell #10 170103 1328 for metals by 6010C.

1341 Sample Grid Cell #11 170103 1341 for metals by 6010C.

1405 Sample Grid Cell #12 170103 1405 for metals by 6010C.

1407 Sample Grid Cell #12 (Dup) 170103 1407 for metals by 6010C.

1423 Sample Grid Cell #13 170103 1423 for metals by 6010C.

1440 Sample Grid cell #14 170103 1440 for metals by 6010C.

1450 Measure out composite sampling locations on squares 15 & 16.

1500 Unload soil samples & rinsate to coolers in B. 1637. Return to office

SUMMARY

- Sampled at 200 Area Firing Range fallout Grid.
- Collected equipment rinsate sample.
- Sampled Grid Squares 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 (w Dup), 13, & 14 (13 soil samples total) for metals by 6010C

Continued on Page —

Read and Understood By

Signed [signature] Date 1/3/17 Signed Pamela Egan Date 1/24/17

0630 R. Burrows & G. Giles setting up for todays soil/metals sampling. Check w/ C. Tufts on turnaround time for metals – 28 days so we have time to collect all samples and ship these out late this week or early next week.

0650 Packing up sampling supplies for the day at B.637. 4oz soil jars and 500 ml poly w/ HNO_3 for rinsate. We are keeping the samples on ice - precautionary measure for the metals rinsate.

WEATHER: Cool ≈ 48°F, forecast high 61°F, partly cloudy ≈ 20% cloud cover, no breeze in the morning.

PERSONNEL: G. Giles, R. Burrows] Navarro.

OBJECTIVE: Continue with 200 Area Firing Range fallout grid soil sampling for metals by 6010C. We will be starting at Grid Square #15 today. We anticipate sampling 15 (+) grid squares.

0730 Depart for 200 Area Firing Range.

0740 We are @ 200 Area Firing Range. Perform a Tailgate Safety Briefing. See form for details. Topics included Schedule & PPE.

0750 We are setting up to take the rinsate sample.

0759 Collect rinsate sample 1701040759 for metals by (6010C) 6010C.

0811 Sample Grid Cell #15 1701040811 for metals by 6010C.

0831 Sample Grid Cell #16 1701040831 for metals by 6010C.

0853 Sample Grid Cell #17 1701040853 for metals by 6010C.

0904 Sample Grid Cell #18 1701040904 for metals by 6010C.

0918 Sample Grid Cell #19 1701040918 for metals by 6010C.

0928 Sample Grid Cell #20 1701040928 for metals by 6010C.

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Read and Understood By

Jeff Navarro. 1/4/17 Signed Date

Pamela Egan 1/24/17 Signed Date

0940	Sample Grid Cell #21	1701040940	for metals by 6010C.
0953	Sample Grid Cell #22	1701040953	for metals by 6010C.
0954	Sample Grid Cell #22 (DUP)	1701040954	for metals by 6010C.
1008	Sample Grid Cell #23	1701041008	for metals by 6010C.
1009	Sample Grid Cell #23 (MS)	1701041009	for metals by 6010C.
1022	Sample Grid Cell #24	1701041022	for metals by 6010C.

1030 We are laying out grab sample locations in the grids.

1050 Break for lunch. Depart for 100 Area

1245 We are back at the 200 Area Firing Range.

1301	Sample Grid Cell #25	1701041301	for metals by 6010C.
1313	Sample Grid Cell #26	1701041313	for metals by 6010C.
1327	Sample Grid Cell #27	1701041327	for metals by 6010C.
1343	Sample Grid Cell #28	1701041343	for metals by 6010C.
1401	Sample Grid Cell #29	1701041401	for metals by 6010C.

1415 Packing up equipment and planning sampling for tomorrow. We will hand over to Grid Cell #30 next. Located on arroyo from Firing Range to GSA. (Gardner Spring Arroyo)

SUMMARY

- Sampled for soil metals by 6010C at the 200 Area Firing Range fallout grid.
- Collected equipment rinsate sample.
- Sampled Grid Squares 15, 16, 17, 18, 19, 20, 21, 22, 22 (DUP), 23, 23 (MS), 24, 25, 26, 27, 28, and 29 (17 soil samples total) for metals by 6010C.
- We will start at Grid Cell #30 tomorrow - probably last day of sampling.

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Read and Understood By

Signed 1/4/17 Date — Signed Pamela Egan 1/24/17 Date

0630 R. Burrows & G. Giles setting up for todays sampling activities @ 100 Area and B.637. Pack 40z jars and 500 ml poly containers. Fill 5 gallon bottle with DI water from B.637.

0700 Head out to 200 Area Firing Range.

WEATHER: Currently 44°F, forcast high 63°F, 50% cloud cover, breeze from the southwest @ 5-10 mph.

PERSONNEL: G. Giles, R. Burrows] Nonuno

OBJECTIVE: Complete 200 Area Firing Range fallout grid sampling for metals by 6010C. We have 15 grid squares remaining, w/ 2 duplicates and 1 matrix spike. We should be able to finish today.

0730 Perform a tailgate safety briefing. See form for details. Topics include plans for the day & PPE.

0736 Collect rinsate sample 1701050736 for metals by 6010C.

0801 Sample Grid Cell #30 1701050801 for metals by 6010C.

0810 Sample Grid Cell #31 1701050810 for metals by 6010C.

0821 Sample Grid Cell #32 1701050821 for metals by 6010C.

0822 Sample Grid Cell #32 (Dup) 1701050822 for metals by 6010C.

0834 Sample Grid Cell #33 1701050834 for metals by 6010C.

0845 Sample Grid Cell #34 1701050845 for metals by 6010C.

0858 Sample Grid Cell #35 1701050858 for metals by 6010C

0908 Sample Grid Cell #36 1701050908 for metals by 6010C.

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0919	Sample Grid Cell #37	1701050919	for metals by 6010C.
0936	Sample Grid Cell #38	1701050936	for metals by 6010C.
0955	Sample Grid Cell #39	1701050955	for metals by 6010C.
1010	Sample Grid Cell #40	1701051010	for metals by 6010C.

1015 We have completed this sample line. The last grid cell (#40) was at the top of the Permian 1st (Panther Seep) hill immediately behind the 200 Area Firing Range Copper fallout grid). Only one line left (Grid Cells #41 - #44). We will catch this in the afternoon. Still cold (34°F) and windy. Wind out of the south @ 10 mph.

1045 Head back to office in 100 Area for lunch. We also have the Weekly Safety Meeting at 1230 - 1330 hrs.

1315 Safety Meeting complete. Gather sampling equipment and head out to 200 Area Firing Range.

1340	Sample Grid Cell #41	1701051340	for metals by 6010C.
1353	Sample Grid Cell #42	1701051353	for metals by 6010C.
1354	Sample Grid Cell #42 (DUP)	1701051354	for metals by 6010C.
1409	Sample Grid Cell #43	1701051409	for metals by 6010C.
1410	Sample Grid Cell #43 (MS)	1701051410	for metals by 6010C.
1426	Sample Grid Cell #44	1701051426	for metals by 6010C.

1430 Pack up equipment, return to B.637, complete internal COCs, Sample jars & bottles into refrigerator.

SUMMARY
- Completed soil sampling at 200 Area Firing Range fallout grid.
- Collected equipment rinsate sample.
- Sampled Grid Cells 30, 31, 32, 32 (DUP), 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 42 (DUP), 43, 43 (MS), and 44 (18 soil samples total) for metals by 6010C.

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Read and Understood By

Signed [signature] Date 1/5/17

Signed Pamela Egan Date 1/24/17

0645 Meet up with R. Burrows in B.101 parking lot. We are pulling together field sampling equipment for today. Equipment includes metal detector, measuring tape, field logbooks etc.

0715 Head over to B.637 to pick up soil & rinsate sampling containers. We will use 4 oz jars for soils and 500ml poly containers w/ HNO_3 preservative for rinsate sample.

0745 Head out to STGT Firing Range.

0800 Tailgate Safety Briefing. See form for details. Topics include PPE & lead contaminants in soil. It has been raining a lot over the weekend and the soil is very moist.

WEATHER: 37°C, forecast high 52°F, overcast 60% cloud cover, damp, potential showers in the afternoon, slight breeze from the south.

PERSONNEL:

G. Giles
R. Burrows
] Navarro

OBJECTIVE: Soil sample at the STGT Firing Range fallout grid. We have a total 44 samples (soil) from 44 grid squares, 4 duplicates, and 2 matrix spikes. Grand total of 50 soil samples.

0815 Set Hip up to sample. First Grid square will be #22 on northwest side of fallout grid. We will move sequentially through to Grid Square #65 on the southeast side.

0834 Collect rinsate sample 1701170834 for metals by 6010C.

0908 Sample Grid Cell #22 1701170908 for metals by 6010C.

0921 Sample Grid Cell #23 1701170921 for metals by 6010C.

0937 Sample Grid cell #24 1701170937 for metals by 6010C.

0949 Sample Grid Cell #25 1701170949 for metals by 6010C.

1002 Sample Grid Cell #26 170117/002 for metals by 6010C.

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Read and Understood By

Geoff [illegible] — Signed — 1/17/17 Date

Pamela Egan — Signed — 1/24/17 Date

1040 Sample Grid Cell #27 1701171040 for metals by 6010C.

1057 Sample Grid Cell #28 1701171057 for metals by 6010C.

1110 Depart for B.101 – lunch.

1230 Depart B.101 parking lot for STGT Firing Range.

1250 Marking grid cells #29 & #30. Dustin Leonard had not done these.

1310 Sample Grid Cell #29 1701171310 for metals by 6010C.

1322 Sample Grid Cell #30 1701171322 for metals by 6010C.

1342 Sample Grid Cell #31 1701171342 for Metals by 6010C.

1400 Sample Grid Cell #32 1701171400 for metals by 6010C.

1415 Raining heavily now. Difficult to collect grab samples. Work on paperwork in truck – daily notes, sample labels, internal COC.

1500 We will continue sampling tomorrow hopefully in better weather conditions. Pack up & return to B.637/B.101.

SUMMARY

- Commenced sampling at STGT Firing Range fallout grid. Collected the following samples.
- 1 x Rinsate Sample from sampling equipment for metals by 6010C.
- 11 x Soil Samples from Grid Cells #22 – #32 for metals by 6010C. Samples were composite grab samples from the center of each grid cell and 4 other locations midway between the grid cell center and the cell corners.
- We have collected samples from 11 of 44 grid cells. 25% complete.

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Read and Understood By

Signed 1/17/17 Date

Signed 1/24/17 Date

0630 Meet up w/ R. Burrows in B.101 parking lot.
0645 Head over to B.637 to prepare rinsate sample equipment and collect sample jars & coolers.
0700 Depart for STGT Firing Range.

WEATHER: 34°F, forcast high 54°F, cold, clear skies (0% cloud cover), no breeze, damp soil conditions due to yesterdays rain.

PERSONNEL: G. GILES, R. BURROWS] Navarro

OBJECTIVE: Continue soil sampling at the STGT Firing Range fallout grid. Start at cell #33 today. We completed 11 of 44 grid cells yesterday (25%).

0730	Tailgate safety briefing. See form for details. Covered PPE & lead sampling details.	
0805	Collect rinsate sample	1701180805 for metals by 6010C.
0819	Sample Grid Cell #33	1701180819 for metals by 6010C
0820	Sample Grid Cell #33 (DUP)	1701180820 for metals by 6010C.
0837	Sample Grid Cell #34	1701180837 for metals by 6010C.
0845	Spotting the center of grid cells #35, #36, #37, & #38. Dustin had not flagged these. Layout grab sample flags.	
0937	Sample Grid Cell #35	1701180937 for metals by 6010C.
0953	Sample Grid Cell #36	1701180953 for metals by 6010C.
1008	Sample Grid Cell #37	1701181008 for metals by 6010C.
1028	Sample Grid Cell #38	1701181028 for metals by 6010C.
1050	Break for lunch. Head back to B.101.	

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Signed 1/18/17 Date

Signed 1/24/17 Date

1230 Meet R. Burrows in B.101 parking lot. Head back out to STGT Firing Range.

1300 Resume Sampling

1330 Sample Grid Cell #39 1701181330 for metals by 6010C.

1349 Sample Grid Cell #40 1701181349 for metals by 6010C.

1407 Sample Grid Cell #41 1701181407 for metals by 6010C.

1408 Sample Grid Cell #41 (DUP) 1701181408 for metals by 6010C.

1428 Sample Grid Cell #42 1701181428 for metals by 6010C.

1429 Sample Grid Cell #42 (MS) 1701181429 for metals by 6010C.

1445 We are preparing the internal COC for soil samples, We will resume soil sampling tomorrow.

1455 Secure site. Depart for B.101/B.637. Store samples in cooler at B.637. File internal COC's in door.

SUMMARY

- Continued soil sampling for metals at the STGT Firing Range fallout grid. Collected the following samples:
- 1 x rinsate from sampling equipment for metals by 6010C.
- 13 x soil samples from grid cells #33-#42, including 1 duplicate in cell #41 and 1 matrix spike in cell #42.
- We have collected samples from 22 of 44 Grid cells. 50% complete.

Continued on Page N/A

Read and Understood By

Signed 1/18/17 Date Signed 1/24/17 Date

0630 Meet up w/ Robert Burrows in B.101 parking lot. I head into office to pick up field supplies.
0700 Drive over to B.637 to pick up sample jars, DI water, and coolers.
0715 Head out to STGT Firing Range. Construction on TDRSS road slows down access. They are performing major construction to fix a 8" leaking water line that has been causing problems for 2+ years (?). This may be the source of our "mound" in the water table downgradient at the Mid-plume. Mounding up to approx. 30'-50' for the last 2 years or so.
0730 Arrive @ STGT Firing Range.

WEATHER: Currently 37°F, forecast high 54°F, clear skies, 20% cloud cover, cool, slight breeze from the South in the morning, forecast says it may be windy in the afternoon, damp soil conditions.

PERSONNEL: G. Giles, R. Burrows] Navarro

OBJECTIVE: Continue soil sampling at the STGT Firing Range fallout grid. We will continue at Grid Cell #43. We have completed 21 of 44 grid cells, so are about 50% complete at this time.

0800	Collect rinsate sample	1701190800	for metals by 6010C.
0827	Sample Grid Cell #43	1701190827	for metals by 6010C.
0849	Sample Grid Cell #44	1701190849	for metals by 6010C.
0903	Sample Grid Cell #45	1701190903	for metals by 6010C.
0921	Sample Grid Cell #46	1701190921	for metals by 6010C.
0940	Sample Grid Cell #47	1701190940	for metals by 6010C.
0957	Sample Grid Cell #48	1701190957	for metals by 6010C.
1019	Sample Grid Cell #49	1701191019	for metals by 6010C.
1035	Sample Grid Cell #50	1701191035	for metals by 6010C.

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Signed 1/24/17 Date

1050 Break for lunch. Head back to B.101

1230 We have the weekly safety meeting in the B.100 Downstairs CR.

1300 Depart B.100 for the STGT Firing Range.

1335 Sample Grid Cell #51 1701191335 for metals by 6010C.

1336 Sample Grid Cell #51 (DUP) 1701191336 for metals by 6010C.

1355 Sample Grid Cell #52 1701191355 for metals by 6010C.

1415 Sample Grid Cell #53 1701191415 for metals by 6010C.

1428 Sample Grid cell #54 1701191428 for Metals by 6010C.

1451 Sample Grid Cell #55 1701191451 for metals by 6010C.

1500 Pack up equipment and depart for B.637.

1570 Place soil sample jars in fridge. Add Interval COC to the folder on the fridge door. Sampling activities complete for the day.

SUMMARY

- Continued soil sampling for metals at the STGT Firing Range fallout grid. Collected the following samples:
- 1 x rinsate from sampling equipment for Metals by 6010C.
- 14 x Soil Samples from Grid Cells #43 – #55 including 1 duplicate Sample.
- We have collected samples from 33 of 44 Grid Cells. 75% complete.

Continued on Page —

Read and Understood By

Signed 1/19/17 Date

Signed 1/24/17 Date

0630 Meet up in B.101 parking lot. Collect gear and notebooks.
0645 Depart for B.637. Pick up DI water, sample containers, & coolers.
0655 Head out to STOT Firing Range.
0705 Arrive @ STOT Firing Range.

WEATHER: 36°F, forecast high 52°F, cloudy = 60% clouds, forecast rain in the afternoon, breeze out of the south @ 5-10 mph.

PERSONNEL: G. GILES, R. BURROWS, NAWOTTO

OBJECTIVE: Continue with STOT Firing Range fallout grid soil sampling. We have completed ≈ 33 of 44 cells (75%). Rain forecast for later today. We will see if we can finish!

0715 Tailgate Safety Briefing. See form for details. Topics: PPE & weather.

0730	Collect rinsate sample	1701200730	for metals by 6010C.
0745	Sample Grid Cell #56	1701200745	for metals by 6010C.
0758	Sample Grid Cell #57	1701200758	for metals by 6010C.
0817	Sample Grid Cell #58	1701200817	for metals by 6010C.
0827	Sample Grid Cell #59	1701200827	for metals by 6010C.
0836	Sample Grid Cell #60	1701200836	for metals by 6010C.

NOTE: For Grid cells #59, #60, & #61 2 sample locations were used for the grab samples. Each location was 12.5' from the center of the north edge of the grid cell. These locations were approximately centered on the berm road that runs between the 2 lagoon cells.

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Signed — Date 1/20/17 — Signed Pamela Egan — Date 1/24/17

0849	Sample Grid Cell #61	1701200849	for metals by 6010C.
0925	Sample Grid Cell #62	1701200925	for metals by 6010C.
0939	Sample Grid Cell #63	1701200939	for metals by 6010C.
0940	Sample Grid Cell #63 (DUP)	1701200940	for metals by 6010C.
0958	Sample Grid Cell #64	1701200958	for metals by 6010C.
0959	Sample Grid Cell #64 (MS)	1701200959	for metals by 6010C.
1019	Sample Grid Cell #65	1701201019	for metals by 6010C.

1030 We have completed the sampling of all 44 grid squares. We also have 4 x duplicates (≃10%) and 2 x Matrix spikes (≃5%).

1035 Packing away field equipment in truck. Pack soil sample jars in coolers, fill out internal CoC's etc.

1055 Secure site. All depart for office.

SUMMARY

- Completed STGT Firing Range fallout grid sampling. Collected the following samples:
  - 1 x rinsate from sampling equipment for metals by 6010C.
  - 12 x soil samples from grid cells #56 - #65 including 1 duplicate and 1 matrix spike.
- We have sampled all 44 grid cells. 100% complete.

Continued on Page N/A

Read and Understood By

Signed 1/20/17 Date

Pamela Egan Signed 1/24/17 Date

0630 G. Giles in office setting up for berm excavation activities at WB-2. JR Hennessey set up project start at 0730 hrs this morning at the WB-2 Firing Range.

0645 Locate Field maps of berm, Form 491 filled out by Pam Egan yesterday, metal detector, Field notebooks etc.

0650 Check in with JR and Steve Maestas in Compliance. Steve will be at the WSTF Form 491/Tailgate Safety Briefing this morning.

0700 Check in with Reed Elliott & Alex @ Photolab. Reed will be down this morning. Suggest about 0830 hours.

WEATHER: Cold ~ 30°F, Forcast high 65°F, clear skies, no clouds, no breeze in the morning.

PERSONNEL:

G. GILES	Navatto	M. PLEMMONS	Jacobs
S. MAESTAS		P. MUNOZ	
T. KONDY		B. HENNA.	
A. MONTES		A. IRION*	

* ON-SITE TEMPORARILY SO DID NOT SIGN TSB OR 491

OBJECTIVE: Scrape suficial 6" off WB-2 Firing Range berm and assess for residual bullets. Repeat process if necessary. We will assess berm surface with a metal detector. Once we have excavated berm portion of concern, Perform confirmatory soil sampling for lab.

0730 All meet at WB-2 Firing Range berm.

0735 Perform a tailgate Safety Briefing and go over WSTF Form 491. Topics covered include PPE – Level D modified. We will wear dust masks when required. Operator in Front End loader cab (M. PLEMMONS) will be ok without dust maske. On the positive, soil from berm is damp due to recent rains and no significat dust anticipated.

0800 A. Irion departs. S. Maestas, T. Kondy & A. Montes set 6-mil black PVC liners in 8 x roll off boxes set adjacent to the Firing Range berm on the west side. Fill roll offs from front end first per subcontractor request. Fill only approximately 50% of dumpster.

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Read and Understood By

Signed — Date 2/1/17

Signed — Date 3/6/18

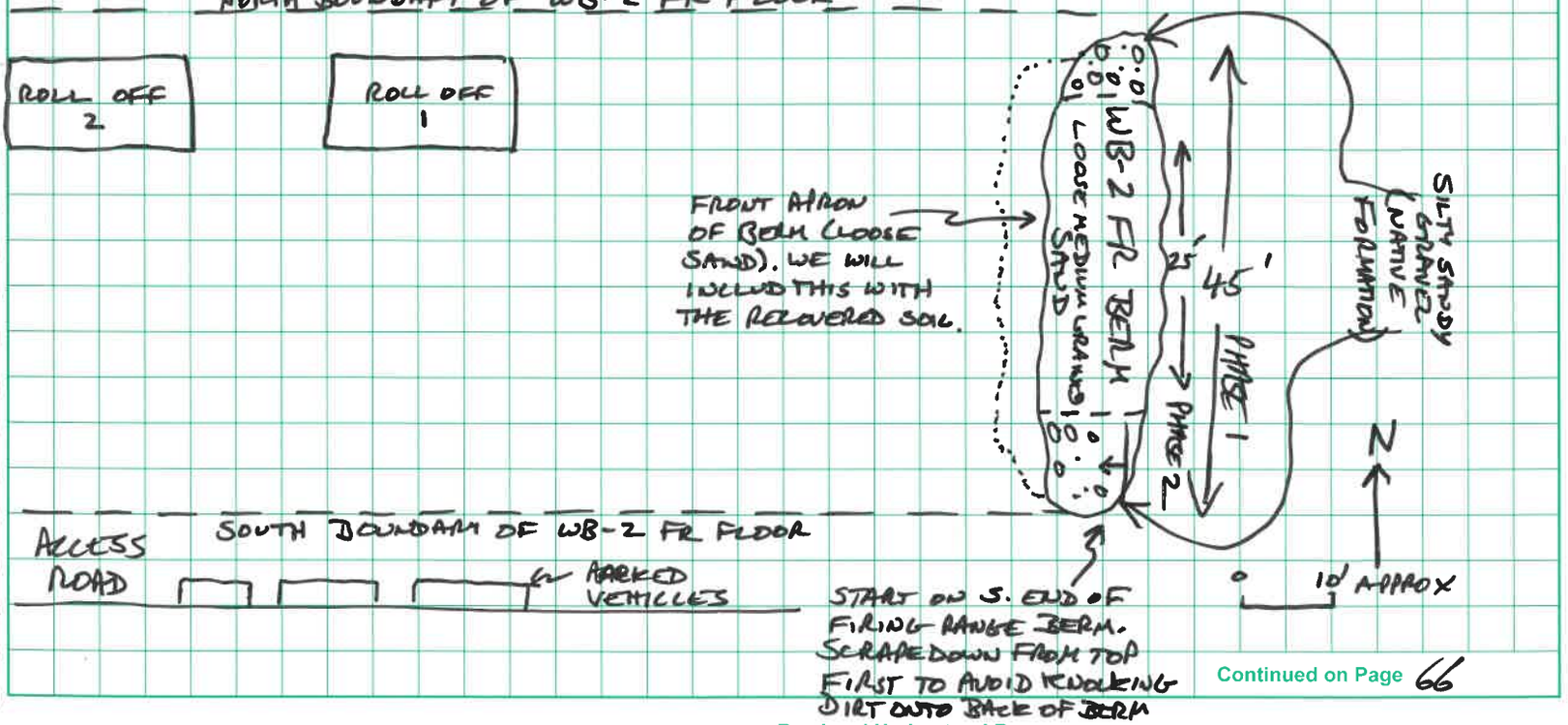
0825 We are still waiting on a copy of the dig permit for the WB-2 berm. Mickey said Arturo Zavala will have this brought to the project site ASAP.

0830 Call Reed Elliot and re-set photography time to 0930 hours. Steve, Tim, & Al have set lines and depart. Steve says he will return later this morning.

0845 Brian acquires a copy of the dig Permit and brings it up to the site. Dated November 2016.

0850 M. Plemmons starts scraping berm. To avoid knocking any bullets onto back side of berm, we are dragging down the top of the berm and then scooping up from the bottom. Start with a 6"-8" first lift. Brian & Mickey performing the field operations. We have the metal detector on hand to check the berm as we scrape it away.

0900 M. Plemmons filling the first dumpster on the east side of the berm. Scraping away from south to north along the berm.



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Read and Understood By

Signed 2/1/17 Date

Signed 3/6/18 Date

0930 Brain calls me over to the scraped portion of berm. We still have bullet detections w/ metal detector every 2-4'. I request we continue excavating as we are and not to sweep more here yet. We may be able to excavate and remove the residuals by hand easily. This is very soft graded medium sand.

0935 Security Department stop by to check in.

0940 Read Elliott on-site to take photographs of berm blading and transfer of soil to roll-off boxes.

0955 We are close to completing the first 8" lift. The east dumpster (Roll off 1 on the figure/sketch) is approx 50% full. The west dumpster (Roll off 2) is approx 30% full.

1015 Read Elliot departs. He will send photographs to me. Tim K and Al H back on-site.

1020 I have swept the entire berm front with the metal detector. We still have a high frequency of bullets in the central berm area that comprises soft sand. Place 2 rocks 25 feet apart and ask Mickey to perform a second 6" pass. See sketch for "Phase 2" excavation marked.

1025 Call S. Macsta to advise on how full roll-offs are. Steve said OK to fill both dumpsters to 50-55% full.

1045 We have finished the "Phase 2" berm scrape. We still have bullets within the sand but a relatively small volume. We will attempt to remove these manually in the afternoon

ROLL OFF 1 20'x8'x3.5' soil ≃ 50% full: container #7535
≃ 21 cubic yards

ROLL OFF 2 20'x8'x4' soil ≃ 55% full: container #7536
≃ 24 cubic yards

1050 Secure site. All depart to 100 Area for lunch.

1245 Return to WB-2 Firing Range. I picked up several sieves and a bucket for manual recovery. Saw T. Kordy & A. Montes @ B. 101 parking lot. They have to run to the Mid-Plume to get a drum for S. Macsta. Heavy equipment working on active range floor adjacent.

1250 Fill out logbooks for Roll Off boxes. Put logbooks in Sealable 5-gal bucket per S. Macsta directions.

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1300 Commence picking up residual bullets visible on top and back side of berm. Recover approximately 250-300 bullets.

1400 Tim Hordy and M Montes arrive on-site to help with bullet clean up. We will now use the metal detector, trowel, & sieve to help locate bullets.

1445 We have recovered another 50-60 bullets. We are finding these in-situ in the sand at least 6" below the current berm face. Steve Maestas contacts Tim Hordy and says Compliance suggest taking another lift of the front of the berm.

1450 Steve Maestas is covering the soil in the roll off boxes to the best extent possible by folding over the 6-mil plastic liner.

1455 G. Gilles Services site. Request to M. Plemmons that they come out in the morning to assist with the next lift.

SUMMARY

- Perform WB-2 Firing Range berm excavation activities.
- Remove Phase 1 lift of 6"-8" across entire berm front face (45 ft)
- Scan berm face with metal detector. Identify a continued presence of bullets in central 25 ft of berm.
- Remove Phase 2 lift of 6" across the central 25 ft of the berm.
- Scan berm face with metal detector.
- At this point we have approx. 21 cuyd of soil in Roll off #1 and 24 cuyd of soil in Roll off #2. Total approx. 45 cuyds of soil.*
- Perform double visual pass of berm crest and back berm. Remove approximately 250-300 bullets.
- Using a metal detector, trowel, and sieve, remove another 50-60 bullets from the front of the berm. We are able to dig down another 6" and still find bullets. Quantity = small clusters of 1-4 bullets per foot.
- Reduced bullet quantity from 1,000's on the surface to a few hundred remaining.
- Compliance suggest another soil lift. Alert M. Plemmons that we will perform another 6" lift tomorrow.

* Note: This total amount revised to ≈20 cuyds. See P. 69.

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2/1/17

03/06/18

0700 G. Giles in office setting up for today's WB-2 berm excavation activities. Pete Rios (Jacobs) emailed me yesterday to confirm they will be ready to go on additional excavation work this morning at 0730 hrs. Pick up field equipment and truck.

0715 Depart for WB-2 Firing Range.

0725 Arrive @ WB-2 Firing Range. Jacobs personnel are already on-site.

WEATHER: 32°F, forecast high 66°F, cool, clear skies, no clouds, no breeze.

PERSONNEL: G. GILES, T. KOWDY, A. MONTES — Navarro; M. PLEMMONS, B. HEIM — Jacobs

OBJECTIVE: Continue with WB-2 berm excavation and sampling. We will commence with an additional 6"-8" lift and perform confirmatory metal detector survey of the front berm face.

0730 Tailgate Safety Briefing. See form for details. Topics include potential lead dust and PPE.

0745 Mickey Plemmons has compressed dirt in the two roll off boxes to create more room for us.

0800 S. Patterson arrives on-site. Reviews WSTF Form 491 and Safety Briefing. Signs Tailgate Safety Briefing form.

0810 Mickey & Brian are performing the Phase 3 8" lift off the WB-2 berm face.

0835 Complete Phase 3 lift. Check the berm face with metal detector. We are still finding frequent native billets in the berms front face.

0850 Mickey and Brian starting the Phase 4 lift. We will take another 8" of the central berm and pack this into the roll off boxes.

0920 We have completed the Phase 4 lift. We have now removed 3 x 8" lifts and 1 x 6" lift, total 30" from the front of the WB-2 berm. This represents approximately ¼ (25%) of the WB-2 berm total volume.

0935 Dumpsters are similar capacity to yesterday. Mickey compacted the dirt, so we will leave the total volumes at:

Roll off 1 = 21 cubic yards
Roll off 2 = 24 cubic yards
Total 45 cubic yards

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Read and Understood By

Signed — Date 2/2/17 — Signed — Date 03/06/18

0945 Mickey & Brian depart. They have left the front end loader on-site at WB-2. If we need to perform further excavation, we can do this. T. Hordy, A. Montes, & G. Giles start manually collecting bullets from the front face of the berm.

1045 We have completed manual collection efforts. We are finding ≈ 5–10 bullets per cubic foot of dirt and there are still hundreds (but not thousands) of bullets in the berm face. S. Maestas on-site to check out dumpsters/roll offs. Pull plastic liner over the top of the soil in the dumpsters. Tim and AA will tape an additional piece of plastic over the middle seam between the two folded sides later today, they do not quite cover the soil (1 ft open strip down axis of roll off).

1050 All depart for 100 Area.

NOTE: Recalculated volume estimate for soil in the roll off boxes. Mickey Plemmons was able to compact the soil added today without increasing the volume in the roll offs significantly.

New calculation: Volume = $\frac{20' \times 6' \times 3'}{27}$ = 13 cuyds.

Approx 13 cuyds in each roll off. Listed on logbooks as ≈10 cuyds or 10 tons within each roll off total ≈ 20 cuyds.

1300 After discussions with JR Hennessey & Steve Maestas, we reviewed the "revised strategy letter" for the firing range cleanup. We will transport the soil off-site at an estimated bid/unit cost of $7,250 per roll off.

JR recommends & sets up for Monday Morning next week – picking up the two full rolloffs and dropping off two more empties (ACT corp). They will be on-site at ≈ 0800 hrs Monday 2/6/17. At this time we will remove additional lifts from the berm face.

1315 Contact Pete Munoz via email to confirm Tuesday availability Monday.

SUMMARY
– We have removed 4 lifts total (≈ 30 inches) from the WB-2 Firing Range berm.
– Total ≈ 20 cuyds soil. Excavation will resume on Monday 2/6/17

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Signed 2/2/17 Date — Signed 03/06/18 Date

0800 – JR reports that ACT were here early at 0630 hrs this morning removing the 2 x full roll offs and replacing them with 2 x empty roll offs.

0810 – Alarm sounds for 1st Monday of the month check-in. G. Giles checks in at B. 101.

0820 – Head out to WB-2 Firing Range. ACT are removing the 2nd full roll off. Pass them (going out) on the WB-2 access road. Steve Maestas is escorting them.

0825 G. Giles on-site @ WB-2. Jacobs personnel are already here (M. Plemmons & B. Heim).

WEATHER: 46°F, forecast High 70°F cool in morning, cloudy skies ≃ 90% cloud cover, no breeze in the morning.

PERSONNEL: G. GILES, A. MONTES] Navarro — M. PLEMMONS, B. HEIM] Jacobs.

0830 Check inside of roll offs. One (west side) is fine (clean). The roll-off on the east side is dirty - coated with oil on inside with several drum bungs in bottom of container.

0845 Call Troy Wiebe in office to locate a technician. T. Roady out today. No techs available. Call Al Montes. He will come over and help us place a liner in the west roll off. Troy calls to say it is OK if Jacobs & I do this per Craig, but Al is on his way out.

0900 A. Montes on-site. Tailgate Safety Briefing. See form for details. Discussed PPE and pinch points.

0920 Liner is in place on west roll off. A. Montes departs. Mickey and Brian take a 6"-8" lift of central 30' of berm. Call S. Maestas again on east roll-off. Al and Mickey noticed a 2" diameter hole in the bottom at the front also where oil has drained out onto the front of the roll off.

0935 First 6" to 8" lift complete. Check w/ metal detector (used new batteries 8 x AA). Still full of bullets. They may have added dirt to form front over time?

Continued on Page

Read and Understood By

Signed — Date 2/6/17 — Michael Mamp — Signed — Date 03/06/18

0940 Call S. Maestas. He will come out & check on east roll off. Mickey and Brian continue w/ next 6-8" lift. We spotted 2 rocks on top of the berm 30' apart defining the residual bullet area. This approximately coincides w/ the soft medium sand to native formation boundary on the north and south sides of the berm - hence this is the central 30' of the 45' berm.

0950 Check in w/ Troy in office to let him know we are still excavating. This roll off is deep = 20' x 6' x 6'.

1000 Mickey & Brian have finished the 2nd 8" lift today. Scan w/ metal detector → we will continue with a third lift. S. Maestas on-site to check roll off.

1010 S. Maestas has checked roll off. Takes photos of roll-off interior w/ bungs and puncture at the front of the roll off. He will double check w/ JR. Steve says AT has the liner for the second roll off.

1015 We have finished the 3 lift from the berm today.

1025 We have inspected berm front with the metal detector. It is a little better. We have two sections that are a problem right now that may correspond to the former locations of targets. These are both about 10 feet wide in the central berm area, separated by a 5' clean area in the middle. The cut in the middle is also a little deeper - so maybe scraping away of the two 10' sections will resolve the problem. S. Maestas departs.

1027 Commence on the 4th excavation of the day. Mickey has packed down the active roll off and we are about 40% filled on this one.

1040 4th lift complete. Scan front (west) side of berm w/ a metal detector. We are all clean! Handful of bullets left max → removed these in residue at front of berm by hand. We have approx 13-15 cu yds of dirt in the container (roll off), 80% full. Back side of berm still an issue

1050 Secure site. Break for lunch.

1100 Check w/ Troy on additional excavation. We will take a thin layer of soil off the back side (1"-2") and see if we can fit this in the west dumpster.

1230 Meet M. Plemmons & B. Heim back @ WB-2. Mickey will try to fit the 1"-2" layer in the first dumpster.

1300 A. Montes on-site with the liner for the 2nd roll off. Looks like we will have to start on this one.

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1305 S. Moestas on-site. Gives us the go-ahead to start on second roll off. We have placed about ½ of the first layer of dirt from the back side (east) of the berm in the first container 2½-4" lift.

1345 We have lined the second roll off and placed the other half of the first east side lift in there.

1350 Scan the back side (east) berm with the metal detector. We have a section over 36', in the center of the 45' berm where they must have combed bullets over when repairing the berm. We will perform a second 4"-6" lift here and add to our second (east) roll off box. A1 departs to get white plastic that we use to cover the dirt/soil in the roll offs. We will seal up the first container. S. Moestas departs, he will be back for another check on the status of the lead-bearing soil in the roll offs.

1400 We have started the second 4"-6" lift on the east side.

1410 A. Montes back on-site w/ white plastic. We are sewing plastic to the liner to cover the top of the soil in container #7545. We have ≈ 15 cubic yards of soil (15 tons) in here.

1430 Finish sewing PVC over top of liner. Check berm on east side after second lift. We look to be down to a handful of bullets left. We can manually locate these with the metal detector tomorrow when we perform confirmatory sampling.

1500 Add compliance labels and start date to the 2 roll offs. A1 departs.

Rolloff West side = #7545 15 cubic yards / 15 tons
Rolloff east side = #7546 2 cubic yards / 2 tons.

1510 Secure site. Depart

SUMMARY

- Complete excavations at WB-2 Firing Range berm to remove lead contaminated soil.
- We removed another ≈ 30" in 4 lifts from the central 30' of the berm. In all, we have removed about 60" of soil (5 ft) from the berm front (west side).
- Confirm no lead present with metal detector scan.
- Remove ≈ 8"-10" in 2 lifts from the back side (east) of the berm.
- Confirm no lead present with a metal detector scan.
- We removed 15 cubic yards from the west side and 2 cubic yards from the east. —

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Michael Naranjo — Signed — Date 03/06/18

0800 G. Giles in office setting up confirmatory berm sampling event at the WB-2 Firing Range. Pull together truck, metal detector, sampling notebooks etc. I in Kondy and A1 Montes will be performing the sampling.

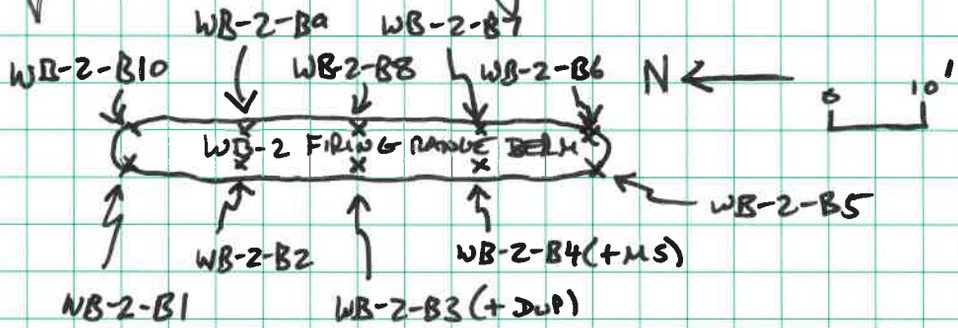
0830 T. Kondy and A. Montes leave to collect shovel, trowel, steel bowls, 4oz jars, and 500 ml poly container with HNO_3. We will collect a rinsate and then 10 samples from the berm with a QA/QC duplicate and matrix spike. Tim & Al collect the rinsate 1702070900.

0900 G-Giles, T. Kondy, A. Montes on access road to WB-2 Firing Range. Fire Dept have set up a road block with a chain about ½ mile west of the Firing Ranges. Call WSF Fire Dept as directed on Sign at x5641.

0910 Fire Dept give OK to proceed through gate. Leave gate down and call when we are out of there (Hang gate back up).

0920 All at Firing Range. Tim and Al preparing labels. I am spotting sample location stakes in the WB-2 Firing Range box. The AWP calls for confirmatory berm sampling at 10' intervals at a height of 3'-5' above the range floor.

WB-2 BERM SAMPLING SKETCH



0940 Labels ready, sample location stakes in place.

0950 Commence sampling soil on berm:

WB-2-B1	1702070950	metals by 6010C.		
WB-2-B2	1702070951	"	"	"
WB-2-B3	1702070952	"	"	"
WB-2-B3(DUP)	1702070953	"	"	"
WB-2-B4	1702070954	"	"	"
WB-2-B4(MS)	1702070955	"	"	"
WB-2-B5	1702070956	"	"	"
WB-2-B6	1702070957	"	"	"
WB-2-B7	1702070958	"	"	"

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WB-2-B8	1702070959	metals by 6010C.
WB-2-B9	1702071000	" " "
WB-2-B10	1702071001	" " "

1015 We have packed up samples in cooler on ice and will transfer these to the refridgerator in R. 637.
1030 Secure site, all depart. Hook up chain & gate on access road. Confirm with the Fire Department at X5641 that we have left.
1230 Back out at WB-2 after lunch. Compliance have requested we perform some soil transfer from #7545 (15 cuyd) to #7546 (2 cuyd). There is a ≃ 20,000 lb (10 tons / cuyds) limit on these roll off boxes. Our first two WB-2 containers weighed about 17,000 lbs per Steve Maestas, so we will have to get #7545 down in weight. Assuming about 3-5 cuyds (6,000-10,000 lbs).
1245 Mickey & Brian run to get a front end loader. T. Kordy & A. Montes on-site to help untape #7545 and re-secure the liner to #7546.
1315 We have taped up the roll offs. Tim and Al park upwind of heavy equipment activities to support supervision and write out labels for Wednesday's 200 Area Sewage lagoon sampling.
1330 Mickey is digging from #7545 with backhoe bucket and transferring to Brians front end loader. Brian then dumps soil from front end loader into #7546. Both are being careful not to spill any soil.
1430 Mickey and Brian done for the day. Estimate we have transferred about 4 cubic yards from #7545 (now 11 cuyds) to #7546 (now 6 cuyds).
1435 Tim, Al, & myself taping PVC covers onto the liners in the roll off boxes to cover the soil. Fill out logbooks.
1455 Tim & Al depart.
1510 Secure site. Depart.

SUMMARY

- Performed confirmatory sampling on the WB-2 Firing Range berm. Collected 10 samples (WB-2-B1 through WB-2-B10) and QA/QC duplicate & matrix spike. Also collected a rinsate from the sampling equipment.
- Transferred 4 cuyds soil from roll off #7545 (now 11 cuyds) to #7546 (now 6 cuyds).

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Read and Understood By

Signed — Date — Signed — Date

2/7/17 — 03/06/18

(WED 2/8/17)

0800 G. Giles meets M. Plemmons & B. Heim at STGT Firing Range. Technicians are tied up with 200 Area lagoon sampling today with Tom McCrory.
0810 Brian needs to run back to his house. Mickey and I continue with berm excavation activities.

WEATHER: 46°F, forcast high 70°F, clear skies, no clouds, no breeze in the morning.
PERSONNEL: G. GILES Navarro M. PLEMMONS Jacobs

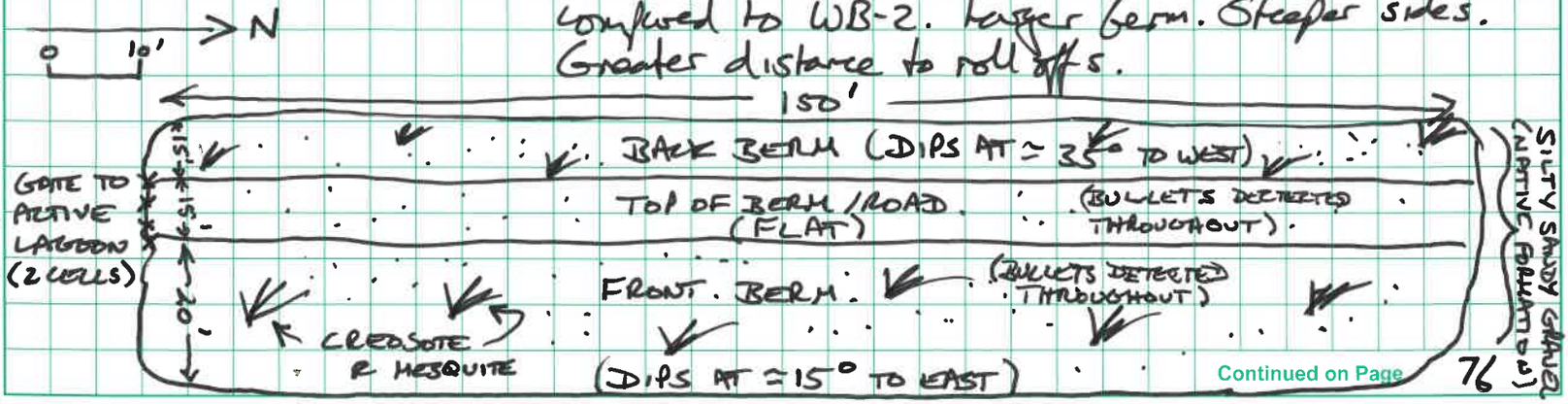
OBJECTIVE: Excavate STGT Firing Range berm. Start by clearing berm of brush and then perform excavation.

0830 Tailgate Safety Briefing. See form for details.
0840 Scan berm with metal detector to confirm distribution of bullets. Numerous bullets on front and top of berm.
0845 Mickey commences clearing sporadic creosote & mesquite bushes from the front of the berm. We need to remove these to gain access to the berm.

General Plan

Front Berm 20' wide
Berm length 150' long
Berm Top 15' wide
Back Berm 15' wide

① Scrape/dig out vegetation and station this vegetation north of the Firing Range Floor.
② Scrape away the front berm face and deposit soil in roll off boxes. We currently have 3 on-site.
③ Weld plate to excavator bucket and drag soil from top of back berm (west side) up onto berm west. Dispose of this soil in roll offs.
④ Clear lower side of back berm on west side with excavator. More time will be involved here compared to WB-2. Larger berm. Steeper sides. Greater distance to roll offs.



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Read and Understood By

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0920 Mickey has finished clearing away brush.
0940 We have inserted the 10 mil (?) black plastic liner in the first of the roll off boxes.
0945 Mickey starts scraping away the front berm by pulling down from the top (combing down from road on west side back to the base of the berm on the east side). Brian Arrives back on-site.
0950 Brian spotting Mickey. Brian on the top of the berm with a hard hat and reflective vest.
1030 We have completed removal of the top layer of the front berm. This lift was approximately 4" in thickness.
1040 Scan the front of the STBT Firing Range berm with the metal detector. Use stakes to flag areas (strips) where bullet density is increased. There seems to be three strips across the berm with higher density where targets may have existed. Secure site, depart for lunch.
1200 Mickey & Brian back on site to start on second lift averaging 8" in thickness.
1245 We have filled the first roll off #7537. We have about 10 cuyds or 10 tons in this dumpster.
1255 We have inserted a liner in the second roll off box #7538.
1310 Start transferring dirt/soil (gravelly sandy silt) into the second roll off #7538
1400 We have completed the second lift of 8" and have removed approx 12" (1 ft) total from the front of the berm. Appears relatively clean with only 1-2 bullets every several feet.
1430 Roll off #7537 - Gravelly sandy silt w/ bullets - 10 cuyds.
Roll off #7538 - Gravelly sandy silt w/ bullets - 4 cuyds.
1500 G. Gile completes logbooks, stickers on roll offs, detach tape from sides for PVC liner. Fold liners over soil & secure with Calfico tape. Secure site, all depart.

SUMMARY
- Commenced excavation of STBT Firing Range berm. Worked on the front (east) side 150 ft x 20 ft. Comprised gravelly sandy silt w/ bullets.
- Removed approximately 12" (1 ft) of soil from berm front.
- Filled dumpster/roll off #7537 w/ 10 cuyds soil.
- Partially filled roll off #7538 w/ 4 cuyds soil
- Steve Maestas ordered 2 more roll offs for STBT (total 5 now).

Continued on Page —

Read and Understood By

Signed — Date — Signed — Date

2/8/17 — 03/06/18

0800 G. Giles, M. Plemmons, & B. Heim out at STGT Firing Range. Mickey & Brian have been working on Test Stand 304 test article preparation this week. This is their first opportunity to support the STGT Firing Range. Coordinated w/ Pete Muñoz.

WEATHER: Cool ≈ 34°F, forcast high 58°F, recent heavy rains have created a muddy working environment, clear skies, 20% cloud cover, no significant breeze in the morning.

PERSONNEL: G. GILES Navarro
M. PLEMMONS, B. HEIM Talbots

0820 Tailgate Safety Briefing. See form for details. Covered care around heavy equipment, PPE - reflective vests in addition to Level D. No dust generation today so we should not need to utilize dust masks. Hard hats when proximal <50' from front end loader.

0830 Scan berm front with metal detector. Flag area of concern. We have a 100' long area in the central berm that we will scrape another 6" lift from. Also a pile of rocks that Mickey moved to the south side of the berm front that contains bullet fragments. We will move this also.

0845 G. Giles runs back to B. 637 for some calpico tape to use on dumpsters / liners.

0905 G. Giles back. No calpico left (:(), but I have several other types of tape including electric tape.

0915 Mickey has completed 1' lift and moved all soil to roll off #7538. We are at 85% of the acceptable limit of about 20,000 lbs.

0920 Re-scan entire berm front w/ metal detector. Looks very good. Identify one area of ≈ 40 sq ft that we will scrape off. Also strip of soil at extreme top of front berm face. We will use this dirt to fill roll off #7538.

0945 We have completed removal of an additional 1 ft over the 40 sq ft area and strip at the top of the front berm. Roll off #7538 now full with approx. 10 cuyds of dirt/soil. Soil is a gravelly sandy silt.

1000 Insert liner in roll off on extreme east end of north firing range area. We have 4 roll offs in line on this side of pad. All empty

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Read and Understood By

Signed	Date	Signed	Date
[signature]	2/15/17	Michael Nannup	03/06/18

1015 Liner is taped into roll off # 7539. This roll off has a folding top, so easy to cover. Shorter roll off at 16' x 6' x 8' (1 foot taller than other roll offs

1020 Mickey starts clearing vegetation from upper back berm (west side). He recommends clearing the road on top of the berm last so that we have a good foundation for the front end loader while clearing the east (front) or west (back) sides of the berm.

1045 We have removed about half of the creosote bushes from the west side of the berm. Break for lunch. Secure site, all depart.

1230 All back on site. Mickey and Brian ready to scrape west side of berm. Perform initial metal detector scan. Lots of bullets on top of berm, but much less significant on back slope. One or two bullets every 5 or 6 feet.

1245 Mickey commences on back berm excavation. G. Giles fills out log book for #7538. Our new roll off box is #7539 on the extreme northeast corner of the STGT Firing Range floor.

1330 Labels are on the new roll off box. Mickey is stripping the upper 6' of dirt from the top of the back berm with a small metal plate welded to the "Stinger" of the backhoe. Seems to be working well.

1415 We have removed a 4"-6" lift from the upper part of the back berm (west side) along a distance of ≈ 110 feet. Continue removing soil from top of berm also.

1445 We are done w/ excavation for the day. Roll off #7539 has ≈ 5 cubic yards (≈ 5 tons) in it. Fill out log book and add to sealable bucket with log books.

1450 Close lid on roll off #7539. Tape up liner in roll off #7538: plastic will not stretch all the way across. An 18" gap is left in the middle (spine down the central roll off) where soil exposed. We can have technicians add plastic cover

1500 Secure site. All depart

SUMMARY

- Continued excavation of STGT Firing Range Berm. Front (east) side complete - removed 2 x partial 6" lifts in selected areas.
- Removed vegetation from top of back (west side). Removed 1 x 6" lift of soil.
- Added 6 cuyds of soil to #7538. Rolloff now has 10 cuyds and is full.
- Added 5 cuyds of soil to #7539. Rolloff partially full

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Read and Understood By

Signed — Date 2/15/17 — Signed — Date 03/06/18

PROJECT STGT FIRING RANGE (BERM EXCAVATION) (THU 2/23/17)

Continued from Page —

0800 G. Giles meets M. Plemmons at STGT Berm. A. Montes and T. Kordy are also on-site preparing for STGT Sewage lagoon berm sampling. T. McCrory has run back to office for a dig permit. They need our help digging 10 small holes to 1' depth for lagoon berm samples. The soil is "too hard" to hand dig.

WEATHER: 48°F, forecast high 66°F clear skies, no clouds, breeze from the southwest at 5 mph.

PERSONNEL: G. Giles (Firing Range)
T. Kordy
A. Montes
T. McCrory
(lagoon berm)] Navarro
M. Plemmons - Jacobs

0815 Tailgate safety briefing. See form for details. Topics covered: heavy equipment operation, winds, use of Supplemental PPE IF required.

0825 G. Giles & M. Plemmons scanning upper back side of STGT berm with the metal detector. Flag limited areas where we still have a few bullets remaining. Overall - very good. We have flagged 6 spots where Mickey will drag the stinger over. Dirt/soil will be transferred to roll off box #7539.

0835 T. McCrory back on site w/ required dig permit to install 10 holes to 1' depth. Mickey takes front end loader/backhoe over to the STGT lagoon to install these holes w/ T. McCrory, T. Kordy & A. Montes.

0900 M. Plemmons has completed the 10 holes. Work with Mickey to open up roll off #7539 and tape liner back up on sides.

0915 Mickey is scraping 6" lifts of soil with the stinger from the top part of the back berm where we had flagged based on metal detector scanning. Scraping soil into piles on the top of the berm. We will scrape this all up with the blade off the top of the berm when we are done. Winds picking up out of the west 15-25 mph!

0930 G. Giles (with permission of Technicians) lining roll off box #7563 with PVC 10 mil (?) black plastic liner.

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Read and Understood By

J. Giles 2/23/17 — Signed / Date

Michael Plemmons 03/06/18 — Signed / Date

1015 Break for lunch. M. Plemmons has to depart to support alternate project.

1200 M. Plemmons & G. Giles back on-site at the STGT Firing Range. Mickey is completing scraping of upper back berm on the west side and trimming the top of the berm. We are placing all of the excavated soil in roll off # 7583. Winds have picked up to 40-45 mph, very strong.

1315 Scan STGT berm top & back berm with metal detector. It is so windy that I can barely hear the metal detector signal.

1325 Danny Hinojos on-site. He and Mickey say it is too windy to continue. We will reconvene at 0700 hrs on Monday morning 2/27/17.

1330 Mickey & Danny depart. I close up roll offs as best possible. Roll off # 7539 now has 10 cuyds (5 cuyds added today) and roll off # 7583 has 8 cuyds in it. Fill out start date for accumulation on # 7583 of 2/23/17. Fill out log books, secure logbook bucket, depart site.

1350 G. Giles back @ B. 101 parking lot.

SUMMARY

- Continued with STGT Firing Range back berm excavation & transfer of soil to roll offs.
- Focused on scanning & removal of dirt from top of back berm and on top of berm.
- Removed 13 cuyds today. 5 cuyds added to roll off # 7539 to fill it to capacity (10 cuyds). 8 cuyds added to roll off # 7583.
- Secured site. All depart.

Monday 2/27/17 : M. Plemmons will be ready to go at 0700 hrs to finish the berm excavations

Continued on Page

Read and Understood By

Signed — Date 2/23/17 — Signed — Date 03/06/18

0655 G. Giles out at STGT berm. Performing an initial metal detector survey of the berm top & top of the back berm (west side). Top needs a 6" scrape / lift. Back berm is good (2 bullet detections across entire berm from top to 8' down.

0710 Mickey Plemmons arrives with a second (larger) front end loader w/ bucket on the back. Brian is not at work today, but Mickey will work soil with both front end loaders (loading dirt into other & pushing dirt into buckets between loaders.

WEATHER: Cool ≈ 40°F, forecast high 68°F, clear skies (<5% clouds), slight breeze from the South (2-3 mph). Weather forecast indicates windy conditions in the afternoon, so we will need to get going this morning.

PERSONNEL: G. Giles - Navarro, M. PLEMMONS - Jacobs

0715 Tailgate safety briefing. See form for details. Topics include reflective vests, potential for dust masks in the afternoon.

0730 I. McCrory, T. Rondy, & A. Montes pull up at the adjacent STGT Sewage lagoon to complete berm sampling.

0740 M. Plemmons starts on top of berm. G. Giles sawing the PVC liners in the roll offs. We will complete the fill of roll off # 7563, and start on roll off # 7564. We have ≈ 2 cubic yards space left in # 7563 and # 7564 is empty.

0830 Mickey has removed a 6" lift off the berm top. Scan with the Metal detector. SOBMS excellent. Flag two zones, one at extreme north end and one at extreme south end of berm top. We need to get good 6" lifts from these two areas. We have filled roll off # 7563 and moved over to roll off # 7564.

0905 Mickey is done with the 6" lift on the south end of the STGT Firing Range berm right up to the separator gate with the sewage lagoon - all good.

0925 We have completed the north side of the berm. All finished on top.

0930 T. McCrory, T. Rondy, A. Montes done with STGT Lagoon sampling - depart.

0935 M. Plemmons starts "grubbing" (removing creosote) from bottom west berm.

Continued on Page 82

Read and Understood By

Signed 2/27/17 Date

Signed 03/06/18 Date

PROJECT STGT FIRING RANGE (BERM EXCAVATION) (MDW 2/27/17)

Notebook No. FRB # 1

Continued from Page 81

1010 We have removed all of the major vegetation from the bottom side of the back berm (west side). This was mainly creosote & mesquite bushes. Ready to excavate after a scan.

1015 Adding liner to final roll off box (6 total). Decided to do this before lunch and before the winds pick up.

1035 Secure site. Depart for lunch.

1200 G. Giles back on-site @ STGT Firing Range after lunch. Scan lower half ≈ 10' of berm on west side (back berm). A few sporadic ammunition fragments mixed in with surface gravels. We will perform a 6" lift of the lower back berm to complete this work.

1210 Mickey Plemmons on-site. Immediately starts to perform 6" lift on the back berm. Pulling down soil from unexcavated horizon to base of berm and then scooping it up with the bucket. Continue Filling # 7564. We will then move to the final roll off box # 7565.

1315 Switch over to roll off # 7565.

1330 We have finished a 6" lift off the lower back (west) berm. Scan berm with metal detector. Look to be in good shape. We will take a little extra lift of the extreme north and south sides of the berm where a lift was not performed. Also, one small pile of dirt not picked up by Mickey. This contains a few bullets so Mickey will pick it up. We still have some room in roll off # 7565.

1415 We have finished scraping off lifts from the STGT Firing Range Berm.

1425 Close top on the last roll off # 7565. Fill out log books at the 90 day area. We filled six roll offs at STGT with an estimated 10 cubic yards in each, so a total of 60 cuyds from the STGT Berm.

1430 Secure site. All depart. High winds at 25-30 mph.

SUMMARY

- Completed STGT Firing Range berm excavation activities. We focused on the berm top, and the lower half of the back berm on the west side.
- Added 2 cuyds soil to roll off # 7563. Total 10 cuyds
- Filled roll off # 7564 with 10 cuyds soil.
- Filled roll off # 7565 with 10 cuyds soil.
- Secured lids on 2 of 5 roll offs on site.
- The remaining 3 need to have PVC secured on top.

Continued on Page —

Read and Understood By

Signed — Date 2/27/17 — Signed — Date 03/06/18

0700 G. Giles @ B.101 picking up field equipment - measuring tape, metal detector, field logbook. T. Kondy & A. Montes @ B.637 preparing sampling jars for soil (4 oz) and rinsate sample bottle (500 ml HNO_3 preservative).

0715 Back to B.101 to prepare Task Memo for next weeks bulk survey & recovery on the periphery of the fallout grid. I prepared a Task Memo for this berm sampling yesterday.

WEATHER: 45°F, forecast high 63°F, Sunny (0% cloud cover), no breeze in the morning.

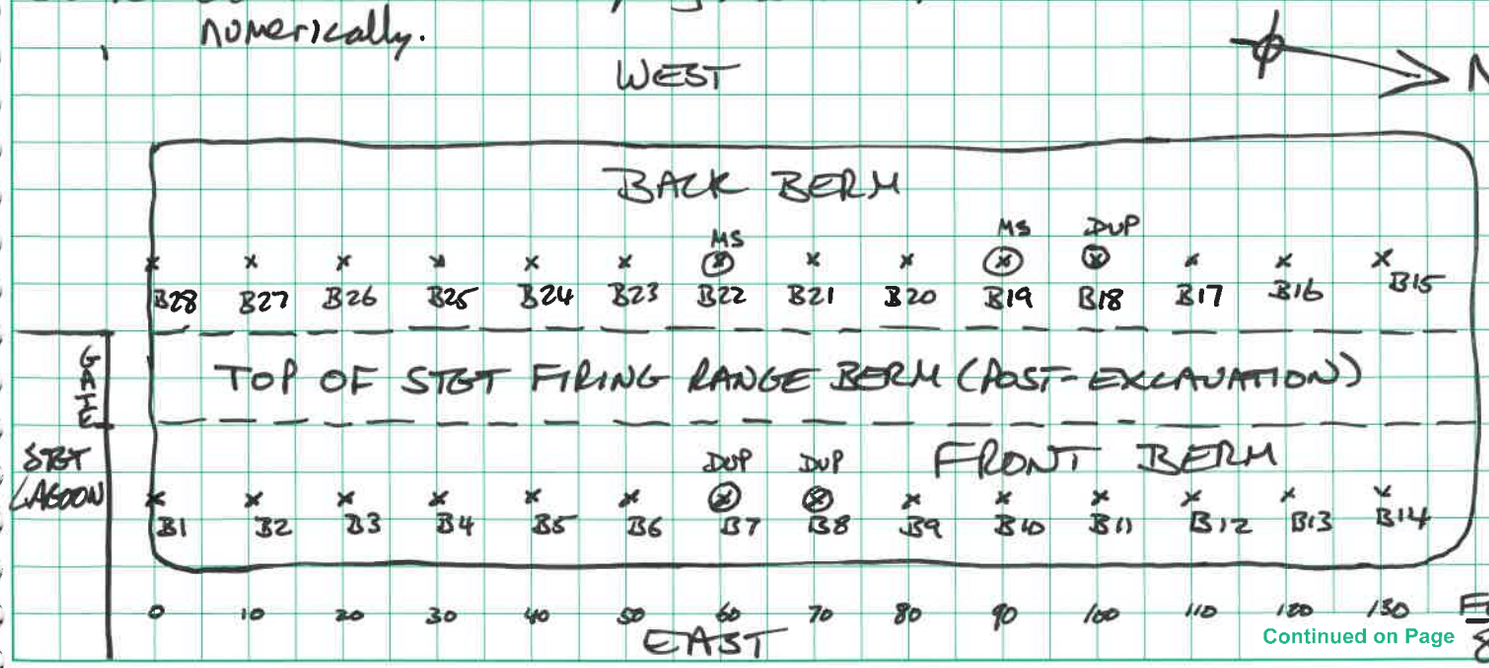
PERSONNEL: G. GILES, T. KONDY, A. MONTES] Navarro.

0730 Check in w T. Wiebe, R. Spencer, C. Delferraro concerning task memo protocol.

0745 Back over to B.637. Technicians are collecting the rinsate sample. Collect Rinsate sample 1703010745 for metals by 6010C.

0800 Depart for STGT Firing Range berm. Perform tailgate safety briefing. See form for details. Topics discussed → PPE (we will use a 3M dust mask if the wind picks up) and cave sampling on the steep side of the berm (back side on west).

0840 Commence berm sampling. We will start at STGT-B1 and continue numerically.



Continued on Page 84

Read and Understood By

Signed — Date 3/1/17 — Signed Michael Thorup — Date 03/06/18

PROJECT STGT FIRING RANGE (BERM CONFIRMATORY SAMPLING) (WED 3/1/17)

Notebook No. FRB # 1

Continued from Page 83

0840	Sample	STGT - B1	1703010840	metals by 6010C.
0842	"	STGT - B2	1703010842	" "
0844	"	STGT - B3	1703010844	" "
0846	"	STGT - B4	1703010846	" "
0848	"	STGT - B5	1703010848	" "
0850	"	STGT - B6	1703010850	" "
0852	"	STGT - B7	1703010852	" "
0854	"	STGT - B7 (DUP)	1703010854	" "
0900	"	STGT - B8	1703010900	" "
0902	"	STGT - B8 (DUP)	1703010902	" "
0904	"	STGT - B9	1703010904	" "
0906	"	STGT - B10	1703010906	" "
0908	"	STGT - B11	1703010908	" "
0910	"	STGT - B12	1703010910	" "
0912	"	STGT - B13	1703010912	" "
0914	"	STGT - B14	1703010914	" "
0944	"	STGT - B 15	1703010944	" "
0946	"	STGT - B16	1703010946	" "
0948	"	STGT - B17	1703010948	" "
0950	"	STGT - B18	1703010950	" "
0952	"	STGT - B18 (DUP)	1703010952	" "
0954	"	STGT - B19	1703010954	" "
0956	"	STGT - B19 (MS)	1703010956	" "
0958	"	STGT - B20	1703010958	" "
1000	"	STGT - B21	1703011000	" "
1002	"	STGT - B22	1703011002	" "
1004	"	STGT - B22 (MS)	1703011004	" "
1006	"	STGT - B23	1703011006	" "
1008	"	STGT - B24	1703011008	" "
1010	"	STGT - B25	1703011010	" "
1012	"	STGT - B26	1703011012	" "
1014	"	STGT - B27	1703011014	" "
1016	"	STGT - B28	1703011016	" "

1030 Secure site. All depart for R.637/638. Store soil samples in cooler/refrigerator.

SUMMARY

- Performed STGT Firing Range berm confirmatory sampling - 28 sampling locations
- Store all soil samples in refrigerator in preparation for shipping.

Continued on Page —

Read and Understood By:

Signed — Date 3/1/17

Signed — Date 03/06/18

GEOLOGISTS LB STOP

Tuesday, March 14, 2017 Weather: Clear, 72°F

1000 M. Narup, Navarro, gathered all GPS equipment needed to take locations for WB-2 and STGT Firing range locations with survey grade TSC3 Trimble GPS devices.

1030 Arrive at WB-2, Geoff has maked out all berm sample locations with stakes, orange flagging, and lables, check the label on the stakes to confirm they are correct sample location to collect points.

1045 Collect points at sample locations WB-2-B1 through WB-2-B10. confirm locations on mini-map and depart back to office.

1130 Picked up some batteries for radio, was at 10% at WB-2, depart to collect the rest of the berm sample locations at STGT

1143 Collected points at sample locations STGT B1 through B28. Confirm locations on mini-map and depart back to 100 Area office

1240 Download the points from the Trimble TSC3 into a shapefile and sent it to Stephanie

Summary: Confirmed berm sample locations using the survey grade Trimble TSC3, at WB-2 and STGT

03/14/17

Continued on Page —

Read and Understood By

Michael Narup Signed 03/14/17 Date

Signed 3/15/17 Date

0700 Personnel: Phillip Bolen
Kyle Williams
Tim Handy
Al Montes

Date: 9-12-2019

SCMI

Temp: 70°F Forcast mid 80s Partly Cloudy

0715 Safety Meeting Uneven surfaces, Snakes

Objectives: Begin discreet soil sampling at 200 Area Firing Range.

0720 Collected equipment / equipment blank.

0925 It is believed that some grid stakes have been washed out. Will need to reconfirm with Nick Balog who will be available Monday AM (9-16-19).

1030 Done attempting to locate "inissing?" grid stakes. Off site, back to the office.

P. Bolen
9-12-2019

Continued on Page

Read and Understood By

P. Bolen — Signed
9-12-19 — Date
Kyle Williams — Signed
9-12-19 — Date

Personel: Phillip Boken, Nicki Balog Date: 9-16-2019 SCMI

Temp/Weather: 73° Humid ~~poor~~ 9-16-19 Partly cloudy slight Breeze

1000: Depart to STGT Firing Range

1015: Met Nicki at STGT begin survey (Check spot stakes)

1109: Staked NE Corner of Grid 30 White/Pink Flag
Staked NE Corner of Grid 24 "
Staked NW Corner of Grid 22 "

1120 Staked SW Corner of Grid, 62 "
Staked SE Corner of Grid 65 "

1133 Staked SE Corner of Grid 61 "
Staked NE Corner of Grid 38 "

1135 Break for Lunch will Resume at Area 200 Firing Range at 1245-100

1240 Hiking into 300 Area F.R. (Roads Washed Out) Southern end

1317 Grids not lining up correctly! PB 9-16-19 PB 9-16-19

1341 Tentatively Marked: 41SW, 42SW, 43SW, 43SE, ~~Illegible~~ 39SE, 28SE, 15SE, 7SW, 6SW
Need to verify layout Moving on to WB-2 Firing Range

1400 Arrived at WB-2 Firing Range
9-16-19

1415 Tentatively Marked: 31NE, 32NE, 47SE, 57SE
9-16-19

1433 Grids not lining up correctly! Wrapping up, will send map points to Nicki to geolocate ~~from~~ points onto maps to verify grid locations on maps.
PB 9-16-19

1441 Back at the office will consult with Kyle.

Continued on Page

Read and Understood By

J. Boken 9-16-19 — Signed / Date

Signed 9-17-19 — Signed / Date

0700: K. Williams coordinates w/ T. Kondy + M. Avo to meet at STGT Firing Range.

0740: All arrive at STGT. Tailgate H+S, uneven walking surfaces & gaiters. Setting up to collect samples. Phillip Bolen on site 0840

Time	Grid	Quad.	Sample No.	Analysis	Jo6
0755	38	3	1909170755	6010 Metals	SCMI
0805	6	1	1909170805	(no preservative)	
0810	12	4	1909170810		
0813	18	2	1909170815		
0820	19	4	— 0820		
0825	20	2	— 0830		
0835	21	3	— 0835		
0840	61	4	— 0840		
~~0846~~	5	1	— ~~0846~~ KW 0850		
0855	11	1	— 0855		

KW - wrong location

0930: Nick Balog checked staked locations and determined that the grid centers are staked instead of grid corners. Therefore the 10 samples collected were from the wrong locations. Will dispose of collected samples and begin sampling the correct locations. Will return collected samples to original locations.

Grid	Quad.	Sample No.	Analysis	Preservative	Job #
38	3 + KW 1		6010 metals	ice	SCMI
KW ~~5~~ 6	1				
KW ~~12~~ 11	~~1~~ KW 1				
KW ~~18~~ 17	~~2~~ KW 1				
19	4				
20	2				
21	3				
6	1				
12	4				
18	2				

(10 Primary)

Continued on Page

1125: Tech wrapped up and off to lunch. Done for the day.

Read and Understood By

T. Balog — Signed — 9-17-19 — Date

T. Kondy — Signed — 9-18-19 — Date

0700 Meet up with Jim Kondy & Marcus Avalos
0705 Techs off to gas up truck.
0710 Phillip Bolen of STGT site
0725 Techs on site rigging up. Tail Gate Safety Brief
0734 Field Blank - - - - - - - -> Grid 1 Quad 2 Sample# 190918 0735

Grid #:	Quad:	Sample#:	Analysis:	Preservative:	Job #:
			6010 Metals	Ice	SCMT
1	2	190918 0745	"	"	"
1	2 (Duplicate)	190918 0746	"	"	"
7	4	190918 0800	"	"	"
13	3	190918 0805	"	"	"
2	3	190918 0815	"	"	"
8	1	190918 0870	"	"	"
14	2	190918 0830	"	"	"
14	2 (Duplicate)	190918 0831	"	"	"
3	3	190918 0835	"	"	"
9	3	190918	"	"	"
15	4 (Matrix)	190918 0844 PB 9/19	"	"	"
15	4	190918 0845 PB 9/19	"	"	"
15	4 (Field Blank)	190918 0847	"	"	"
4	2	190918 0850	"	"	"
10	4	190918 0855	"	"	"
16	1	190918 0900	"	"	"

915 Range Floor Complete (10 min break for water & shade) PB 9/19

Grid #	Quad #:	Sample #	Analysis:	Preservative:	Job #:
			6010 Metals	Ice	SCMT
37	1	190918 0930	"	"	"
36	2	190918 0935	"	"	"
35	3	190918 0945	"	"	"
35	3 (Duplicate)	190918 0946	"	"	"
34	2	190918 0950	"	"	"
33	1 (Matrix)	190918 1001	"	"	"
33	1	190918 1000	"	"	"
33	1 (Field Blank)	190918 1002	"	"	"
32	3	190918 1010	"	"	"
31	3	190918 1020	"	"	"
25	3	190918 1030	"	"	"

Continued on Page 91 PB 9/19

Read and Understood By

P. Bolen — Signed — 9-18-19 Date

[signature] — Signed — 9-18-19 Date

1026 Continued Soil Sampling 9-18-19

Grid #	Quad #:	Sample #:	Analysis:	Preservative:	Tab #
26	4	1909181035	6010 Metals	Ice	SCMS
27	1	1909181045	"	"	"
27	1 (Duplicate)	1909181046	"	"	"
28	1	1909181055	"	"	"

1105 Wrapping up, Picking up done sampling for the day.

1107 Techs off site enroute to Building 537 to store samples & decon.

Summary for the day: Soil sampling of STGT Firing range and surrounding fallout area. 32 total samples (3 Field Blanks, 3 Duplicates, 2 Matrix spikes, 24 discreet). Firing range floor complete in Northernmost lagoon. Most of Northern fallout zone.

Goal for tomorrow: Continue sampling Firing range (STGT) area. Attempt to complete the remaining areas available. Grab sample 9-3 which was missed.

23 Primary,
4 Duplicates,
2 Field Blanks,
2 Matrix Spike.

R. Baker 9-18-19

Continued on Page

Read and Understood By

R. Baker 9-18-19
Signed Date

Signed Date 9-18-19

1245: Williams, Kondy, Garcia, Torres meet at STGT to resume sampling.

Williams locating sampling locs. Kondy/Garcia collecting samples. Torres logging samples, labelling, int. COCs.

Grid	Quad	Sample No.	Analysis	Pres.	Lab
22	1	190924 1305	6010 Metals	Ice	SLMT
23	4	— 1315	"	"	"
24	2	— 1322	"	"	"
29	4	— 1327	"	"	"
30	4	— 1332	"	"	"
	1 → FB	— 1333	"	"	"
43	2	— 1340	"	"	"
	1 → MS	— 1341	"	"	"
42	4	— 1346	"	"	"
41	1	— 1351	"	"	"
40	1	— 1355	"	"	"
50	1 Dup	— 1356	"	"	"
39	1	— 1405	"	"	"
44	4	— 1415	"	"	"
45	4	— 1421	"	"	"
46	1	— 1430	"	"	"
47	4	— 1435	"	"	"
48	1	— 1440	"	"	"
	1 → FB	— 1441	"	"	"
53	3	— 1445	"	"	"
52	3	— 1450	"	"	"
	3 → Dup.	— 1451	"	"	"

1500: Shift end, stop for the day.

Summary: Collected 17 primary, 2 FB, 2 Dup, 1 M.S.
STGT Totals: 50 primary, 4 FB, 6 Dup, 3 M.S.
Resume soil sampling on Thursday 9-26-19.

Continued on Page

Read and Understood By

Signed — Date 9-24-19 — Signed — Date 9-26-19

PROJECT STGT Firing Range Sampling 9-26-19

Notebook No. FR Book #1

Continued from Page _____

Weather: Clear, Calm, 64° Objectives: Try to finish out STGT sampling today

0750 Philip Bolen on site. Techs gathering gear, should be along shortly. Getting ovens

0815 Techs: Tim Kondy & Marcos Avalos (#Al) (#Montez) on site

0820 Tailgate safety briefing. Loose soil, slips, snakes

0825 Rig up & begin sampling

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Job #:
58	3	190926 0840	6010 Metals	Ice	SCMT
57	1	190926 0847	"	"	"
56	4	190926 0852	"	"	"
55	4	190926 0858	"	"	"
54	3	190926 0904	"	"	"
49	3	190926 0911	"	"	"
50	3	190926 0918	"	"	"
51	1	190926 0924	"	"	"
65	1	190926 0944	"	"	"
65 MS.	1	190926 0945	"	"	"
64	2	190926 0951	"	"	"
64 Duplicate	2	190926 0952	"	"	"
64 Field Blank	2	190926 0953	"	"	"
63	3	190926 1000	"	"	"
67	1	190926 1007	"	"	"

1030 STGT sampling finished for the day. Rigging down, picking up. Techs off to store samples and decon equipment and dispose of waste. Sampling will resume after safety stand-down ~1230 at 200 Area Firing range.

1032 Philip Bolen off site. (#M)

Today: 12 Primary samples Totals: 62 Primary, 5 Field Blanks, 7 Duplicates, 4 Matrix Spikes

1 Duplicate

1 Field Blank

1 Matrix Spike

T. Bolen 9-26-19

Continued on Page

Read and Understood By

T. Bolen 9-26-19 Signed Date

Signed 10-1-19 Date

0800: Begin sampling of 200 FR Area. Weather: Sunny, warm & breezy ~90°
~~9-27-19~~ mb
9-26-19

0835 Tim Kondi, Al Montez, Phillip Bolen on site

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Lab #:
3	3	190926 1342	6010 Metals	Ice	SCMT
4	3	190926 1346	"	"	"
5	4	190926 1350	"	"	"
6	1	190926 1356	"	"	"
9	2	190926 1402	"	"	"
10	3	190926 1410	"	"	"
11	1	190926 1415	"	"	"
17	1	190926 1420	"	"	"
18	3	190926 1425	"	"	"
19	4	190926 1435	"	"	"
19	4 (Duplicate)	190926 1436	"	"	"
19	4 (Field Blank)	190926 1437	"	"	"
					PB ✓

1450 Techs had to go, rigged down packed up, off site.

1500 Marked off last grid completed, flagged off some of next rows for tomorrow.

1520 Phillip Bolen packed up, off site.

Summary for the day: Finished out STGT FR before lunch. After lunch started 200 Area FR. Worked up from Arroyo to Grid #20, stopped for the day

Todays (200 FR) samples:
Primary Samples: 10
Duplicate Samples: 1
Field Blank: 1

200 FR Total Samples:
Primary Samples 10
Duplicate Samples 1
Field Blanks 1
Matrix Spike 0

Goal for tomorrow: Aim to finish off sampling of 200 Area FR. If time pack samples for shipping.

Continued on Page

Read and Understood By

T. Bolen — Signed — 9-26-19 — Date

Signed — 10-1-19 — Date

Weather: Clear, calm, cool ~60° Phillip Boken, Tim Handy, Tony Torrez 9-27-19

Objectives: Collect samples for 200 Area FR, continued (soil samples)

0749 Phillip Boken on site. Techs finishing up getting gear, should be along shortly.

Tailgate safety briefing: Hiway hazards, steep slopes.

Rig up begin soil sampling for the day.

Grid #:	Quad #:	Sample #:	Analysis:	#8 Preservative: Preservative	Job #:
31 30	2 3	190927 0805	6010 Metals	Ice	SCMT
31	2	190927 0812	"	"	"
32	3	190927 0818	"	"	"
33	4	190927 0823	"	"	"
34	1	190927 0830	"	"	"
35	3	190927 0838	"	"	"
36	2	190927 0846	"	"	"
37	2	190927 0855	"	"	"
26	2	190927 0915	"	"	"
21	1	190927 0922	"	"	"
21 Dup	1	190927 0923	"	"	"
21 F.B.	1	190927 0925	"	"	"
21 M.S.	1	190927 0924	"	"	"
22	1	190927 0932	"	"	"
23	3	190927 0938	"	"	"
1	3	190927 0945	"	"	"
2	1	190927 0951	"	"	"
24	4	190927 1000	"	"	"
25	2	190927 1006	"	"	"
26	3	190927 1015	"	"	"
27	4	190927 1024	"	"	"
27 Dup.	4	190927 1025	"	"	"
27 F.B.	4	190927 1026	"	"	"

1030 Techs packing up off site. Training class.

1045 Phillip Boken marking end point. Flagging location for next sampling day.

1100 Phillip Boken off site.

Continued on Page 95

Read and Understood By

P. Boken 9-27-19
Signed Date

Signed 10-1-19
Signed Date

Summary for the day: Sampled ~3/4 of 200 Area F.R. total now. Techs had to leave at 1030 for class and lunch. No sampling scheduled for the afternoon. Samples collected will be packed for shipping this afternoon.

Objective for not scheduled day: ~15 more grids left to sample in the 200 Area F.R. Will finish these thus finishing sampling for this area.

Todays Collected Samples (200 Area F.R.): 18 Primary Samples
2 Duplicate Samples
2 Field Blank Samples
1 Matrix Spike Sample

Total Collected Samples for 200 Area F.R.: 28 Primary Samples
3 Duplicate Samples
3 Field Blank Samples
1 Matrix Spike Sample

9-27-19 T. Bath

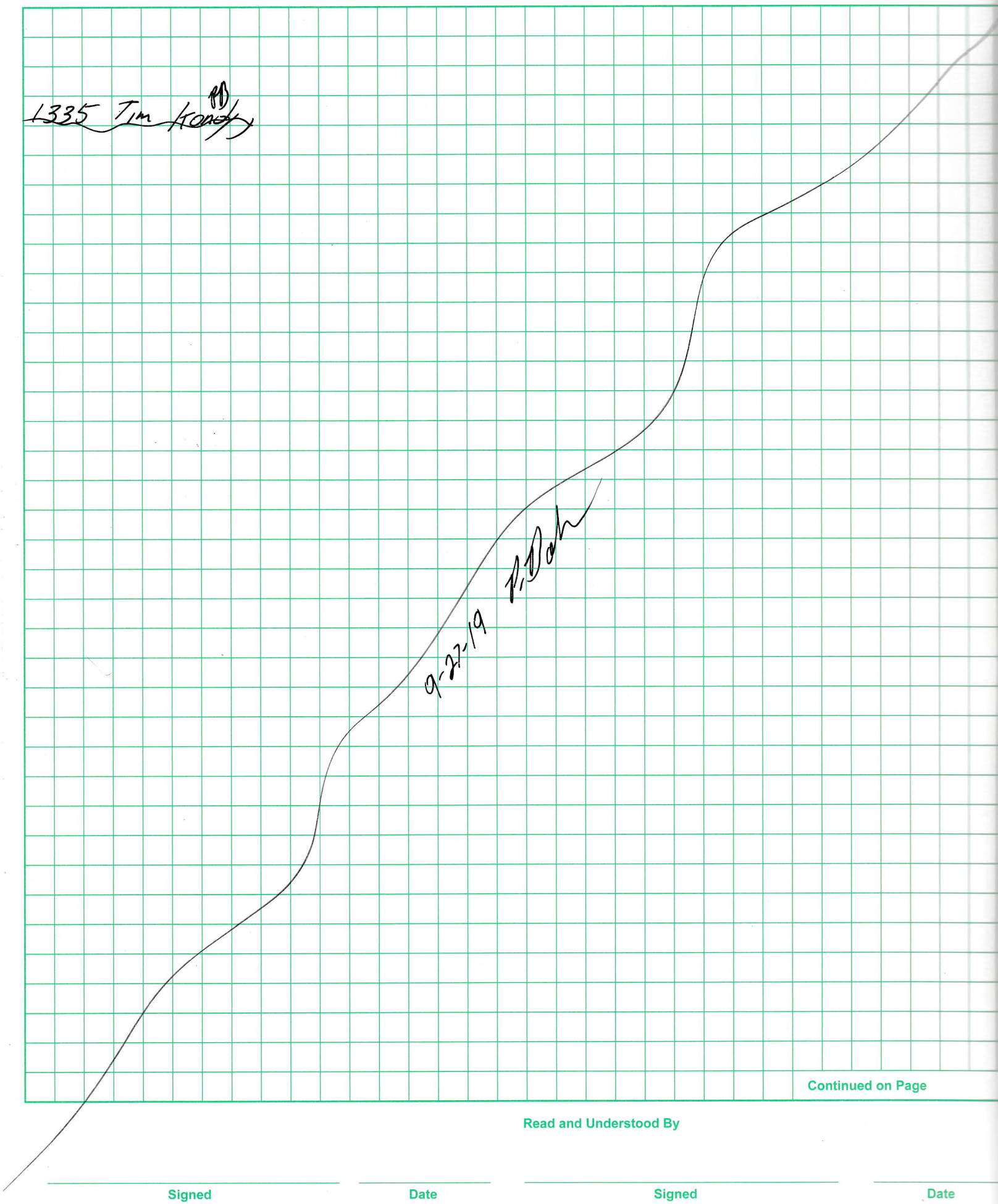
Continued on Page

Read and Understood By

T. Bath 9-27-19
Signed Date

[signature] 10-1-19
Signed Date

1335 Tim Kordy PJ



Continued on Page

Read and Understood By

Signed _____ Date _____ Signed _____ Date _____

Weather: Slightly cloudy, calm ~68° Phillip Boken, Mike Kondy, Marcus Anders
Chance of storms in afternoon 9-30-19
Objectives for today: Finish sampling of 200 Area Firing Range soils.

0748 Phillip Boken on site.
0805 Techs on site forgot notebook back to Area 631
0823 Techs back rigging up setting up.

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Job #:
41	3	1909300840	6010 Metals	Ice	SCMI
42	4	1909300855	"	"	"
43	1	1909300906	"	"	"
44	1	1909300918	"	"	"
40	2	1909300932	"	"	"
39	1	1909300949	"	"	"
38	1	1909301013	"	"	"
28	3	1909301024	"	"	"
29	2	1909301040	"	"	"
29 Matrix Spike	2	1909301041	"	"	"
16	3	1909301054	"	"	"
16 Duplicate	3	1909301056 55 PD 12-1-19	"	"	"
16 Field Blank	3	1909301057 56 FB 12-1-19	"	"	"

1057 Breaking for lunch, techs packing up, heading out.
1103 Phillip Boken off site.
1305 Resume Final Sampling.

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Job #:
15	2	1909301315	6010 Metals	Ice	SCMI
7	1	1909301325	"	"	"
6	4	1909301333	"	"	"
14	1	1909301340	"	"	"
13	3	1909301347	"	"	"
12	2	1909301355	"	"	"

FB ~~1305~~

1405 Area 200 FR Soil Sampling complete.

Continued ~~from~~ on page 2

Read and Understood By

T. Boken 9-30-19 Signed Date

[signature] 10-1-19 Signed Date

1415 Techs rigged down pickup. OEE to Area 637 to decon and store samples
1417 Phillip Boken off site.

Summary for the day: Completed soil sampling of Area 200 Firing Range.

Todays (200 FR) samples:

Primary Samples: 16
Duplicate Samples: 1
Field Blanks: 1
Matrix Spikes: 1

Total (200 FR) samples:

Primary Samples: 44
Duplicate Samples: 4
Field Blanks: 4
Matrix Spikes: 2

Objectives For tomorrow: Begin sampling of WB-2 Firing Range

9-30-19 P. Boken

Continued from page

Read and Understood By

P. Boken — 9-30-19 — 10-1-19

Signed — Date — Signed — Date

~~Weather~~ 10-1-19 Weather: Mostly Cloudy 68° Calm, 20% Chance rain. 10-1-19

Phillip Boles, Tim Handy, Marcus Avalos

Objectives: Begin sampling of LWB-2 Firing Range.

745 Phillip Boles & Techs on site
750 Tail ~~Gate~~ Safety Meeting.

Square:	Quad:	Sample #:	Analysis:	Preservative:	Job #:
			6010 Metals	Ice	SCMI
38	3	191001 0834	"	"	"
39	2	191001 0840	"	"	"
40	4	191001 0847	"	"	"
41	4	191001 0902	"	"	"
42	4	191001 0911	"	"	"
43	4	191001 0919	"	"	"
44	4	191001 0930	"	"	"
45	2	191001 0944	"	"	"
45 Duplicate	2 10-1-19	191001 0945	"	"	"
45 ~~Matrix Spike~~	2 Field Blank	191001 0946	"	"	"
46	2	191001 1010	"	"	"
47	3	191001 1017	"	"	"
37	3	191001 1024	"	"	"
32	3	191001 1032	"	"	"
31	1	191001 1039	"	"	"
36	3	191001 1044	"	"	"
35	3	191001 1050	"	"	"

1100 Techs off to lunch, used/lost of 4oz bottles. Will bring out 8oz. jars to continue sampling after lunch. Packing up.

1105 Phillip Boles & Techs off site. Will return 1230-1245 to resume soil sampling.

10-1-19 P. Boles

Continued ~~from~~ on page 4

Read and Understood By

P. Boles 10-1-19
Signed Date

Signed Date

PB 10-3-19

PROJECT ~~200 Area Firing Range~~ WB-2 Firing Range

Notebook No. FR Book 2

Continued from page 3

1310 Onsite w/ Techs. Rigging up
1319 Beginning sampling for afternoon.

Grid #:	Quad #:	Sample #:	Preservative: Ice	Analysis: 6010 Metals	Job #: SCMT
34	2	191001/1323	"	"	"
33	4	191001/1330	"	"	"
57	2	191001/1338	"	"	"
57 Duplicate	2	191001/1339	"	"	"
57 Field Blank	2	191001/1340	"	"	"
56	1 10-1-19 PB	191001/1347 10-1-19	" 10-1-19 PB	" 10-1-19 PB	" 10-1-19 PB
~~56 Matrix Spike~~	~~1 PB~~	~~191001/1353 PB~~	~~" PB~~	~~" PB~~	~~" PB~~
55	3	191001/1353	"	"	"
55 Matrix Spike	3	191001/1354	"	"	"
54	2	191001/1400	"	"	"
53	1	191001/1410	"	"	"
66	3	191001/1415	"	"	"
65	2	191001/1435	"	"	"

1437 Finished sampling for the day. Techs rigging down headed to decon @ 637 and store samples.
1445 Phillip Baker and Techs off site for the day.

Summary: Began sampling of WB-2 Firing Range. ~1/3 completed.

Objectives for tomorrow: Continue with WB-2 Firing Range Soil sampling.

Todays WB-2 FR Samples:

Primary Samples:	24
Duplicates:	2
Field Blanks:	2
Matrix Spikes:	1

Total WB-2 FR Samples:

Primary Samples:	24
Duplicates:	2
Field Blanks:	2
Matrix Spikes:	1

P. Baker 10-1-19

Continued from page

Read and Understood By

P. Baker — Signed — 10-1-19 Date

Signed — 10-1-19 Date

PB 10-3-19

PROJECT ~~700 Area Firing Range~~ WB-2 Firing Range

Notebook No. FR Book 2 5

Continued from page

Weather: Partly Cloudy 68° Calm Chance of storms in the afternoon.

10-2-19

Phillip Bolen, Tim Handy, Marcus Avalos

0750 All above onsite Tailgate Safety briefing & Rigging Up

Sad #:	Quad #:	Sample #:	Preservative:	Analysis:	Job #:
64	2	191002 0810	Ice	6010 Metals	SCMT
63	2	191002 0815	"	"	"
62	1	191002 0823	"	"	"
61	4	191002 0832	"	"	"
61 Duplicate	4	191002 0833	"	"	"
61 Field Blank	4	191002 0834	"	"	"
60	3	191002 0842	"	"	"
59	2	191002 0850	"	"	"
58	4	191002 0900	"	"	"
72	2	191002 0920	"	"	"
71	3	191002 0924	"	"	"
70	4	191002 0930	"	"	"
69	4	191002 0936	"	"	"
68	4	191002 0945	"	"	"
67	1	191002 0951	"	"	"
30	1	191002 1020	"	"	"
30 Duplicate	1	191002 1021	"	"	"
30 Field Blank	1	191002 1022	"	"	"
29	4	191002 1026	"	"	"
28	3	191002 1034	"	"	"
24 Matrix Spike	3	191002 1035	"	"	"
27	3	191002 1043	"	"	"
26	1	191002 1050	"	"	"

1055 Breaking for lunch. Techs picking up, ~~rigging~~ PB 10-2-19 rigging down.

1100 Techs off site. Phillip Bolen flagging last location & next row

1110 Phillip Bolen off WB2 FR site for lunch.

10-2-19 P. Bolen

Continued ~~from~~ on page 6

Read and Understood By

P. Bolen — Signed — 10-2-19 — Date

[signature] — Signed — 10-2-19 — Date

PB-10-3-19

PROJECT ~~200 Area Firing Range~~ WB-2 Firing Range

Notebook No. FR Book #2

Continued from page 5

1300 Phillip Bolen on WB-2 site.
1309 Techs on site, rigging up setting up.

Square #:	Grid #:	Sample #:	Preservative:	Analysis:	Jar #:
25	1	191002-1315	Ice	6010 Metals	500
24	1	191002-1321	"	"	"
23	3	191002-1327	"	"	"
22	4	191002-1335	"	"	"
21	3	191002-1345	"	"	"
20	3	191002-1400	"	"	"
20 Duplicate	3	191002-1401	"	"	"
20 Field Blank	3	191002-1402	"	"	"

1400 Finished with soil sampling for the day. Techs rigging down & packing up.

1410 Phillip Bolen & Techs off WB-2 FR site. Heading to Area 637 to prep and pack samples for shipment.

Summary for the day: Continued soil sampling at WB-2 Area Firing Range

Objectives for Tomorrow: Finish up with soil sampling at WB-2 Area Firing Range

Todays WB-2 FR Samples: 24 Primary Samples
3 Duplicates
3 Field Blanks
1 Matrix Spike

Total WB-2 FR Samples: 48 Primary Samples
5 Duplicates
5 Field Blanks
2 Matrix Spikes

10-2-19 P. Bolen

Continued from page

Read and Understood By

P. Bolen — Signed — 10-2-19 Date

Signed — 10-2-19 Date

10-3-19

Weather: Cloudy, Calm possible showers later. ~67°

10-3-19 PB (Auditor) ~~(Auditor)~~

Tim Kandy Marcus Avalos Techs. Phillip Boleu site Supervisor. Roy Spencer

~~0805~~ 10-3-19 0900 All on site. Rigging up, held Tailgate safety briefing.

Square #:	Grid #:	Sample #:	Preservatives:	Analysis:	Job #:
			Ice	6010 Metals	SCMT
19	3	19100308O2	"	"	"
18	2	19100308O8	"	"	"
17	2	19100308I4	"	"	"
16	4	19100308I2	"	"	"
15	3	19100308I0	"	"	"
14	2	19100308I6	"	"	"
13	3	19100308I8	"	"	"
13 Matrix Spike	3	19100308I9	"	"	"
12	4	19100309O4	"	"	"
11	3	19100309I4	"	"	"
10	3	19100309I7	"	"	"
10 Duplicate	3	19100309I8	"	"	"
10 Field Blank	3	19100309I9	"	"	"
9	1	19100309I8	"	"	"
8	3	19100309I7	"	"	"
7	3	19100310O0	"	"	"
6	3	19100310I0	"	"	"
5	3	19100310I6	"	"	"
4	4	19100310I5	"	"	"
3	4	19100310I53	"	"	"
3 Matrix Spike	4	19100310I54	"	"	"

1105 Breaking for lunch. Will return after lunch to finish last 2 off site.

P. Boleu 10-3-19

Continued ~~from~~ on page 7

Read and Understood By

P. Boleu — Signed — 10-3-19 — Date

Signed — 10-8-19 — Date

Phillip Boles, Techs: Tim Handy & Marcus Avalos

1305 Onsite to take last 2 soil samples. Reed Elliot joining us for pictures. Take photographs. Rigged up tools, last 2 samples & pictures.

Square #:	Quad #:	Sample #:	Preservative:	Analysis:	Jar:
2	3	191003 1325	Ice	6010 Metals	SOIL
1	2	191003 1335	"	"	"
1 Duplicate	2	191003 1336	"	"	"
1 Field Blank	2	191003 1337	"	"	"

1340 Phillip Boles, Tim Handy, Marcus Avalos picking up, rigging down.
1345 Phillip Boles, Tim Handy, Marcus Avalos, Reed Elliot left WB-2 FR site.

Summary: Completed soil sampling of WB-2 Area Firing Range.

Todays WB-2 FR Samples: 19 Primary Samples
2 Duplicate Samples
2 Field Blank Samples
2 Matrix Spikes

Total WB-2 FR Samples: 67 Primary Samples
7 Duplicates
7 Field Blanks
4 Matrix Spikes

P. Boles 10-3-19

Continued from page

Read and Understood By

P. Boles — Signed — 10-3-19 — Date
T. Handy — Signed — 10-8-19 — Date

Weather: 37° Cold, Clear & Sunny. Should warm up later. 11-13-2019

Objective: Ammo recovery at STGT south lagoon berm. Don't anticipate many recoveries. Not many hits when checked earlier.

0753 P. Bolen on site. Setting up, waiting up T5B.

0800 Techs on site. Tim Kandy, Tony Tocci.

Gave them tasks memo & stickers, ~~dispatch~~ 11-13 disposal/ books, stickers. Went to get buckets for recovered ammo.

0810 Made a couple passes near NE end of south STGT lagoon berm. No hits don't think we're going to be finding many bullets at ~~range~~ 11-13 or fragments?

0845 Found 2 scraps so far. Scanning top side of berm from north to south.

0930 Walked berm top south to end of southmost lagoon. Only 3 fragments recovered so far.

1000 1 more bullet recovered along top road between berms (northmost).

1030 1 more fragment recovered at top of berm edge NE edge (northmost).

1055 Recovered 3 more fragments so 5 total recovered. Recovered near gate at top of berm road NE corner.

1115 No more detector hits since last @ 1055. Packing up techs heading off site to decon and head to lunch.

1120 Philip Bolen off site to lunch.

1240 P. Bolen, T. Kandy, T. Tocci back on site will start by ~~sweep~~ 11-13 surveying 66, 71, 76 grids in northmost lagoon that has yet to be surveyed.

1400 4 more scraps collected so far 66, 71, 76 completed. Moving on to 67, 72, 77

1510 2 more scraps recovered. First sweep of west side of 67, 72, 77 complete.

1515 Techs packing up heading off site. 15 bullets/fragments recovered total for the day.

1520 P. Bolen packed up heading off site.

Summary for the Day: Surveyed with metal detector grids 48 & 53 along berm top NE of STGT lagoons. Completed cells 66, 71, 76 inside lagoon. Made first sweep of cells 67, 72, 77.

Fragments/Bullets Recovered: 15

Continued from page ~

Read and Understood By

T. Bolen	11-13-19		4/13/2020
Signed	Date	Signed	Date

PROJECT STGT Firing Range

Notebook No. FR Book #2

Continued from page

Weather: 39° Clear & Cold. Suppose to warm up later however. 11-14-2019

0715 P. Baker on site. Techs: Tim Handy, Tony Torrez
Objective: Continue bullet recovery at STGT Firing Range - Southern Lanes.

0720 Techs on site. Conducted TSB. Begin surveying for the day.

0900 67,72,77 grids surveyed. 5 Fragments/bullets recovered so far today. Now going to survey grids 68,73,78 for ammo scrap.

1040 Almost completed grids 68,73,78. Found 4 more scraps so far.

1110 Collect 10 Fragments/bullets so far for the day. Almost through grids 68,73, 78

1115 Breaking for lunch. Packing up. Will return after lunch & Safety Meeting. Techs at site. P. Baker packing up.

1120 P. Baker heading off site for lunch / safety meeting as well.

1330 P. Baker, T. Handy, T. Torrez back on site to resume bullet recovery survey.

1420 ~~Almost completed~~ 11-14 68,73,78 completed. Almost completed 69,74,79
No new scraps or bullets recovered from 68,73, or 78. No fragments or bullets found so far on grids 69,74 & 79. Found a few Aluminum cans but that's been it.

1505 Techs packing up and heading off site. Grids 69,74 & 79 completed. No new scrap or bullets identified or recovered.

1540 P. Baker packing up and preparing to head off site for the day. Conclusion of survey for the week - will resume monday with Grids # 70,75,80

Summary for the day: Completed survey of grid #s.
67,72,77,68,73,78,69,74,79,
10 new bullets/fragments collected today

Total collected: 25

No fragments/bullets found in grids #. 69,74 & 79. Will resume monday with Grids # 70,75,80.

T. Baker 11-14-19

Read and Understood By

T. Baker 11-14-19 — Signed / Date

Signed 4/13/2020 — Date

Weather: Clear, Cool 44°. Should warm up to mid 70s. 11-18-19

Objective: Continue if Try to finish bullet recovery today. (STBT & WB-2)

0715 P. Baker onsite. Techs on site Techs: Tim Handy Tony Torres

0720 TSB, Rigging up to begin recovery.

0815 70,75,80 almost completed. 1 Bullet recovered @ 70. Fake bits of wire, cans seem more common in the eastern rows.

0930 70,75,80 Completed. 19,20,21 grids #s almost complete. No fragments or bullets recovered.

1000 Grids 19,20,21 completed. Several cans discovered, no bullets or fragments at ammo recovered. Stacking grids #59,60,61.

1055 About half way through grids #59,60,61 no bullets or fragments recovered. Couple pieces of bark wire 1 pull tab found.

1105 Packing up/picking up for lunch. Techs off site. Will come after lunch and complete grid #s 59,60,61. Then move over to WB-2 firing range for rest of afternoon.

1110 P. Baker off site, Headed to office.

1240 P. Baker back at STBT. Reed Elliot should be along soon to take some official pictures of the survey and recovery process.

1245 Techs on site. Preparing to finish out STBT bullet recovery. Reed Elliot on site.

1320 Completed 59,60,61 survey of STBT site for bullet/fragments complete.

1330 Heading over to WB-2 firing range for bullet recovery.

1330 P. Baker at WB-2 gate waiting on techs.

1335 Techs on site cleared to enter WB-2. Heading to survey site

11-19

1340 Received call that security needs to use firing range. Will have to try to complete WB-2 bullet/fragment recovery tomorrow. Vacating firing range. Headed back to the office.

Summary for the day: Completed survey of STBT site for recoverable bullets. Found 1 bullet in grid #70.

Total for day: 1

total collected from STBT site: 26

Hope to start→finish bullet recovery tomorrow. Start soil sampling of STBT southern lagoons later tomorrow as well if possible.

Continued from page

Read and Understood By

K. Baker	11-18-19		4/13/2020
Signed	Date	Signed	Date

12

PROJECT Firing Ranges

Notebook No. FR Book #2

Continued from page _____

Weather: Clear / Cool / 65° Chance of showers increasing later in the day. Breezy. 11-19-2019

1230 P. Bolen on site @ STGT lagoons. Setting up will start with square #70.

1245 Techs on site Techs: Tim Handy, Al Montez Conducted TSB.

Analysis: #19119125~~4~~/115, 6010 Metals, Ice HNO_3, 125 ml poly, SCMT

Square #:	Dead #:	Sample #:	Preservative:	Analysis:	Job #:
70	3	191191257	Ice	6010 Metals	SCMT
~~63~~ 69	~~3~~ 4	191191301	"	"	"
68	3	191191306	"	"	"
67	2	191191311	"	"	"
66	4	191191316	"	"	"
71	2	191191323	"	"	"
72	4	191191330	"	"	"
72 Duplicate	4	191191331	"	"	"
73	3	191191334	"	"	"
73 Matrix Spike	3	191191335	"	"	"
74	1	191191339	"	"	"
75	3	191191342	"	"	"
9	3	191191349	"	"	"
59	1	191191355	"	"	"
59 Field Blank	1	191191356	"	"	"
60	4	191191401	"	"	"
61	4	191191405	"	"	"
80	1	191191407	"	"	"
79	2	191191410	"	"	"
78	3	191191414	"	"	"
77	3	191191418	"	"	"
76	3	191191422	"	"	"

1430 Soil sampling of STGT Firing Range completed. P. Bolen, T. Handy, A. Montez packing up. Techs headed to 637 to stage samples and decon.

Summary for day: Finished soil sampling of STGT Firing range. All soil samples complete.

Samples Collected Today: Primary: 19
Duplicates: 1
Matrix Spike: 1
Field Blanks: 1

Total Samples Collected (STGT): Primary: 80
Duplicates: 8
Matrix Spike: 5
Field Blanks: 6

Continued from page

Read and Understood By

P. Bolen — Signed — 11-19-19 — Date

Signed — 4/13/2020 — Date

Weather: Cloudy, Cool 53° Rain the night before. Might rain more later today. 11-20-2019

0720 P. Balen, T. Conley, Al Montez on site @ WB-2 Firing range to complete bullet recovery. Reed Elliot joining us later for official photographs.

0725 Rigging up conducted Tailgate Safety Briefing - Going to begin recovery

0800 Started ~ 30 bullets just exposed on the surface so far. Going to continue recovering the ones that are visible then after it appears those are collected going to move on to using metal detector over the area.

0900 ~30+ more recovered on the surface. (visible to the eye). Taking 10 min break to warm up tired eyes.

1100 Counted how many bullets/fragments collected so far.: 140+84=224 collected so far. Security arrived to the range for an hour or two. Packing up. Techs off site. P. Balen packing up.

1105 P. Balen off site. Will try to resume collection after lunch. (So far, surface picked visible ammunition of ~4'x8' truck)

1240 P. Balen on site at WB-2 gate.

1245 Techs on site. Were given cleared to enter. Going to resume ~~sampling~~ survey.

1345 Frank Gallegos on site Truck 1903 was ready headed back to swap trucks.

1355 P. Balen back on site in 1903. Reed Elliot on site for official pictures.

1400 R. Elliot taking procedural photos. Continue bullet recovery.

1415 R. Elliot off site. Continuing with bullet location & recovery.

1500 Finished with bullet recovery for the day. Counting # recovered this afternoon. 114 more recovered this afternoon. ~1/2 of intended survey area covered. Will continue

1505 Techs packing up to head off site to dispose of todays recovered ammunition.

1510 Techs & P. Balen off site for the day.

Total bullets/ammo scrap recovered: 338

Summary for the day: Collected visible ammo scrap on the surface. Then began survey with metal detector. Covered ~1/3-1/2 of range floor in front of old WB-2 firing range berm. Collected 338 bullets/ammo scrap. Goal for tomorrow: Aim to finish final bullet/ammo recovery of WB-2 firing range.

Read and Understood By

T. Balen — Signed — 11-20-19 — Date

J. Williams — Signed — 4/13/2020 — Date

Weather: Mostly Cloud 54°, Possible Rain later. 11-21-2019

~~#8~~ #20 P. Baker & Tim Kemp, Al Montez on site.

Objectives: Continue bullet recovery.

0725 Rigging up conduct TSB continue with bullet recovery.

0750 Taking 10 min break. Quite a few bullets recovered, seems there are still quite a few in the ground at the foot of the berm. Techs off site. T. Kemp needed to use restroom.

0905 Techs back side side. Going to continue bullet recovery.

0935 Batteries ran out on metal detector. P. Baker to the office to get more

0945 P. Baker back on site with new batteries. ~~to~~ Changing batteries and resuming bullet recovery.

1100 Stopping for the morning. Counting bullets recovered for the day so far. 192 bullets/ammo scrap recovered so far today.

1105 Picking up rigging down till later. Techs off site to dispose of bullets collected so far and then off to lunch.

1110 P. Baker off site. Called us out, & secured gate.

Summary for the day: Almost completed 1st pass of floor area along the base of WB-2's old firing range berm. Still recording alot of hits even after first pass.

Total Bullets/scrap recovered for the day: 192

Total bullets/scrap recovered so far: 530

Goals for the future: Talk with Kyle Williams & or Troy Weaver about the possibility of just removing the rest of the old WB2 berm and scraping the berm floor adjacent. Still appears that there are a lot of bullets & scrap still to be recovered. In lieu of that will continue next week with ammo/scrap recovery.

P. Baker 11-21-19

Continued from page

Read and Understood By

P. Baker — 11-21-19
Signed — Date

Signed — 4/13/2020
Signed — Date

Weather: Cold mostly sunny 47° 12-12-2019

Objective for the day: Soil Removal of ammo fragments at WB2 Firing range. Try to limit as much as possible soil removal. Using metal detector to confirm scrap removal.

0845 Phillip Bolen on site. Facilities should be along shortly.

0915 Danny Hinojos & Mitch on site with Backhoe. Beginning grubbing.

0930 Tim Kontz & Al Mantez on site with 4 big super sacks. Unloaded first supersack.

0945 T. Kontz & A. Mantez off site. Beginning soil removal. Going 4-6 inches deep only. Scraping & scooping from south end in front to start.

1030 Filled 3 supersacks so far. Danny Hinojos off site to grab 2 more along with pallet. Having to go deeper to 6in. still getting some detections

1045 Danny Hinojos back at WB2 Firing range site. Set up 4th supersack and pallet to fill. May need the 5th also we shall see. Need to get with Brian Barcick for documentation. (will try at lunch).

1100 Danny Hinojos & M getting ready to head off site for lunch. Will complete soil removal after lunch.

1245 Back on site with Danny Hinojos & Mitch resuming soil removal. Need to make sure wrapped up for the day at ~~12~~ 1415 so we have time to clean Backhoe. 4 supersacks filled up so far.

1300 Soil recovery complete. Backhoe off site to clean pad at 637. Brian Barcick on site to look over activities. P. Bolen & B. Barcick sealed and tied off supersacks.

1345 Danny Hinojos & Mitch back on site to load supersacks for transport to CSU location for storage.

4 Logbooks. Contains #8717 ~1yd³
#9357 ~1yd³
#8716 ~1yd³
Need logbook from B. → #9358 ~1yd³
Barcick.

1410 Supersacks loaded onto flatbed transporting to CSU site. (4 sacks total)

1425 Supersacks unloaded at CSU site. D. Hinojos, M. , P. Bolen off site. Soil recovery is complete.

(Brian H 496-3748)

Continued from page

Read and Understood By

P. Bolen — Signed
12-12-19 — Date
Signed
4/13/2020 — Date

16

Notebook No. FR Book #2

PROJECT Firing Ranges

Continued from page

1-15-20

1253 Leather Clouds, Mild, nice day out!
P. Boden, Kyle Williams, Dave Burkett on site for bio survey of LB-2 Firing range.
1320 Survey of LB-2 complete. Off site to 200 Area.
1333 On site at 200 Area Firing range. Conducting bio survey.
*Note: Site photos needed for All Firing ranges?
1402 Finished at Area 200 Firing range. Headed off site.
1415 On site at STBT firing range site. Conducting bio-survey at the area.
1433 Finished at STBT area P. Boden, K. Williams, D. Burkett headed off site. Done for the day.

P. Boden 1-15-20

Continued from page

Read and Understood By

P. Boden
Signed

1-15-20
Date

Signed

4/13/2020
Date

PROJECT Firing Ranges

Notebook No. FR Book #2 17

Continued from page —

12:00- K. Williams contacts Alex Tupolus (WSTF photographer) to coordinate photos at each FR. Will take 4 at each, in the 4 cardinal directions from the center of each shown.

12:30- WB-2 photos.

12:35- Completed WB-2

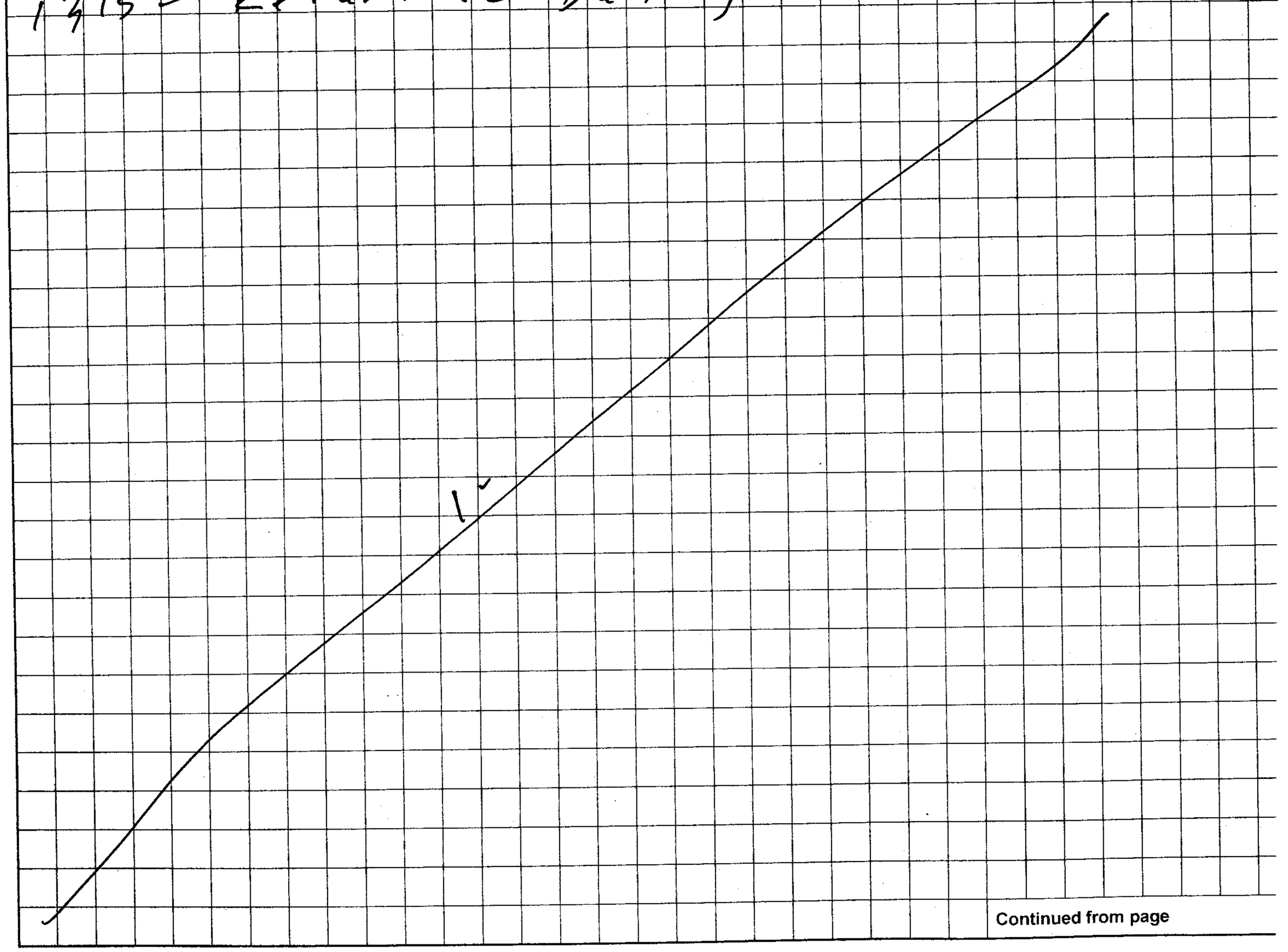
1245- 200 Area photos.

1250- completed 200 Area.

1255- STGT photos

1300- Completed STGT.

1315- Return to Building 601



Continued from page

Read and Understood By

K. Williams — 1-22-20

Signed — Date

P. Baker — 1-30-20

Signed — Date

18

PROJECT Firing Ranges

Notebook No. PR Book #2

Continued from page

Weather: Sunny, light clouds 58° 1-30-2020

Book 1-30

1350 Philip Boden on site at STGT Firing Range looking for disturbed
1315 rock pile that might have been scraped to use for road fill?

1330 Not really sure where it may have ended up. Looking around for it. Might need someone to show me where it is.

1338 Found it I believe big gravel and cobble used to level fill washout on Tacnab road. Going to check it over with Metal Detector to look for any anomalies.

1350 So far a couple of detector hits but all are trash and a bolt. Will finish out sweep of the road section.

1410 Sweep of filled washout section complete. Located 11 pieces of assorted junk such as bolts, wire, fencing brackets?, but no ammo scrap or casings.

1418 Found another spot further down where fill was used again. Going to scan this spot as well.

1436 Found 14 more pieces of fencing brackets?, bolts, can, wire. No ammo scrap or cartridges found. Almost finished with sweep of second fill section in road.

1441 Finished at second fill site. Going to head down road to make sure that was all the fill locations.

1445 Found a third site. Going to check and scan this filled section as well.

1455 Located another 12 pieces of assorted junk again, but no ammo scrap or cartridges.

1457 Going to head back in for the day. 3rd spot check completed.

P. Boden
1-30-2020

Continued from page

Read and Understood By

W. Boden — Signed
1-30-2020 — Date
Signed
4/23/2020 — Date

TECHNICIANS LB START

Notebook No. FRSS Book 1 # 1

PROJECT Firing Range Sampling WB-2

Continued from Page N/A

R. Burrows & F. Gallegos present. Collecting a composite of soil from each Cell, Decon equipment between Cell samples. Weather is cloudy & calm. *NOTE: we will be using 000 Numbers & Carboy G-5 in use.

Cell-#	Analysis	Preservative	Lot #	Lab	P-Prepared U-Unprepared
7 # 150827 0827	~~Metals 6010C~~ XRF	NONE	N/A	WSTF	U
150827 0829	"	"	"	"	P
#19-150827 0857	XRF	NONE	"	"	U
150827 0901	"		"	"	P
150827 0859	TOTAL metals by 6010C	"	"	HALL	U
# 20 - Cell			N/A		
150827 0935	XRF	NONE	"	WSTF	U
150827 0937	"	"	"	"	P
Cell # 8					
150827 0955	XRF	NONE	N/A	WSTF	U
150827 0959	"	"	"	"	P
150827 0957	Total Metals by 6010C	"	"	HALL	U
Cell # 9					
150827 1025	XRF	NONE	N/A	WSTF	U
150827 ~~1029~~ 1027	"	"	"	"	P
150827 ~~1029~~ 1029	Total Metals by 6010C	"	"	HALL	U
Cell # ~~21~~ 10 PSE 9.22.15		NONE			
150827 1333	XRF	"	N/A	WSTF	U
150827 1337	"	"	"	"	P
150827 1335	Total Metals by 6010C	"	"	HALL	U
Cell # 22					
150827 1301	XRF	NONE	N/A	WSTF	U
150827 1303	"	"	"	"	P
150827 1305	Total Metals by 6010C	"	"	HALL	U
Cell # ~~10~~ 21 PSE 9.22.15					
150827 1047	XRF	NONE	N/A	WSTF	U
150827 1049	"	"	"	"	P
150827 1047	Total Metals by 6010C	"	"	HALL	U
Cell # 23					
150827 1405	XRF	NONE	N/A	WSTF	U
150827 1409	"	"	"	"	P
150827 1407	Total Metals by 6010C	"	"	HALL	U

Continued on Page 2

Read and Understood By

Robert Burrows — Signed — 8-27-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

R. Burrows & E Gallegos present. Collecting a composite of soil from each cell. Decon equipment between cells sampling cells. Weather is clear & Calm. Will be using odd numbers for sampling ID. Carboy G-5 in use.

Cell # 11	**Preservative**	**Lot #**	**Lab**	**P- Prepared U- Unprepared**
150831 0815	XRF	N/A	WSTF	U
—— 0817	"	"	"	P
—— 0819	Total Metals by 6010C	"	Hall	U
Cell # 12				
150831 0841	XRF	N/A	WSTF	U
—— 0845	"	"	"	P
—— 0843	Total Metals by 6010C	"	Hall	U
Cell # 24				
150831 0857	XRF	N/A	WSTF	U
—— 0901	"	"	"	P
—— 0859	Total Metals by 6010C	"	Hall	U
Cell # 25				
150831 0921	XRF	N/A	WSTF	U
—— 0925	"	"	"	P
—— 0923	Total Metals by 6010C	"	Hall	U
Cell # 13				
150831 0945	XRF	N/A	WSTF	U
—— 0949	"	"	"	P
—— 0947	Total Metals by 6010C	"	Hall	U
Cell # 1				
150831 1011	XRF	N/A	WSTF	U
—— 1015	"	"	"	P
—— 1013	Total Metals by 6010C	"	Hall	U
Cell # 2				
150831 1033	XRF	N/A	WSTF	U
—— 1035	"	"	"	P
	~~Total Metals by 6010C~~ RB	~~"~~ RB	~~Hall~~ RB	~~U~~ RB
Cell # 14				
150831 1305	XRF	N/A	WSTF	U
—— 1309	"	"	"	P
—— 1307	Total Metals by 6010C	"	Hall	U

Continued on Page 3

Read and Understood By

Robert Burrows — Signed — 8-31-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

	Preservative	Lot #	Lab	P-prepared U-unprepared
Cell # 26				
150831 1331	XRF	N/A	WSTF	U
——— 1335	"	"	"	P
——— 1333	Total Metals by 6010C	"	Hall	U
Cell # 27				
150831 ~~1409~~ 1351	XRF	N/A	WSTF	U
——— ~~1413~~ 1355	"	"	"	P
——— ~~1411~~ 1353	Total Metal by 6010C	"	Hall	U
Cell # 15				
150831 1409	XRF	N/A	WSTF	U
——— 1413	"	"	"	P
——— 1411	Total Metals by 6010C	"	Hall	U
~~Cell # 9~~				

Continued on Page 4

Read and Understood By

Robert Bueno — Signed — 8-31-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Burrows & F. Gallegos present. Weather is Clear & Calm. Collecting a composite of soil from each cell. We Decon Equipment between cell after sampling. We will be using odd numbers for Sampling I.D. Carboy G-5 in use for Decon.

	Preservative	Lot #	Lab	p-prepared u-unprepared
Cell # 3				
150901 0735	XRF	N/A	WSTF	u
—— 0739	"	"	"	p
—— 0737	Total Metals by 6010C	"	Hall	u
Cell # 4				
150901 0751	XRF	N/A	WSTF	u
—— 0755	"	"	"	p
—— 0753	Total Metals by 6010C	"	HALL	u
Cell # 16				
150901 0809	XRF	N/A	WSTF	u
—— 0813	"	"	"	p
—— 0811	Total Metals by 6010C	"	HALL	u
Cell # 28				
150901 0831	XRF	N/A	WSTF	u
—— 0835	"	"	"	p
—— 0833	Total Metals by 6010C	"	Hall	u
Cell # 29				
150901 0847	XRF	N/A	WSTF	u
—— 0851	"	"	"	p
—— 0849	Total Metals by 6010C	"	HALL	u
Cell # 17				
150901 0915	XRF	N/A	WSTF	u
—— 0919	"	"	"	p
—— 0917	Total Metals by 6010C	"	Hall	u
Cell # 5				
150901 0931	XRF	N/A	WSTF	u
—— 0935	"	"	"	p
—— 0933	Total Metals by 6010C	"	HALL	u
Cell # 6				
150901 0951	XRF	N/A	WSTF	u
—— 0953	"	"	"	p

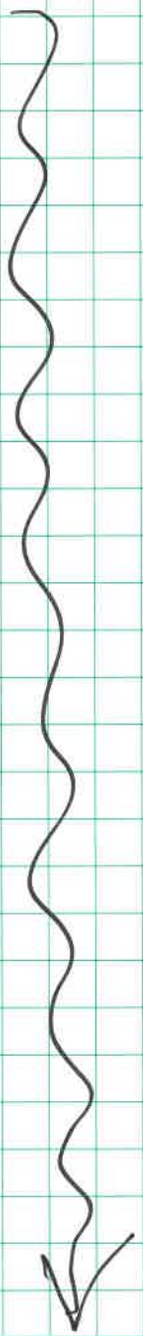
Continued on Page 5

Read and Understood By

Robert Burrows — Signed — 09-01-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

Cell # 18	Preservative	Lot #	Lab	P- prepared U- unprepared
150901/1007	XRF	N/A	WSTF	U
—— 1011	"	"	"	P
—— 1009	Total Metals by 6010C	"	Hall	U
Cell # 30				
150901/1025	XRF	N/A	WSTF	U
—— 1029	"	"	"	P
—— 1027	Total Metals by 6010C	"	Hall	U



Continued on Page ——

Read and Understood By

Robert Burrows — Signed — 09-01-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

PROJECT Firing Range Sampling 200 Area

Notebook No. FRSS Book #1

Continued from Page N/A

R. Burrows & Frank Gallegos present. Weather is Cloudy & Calm. Collecting a composite of soil from each cell. We will Decon Equipment between cell after sampling. We will be using odd numbers for Sampling ID. Carboy G-5 in use for Decon.

Cell #1	Preservative	Lot#	Lab	P-prepared U-unprepared
150904 0815	XRF	N/A	WSTF	U
—— 0819	"	"	"	P
—— 0817	Total Metals by 6010C	"	HALL	U
Cell #2				
150904 0835	XRF	N/A	WSTF	U
—— 0839	"	"	"	P
—— 0837	Total Metal by 6010C	"	HALL	U

Continued on Page N/A

Read and Understood By

Robert Burrows — Signed — 9-4-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Burrows & F. Gallegos present. Weather is windy & warm & cloudy. Collecting a composite of soil from each cell. We will Decon Equipment between cell after sampling. We will be using odd numbers for Sampling I.D. Carboy C-5 in use for Decon. Continue on 9-15-15.

	Preservative	Lot #	Lab	P- prepared U- unprepared
Cell # 6				
150914 1441	XRF	N/A	WSTF	U
——— 1445	"	"	"	P
——— 1443	Total metals by 6010C	"	Hall	U
Cell # 5				
150914 1518	XRF	N/A	WSTF	U
——— 1519	"	"	"	P
——— 1517	Total metals by 6010C	"	Hall	U
Cell # 11				
150915 0819	XRF	N/A	WSTF	U
——— 0821	"	"	"	P
Cell # 12				
150915 0841	XRF	N/A	WSTF	U
——— 0845	"	"	"	P
——— 0843	Total metals by 6010C	"	HALL	U
Cell # 18				
150915 0903	XRF	N/A	WSTF	U
——— 0907	"	"	"	P
——— 0905	Total metals by 6010C	"	HALL	U
Cell # 19				
150915 0945	XRF	N/A	WSTF	U
——— 0949	"	"	"	P
——— 0947	TOTAL metals by 6010C	"	HALL	U
Cell # 20				
150915 1043	XRF	N/A	WSTF	U
——— 1047	"	"	"	P
——— 1045	Total Metals by 6010C	"	Hall	U
Cell # 21				
150915 1107	XRF	N/A	WSTF	U
——— 1111	"	"	"	P
——— 1109	Total metals by 6010C	"	Hall	U

These 2 sampling events are from 9.14.2015 — Pamela Egan 9.22.15

Continued on Page 8

Read and Understood By

Robert Burrows — Signed — 9-15-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

PROJECT Firing Range Sampling STGT

Notebook No. FRSS Book 1#

Continued from Page 7

	Preservative	Lot #	Lab	P- prepared U- UN prepared
Cell # 17				
150915 1343	XRF	N/A	WSTF	U
—— 1347	"	"	"	P
—— 1345	Total metals by 6010C	"	Hall	U
Cell # 16				
150915 1405	XRF	N/A	WSTF	U
—— 1409	"	"	"	P
—— 1409	Total metals by 6010C	"	Hall	U
Cell # 10				
150915 1433	XRF	N/A	WSTF	U
—— 1437	"	"	"	P
—— 1435	Total metals by 6010C	"	Hall	U

Continued on Page —

Read and Understood By

Robert Burrows — Signed — 9-15-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Barrows & E. Gallegos present. Weather is Breezy & Warm & cloudy, Collecting a composite of soil from each cell. We will Decon Equipment between cell after Sampling. We will be using odd numbers for Sampling ID, Carboy G-J in use for Decon.

	Preservative	Lot #	Lab	P- prepared U- unprepared
Cell # 4				
150916 0915	XRF	N/A	WSTF	U
—— 0917	"	"	"	P
—— 0917	Total Metals by 6010C	"	Halls	U
Cell # 3				
150916 0933	XRF	N/A	WSTF	U
—— 0937	"	"	"	P
—— 0935	Total Metals by 6010C	"	Hall	U
Cell # 9				
150916 0953	XRF	N/A	WSTF	U
—— 0957	"	"	"	P
—— 0955	Total Metals by 6010C	"	Hall	U
Cell 15 #				
150916 1013	XRF	N/A	WSTF	U
—— 1017	"	"	"	P
—— 1015	Total Metals by 6010C	"	Hall	U
Cell # 14				
150916 1033	XRF	N/A	WSTF	U
—— 1037	"	"	"	P
—— 1035	Total Metals by 6010C	"	Hall	U
Cell # 8				
150916 1339	XRF	N/A	WSTF	U
—— 1343	"	"	"	P
—— 1341	Total Metals by 6010C	"	Hall	U
Cell # 2				
150916 1357	XRF	N/A	WSTF	U
—— ~~1401~~ 1359	"	"	"	P
—— ~~1403~~	~~Total Metals by 6010C~~ RB	— RB	~~Hall~~ RB	~~—~~ RB
Cell # 1				
150916 1421	XRF	N/A	WSTF	U
—— 1425	"	"	"	P
—— 1423	Total Metals by 6010C	"	HALL	U

Continued on Page 10

Read and Understood By

Robert Barrows — Signed — 9-16-15 Date

Pamela Egan — Signed — 9.22.15 Date

Cell # 7	Preservative	Lot #	Lab	P- prepared U- unprepared
150916 1443	XRF	N/A	WSTF	U
— 1445	"	"	"	P
~~Cell # 13~~				
RB	XRF	N/A	~~WSTF~~	U
	"	"	"	P
	Total Metals by 6010C	"	Hall	

Continued on Page 11

Read and Understood By

Robert Burrows — Signed — 9-16-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Burrows & F. Gallegos present, weather is clear & Breezy & warm. Collecting a composite of soil from each cell, we will Decon Equipment between cells After sampling. We will be using odd numbers for Sampling I.D. Carboy G-5 in use for Decon.

Cell #13	Preservative	Lot #	Lab	P-prepared U-unprepared
150917 0819	XRF	N/A	WSTF	U
[redacted] 0823	"	"	"	P
[redacted] 0821	Total Metals by GOLDC	"	HALL	U

Continued on Page —

Read and Understood By

Robert Burrows — Signed — 9-17-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

K. Burrows & M Gaeta present. Collecting a composite of soil from each cell. We will Decon Equipment between Cell samples. Weather is Clear and breezy. Carboy 6-4 in use.

Sample #	Analysis	Rinsate Preservative	Container	Lot #	Lab
161115 0910	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	H&LL

Cell # / Sample #	Analysis	Sample Preservative	Container	Lot #	Lab
161115 0921 (#72)	Total Metals 6010C	ICE	(1) Clear 4oz jar	01250015	H&LL
(#71) 161115 0948	" "	" "	(1) "	" "	" "
(#70) 161115 0959	" "	" "	(1) "	" "	" "
(#69) 161115 1006	" "	" "	(1) "	" "	" "
(#68) 161115 1013	" "	" "	(1) "	" "	" "
(#67) 161115 1020	" "	" "	(1) "	" "	" "
(#66) 161115 1028	" "	" "	(1) "	" "	" "
(#65) 161115 1034	" "	" "	(1) "	" "	" "
(#64) 161115 1041	" "	" "	(1) "	" "	" "
(#63) 161115 1048	" "	" "	(1) "	" "	" "
(Dup) 161115 1049	" "	" "			
(#62) 161115 1056	" "	" "	(1) "	" "	" "
(#61) 161115 1328	" "	" "	(1) "	" "	" "
(#60) 161115 1335	" "	" "	(1) "	" "	" "
(#59) 161115 1343	" "	" "	(1) "	" "	" "

Continued on Page 13

Read and Understood By

Robert Burrows
Signed

11-16-16
Date

Signed

11/17/16
Date

PROJECT Firing Range WB-2

Notebook No. FRSS Book 1# 13

Continued from Page 12

Samples					
Cell#/Sample#	Analysis	Preservative	Container	Lot#	Lab
(58) 161115 1352	Total Metals 6010C 6020A	ICE	(1) Clear 4oz jar	01250015	HALL
(57) 161115 1407	" "	" "	" "	" "	" "
(56) 161115 1412	" "	" "	" "	" "	" "
(55) 161115 1416	" "	" "	" "	" "	" "
(54) 161115 1421	" "	" "	" "	" "	" "
(53) 161115 1427	" "	" "	" "	" "	" "
#Dup) 161115 1428					
(47) 161115 1438	" "	" "	" "	" "	" "
#MS) 161115 1439					
(46) 161116 00756	" "	" "	" "	" "	" "
(45) 161116 00802	" "	" "	" "	" "	" "
(44) 161116 00808	" "	" "	" "	" "	" "
(43) 161116 00814	" "	" "	" "	" "	" "
(42) 161116 00823	" "	" "	" "	" "	" "
(41) 161116 00832	" "	" "	" "	" "	" "
(40) 161116 00841	" "	" "	" "	" "	" "
(39) 161116 00854	" "	" "	" "	" "	" "
(38) 161116 00905	" "	" "	" "	" "	" "
(37) 161116 00913	" "	" "	" "	" "	" "
(Dup) 161116 00914					

Continued on Page 14

Read and Understood By

Robert Burnett — Signed — 11-16-16 — Date

Jeff [illegible] — Signed — 11/17/16 — Date

PROJECT Firing Range WB-2

Notebook No. FRSS Book 1 #

Continued from Page 13

Samples

Cell#/Sample#	Analysis	Preservative	Container	Lot#	Lab
(32) 161116 0921	Total Metals 6010C 6020A	ICE	(1) Clear 4oz Jar	01250045	Hall
(35) 161116 0928	" "	" "	(1) " "	" "	" "
(34) 161116 0937	" "	" "	(1) " "	" "	" "
(33) 161116 0947	" "	" "	(1) " "	" "	" "
(32) 161116 0954	" "	" "	(1) " "	" "	" "
(Dup) 161116 0955					
(31) 161116 1002	" "	" "	(1) " "	" "	" "
(MS) 161116 1003					

* R. Burrows & M. Gordon Resumed Sampling 11-16-16 IDW - 5 gal.

Rinsate

Sample#	Analysis	Preservative	Containers	Lot#	Lab
161116 0747	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	Hall

Continued on Page —

Read and Understood By

Robert Burrows — Signed — 11-16-16 Date

Signed — 11/17/16 Date

R. Burrows & Giles, Jeff present, Weather is cloudy & Cool. Collecting a composite of Soil from each cell in fallout areas, We will Decon Equipment prior to Samples. Carboy G-4 in use. Washed equipment with Alconox.

Sample #	Analysis	Rinsate Preservative	Container	Lot #	Lab
170103090 4	Total Metals 6010C	HNO3 / ICE	(1) 500 ml poly	N/A	Hall

(Cell #) / Sample #	Analysis	Sample Preservative	Container	Lot #	Lab
(3#) 170103092 5	Total Metals 6010C	ICE	(1) Clear 4oz jar	0125 0015	HALL
(4#) 170103093 8	"	"	(1) "	"	"
(5#) 170103095 2	"	"	(1) "	"	"
(6#) 170103101 7	"	"	(1) "	"	"
(7#) 170103104 4	"	"	(1) "	"	"
(8#) 170103130 5	"	"	(1) "	"	"
(9#) 170103131 7	"	"	(1) "	"	"
(10#) 170103132 8	"	"	(1) "	"	"
(11#) 170103134 1	"	"	(1) "	"	"
(12#) 170103140 5	"	"	(1) "	"	"
Dup) 170103140 7	"	"	(1) "	"	"
(13#) 170103142 3	"	"	(1) "	"	"
(14#) 170103144 0	"	"	(1) "	"	"

Continued on Page N/A

Read and Understood By

Robert Burrows — Signed — 1-3-17 Date

Signed — 1/6/17 Date

R. Burrows & G. Giles present. Weather is cloudy and cold. Collecting a composite of soil from each Cell in fallout areas, we will decon Equipment prior to Sampling. Carboy G-4 in use.

Sample #	Analysis	Rinsate Preservative	Container	Lot #	Lab
170104 0759	Total Metal 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

(Cell #)/Sample #	Analysis	Samples Preservative	Container	Lot #	Lab
(15#) 170104 0811	Total Metals 6010C	ICE	(1) 4oz clear Jar	01250015	HALL
(16#) 170104 0831	"	"	(1) "	"	"
(17#) 170104 0853	"	"	(1) "	"	"
(18#) 170104 0904	"	"	(1) "	"	"
(19#) 170104 0918	"	"	(1) "	"	"
(20#) 170104 0928	"	"	(1) "	"	"
(21#) 170104 0940	"	"	(1) "	"	"
(22#) 170104 0953	"	"	(1) "	"	"
(Dup) 170104 0954	"	"	(1) "	"	"
(23#) 170104 1008	"	"	(1) "	"	"
(MS) 170104 1009	"	"	(1) "	"	"
(24#) 170104 1022	"	"	(1) "	"	"
(25#) 170104 1301	"	"	(1) "	"	"
(26#) 170104 1313	"	"	(1) "	"	"
(27#) 170104 1327	"	"	(1) "	"	"

Continued on Page 17

Read and Understood By

Robert Burrows — Signed
1-4-17 — Date
Signed
1/6/17 — Date

Samples

(Cell #) / Sample #	Analysis	Preservative	Container	Lot #	Lab
(28#) 170104/343	Total Metals 6010C	ICE	(1) 4oz clear JAR	0125 0015	HALL
(29#) 170104 1401	" "	" "	(1) " "	" "	" "

Rinsate

Sample #	Analysis	Preservative	Container	Lot #	Lab
170105 0736	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

Samples

(Cell #) / Sample #	Analysis	Preservative	Container	Lot #	Lab
(30#) 170105 0801	Total Metals 6010C	ICE	(1) 4oz clear JAR	0125 0015	HALL
(31#) 170105 0810	" "	" "	(1) " "	" "	" "
(32#) 170105 0821	" "	" "	(1) " "	" "	" "
(Dup) 170105 0822	" "	" "	(1) " "	" "	" "
(33#) 170105 0834	" "	" "	(1) " "	" "	" "
(34#) 170105 0845	" "	" "	(1) " "	" "	" "
(35#) 170105 0858	" "	" "	(1) " "	" "	" "
(36#) 170105 0908	" "	" "	(1) " "	" "	" "
(37#) 170105 0919	" "	" "	(1) " "	" "	" "
(38#) 170105 0936	" "	" "	(1) " "	" "	" "
(39#) 170105 0955	" "	" "	(1) " "	" "	" "
(40#) 170105 1010	" "	" "	(1) " "	" "	" "
(41#) 170105 1340	" "	" "	(1) " "	" "	" "

Continued on Page 18

Read and Understood By

Robert Burrows — Signed — 1-5-17 — Date

Signed — 1/6/17 — Date

Samples

(cell #)/Sample #	Analysis	Preservative	Container	Lot #	Lab
(42#) 170105 1353	Total Metals 6010C	ICE	(1) 4oz clear JAR	0125 0015	Hall
(Dup) 170105 1354	" "	" "	(1) " "	" "	" "
(43#) 170105 1409	" "	" "	(1) " "	" "	" "
(MS) 170105 1410	" "	" "	(1) " "	" "	" "
(44#) 170105 1426	" "	" "	(1) " "	" "	" "

Continued on Page N/A

Read and Understood By

Robert Burnard — Signed — 1-5-17 — Date

Signed — 1/6/17 — Date

R. Burrows & G. Giles present. Weather is cloudy and cold. Collecting a composite of soil from each Cell in fallout area. We will decon Equipment prior to Sampling Carboy - G-5 in use.

RINSATE

Sample #	Analysis	Preservative	Container	Lot #	Lab
170117 0834	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

SAMPLES

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
(22#) 170117 0908	Total Metals 6010C	ICE	(1) 4oz clear Jar	082216BNS	HALL
(23#) 170117 0921	"	"	(1) "	"	"
(24#) 170117 0937	"	"	(1) "	"	"
(25#) 170117 0949	"	"	(1) "	"	"
(26#) 170117 1002	"	"	(1) "	"	"
(27#) 170117 1040	"	"	(1) "	"	"
(28#) 170117 1057	"	"	(1) "	"	"
(29#) 170117 1310	"	"	(1) "	"	"
(30#) 170117 1322	"	"	(1) "	"	"
(31#) 170117 1342	"	"	(1) "	"	"
(32#) 170117 1400	"	"	(1) "	"	"

RINSATE

Sample #	Analysis	Preservative	Container	Lot #	Lab
170118 0805	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

Continued on Page 20

Read and Understood By

Robert Burrows — Signed — 1-18-17 Date

Signed — 2/9/17 Date

R. Burrows & G. Giles continue on 1-18-17

Samples

Cell #/Sample #	Analysis	Preservative	Container	Lot #	Lab
(33#) 170118 0819	Total Metals 6010C	ICE	(1) 4oz Clear Jar	082216IBWS	HALL
(Dup) 170118 0820	" "	" "	(1) " "	" "	" "
(34#) 170118 0837	" "	" "	(1) " "	" "	" "
(35#) 170118 0937	" "	" "	(1) " "	" "	" "
(36#) 170118 0953	" "	" "	(1) " "	" "	" "
(37#) 170118 1008	" "	" "	(1) " "	" "	" "
(38#) 170118 1028	" "	" "	(1) " "	" "	" "
(39#) 170118 1330	" "	" "	(1) " "	" "	" "
(40#) 170118 1349	" "	" "	(1) " "	" "	" "
(41#) 170118 1407	" "	" "	(1) " "	" "	" "
(Dup) 170118 1408	" "	" "	(1) " "	" "	" "
(42#) 170118 1428	" "	" "	(1) " "	" "	" "
(MS) 170118 1429	" "	" "	(1) " "	" "	" "

R. Burrows & G. Giles continue Sampling 1-19-17

Rinsate

Sample #	Analysis	Preservative	Container	Lot #	Lab
170119 0800	Total Metals 6010C	HNO3 / ICE	(1) 500 ml poly	N/A	HALL

Samples

Cell #/Sample #	Analysis	Preservative	Container	Lot #	Lab
(43#) 170119 0827	Total Metals 6010C	ICE	(1) 4oz Clear Jar	082216IBWS	HALL

Continued on Page 21

Read and Understood By

Robert Burrows — Signed — 1-19-17 — Date

[signature] — Signed — 2/9/17 — Date

Samples

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
(44#) 1701190849	Total Metals 6010C	ICE	(1) 4oz clear JAR	0822161BNS	HALL
(45#) 1701190903	"	"	(1) "	"	"
(46#) 1701190921	"	"	(1) "	"	"
(47#) 1701190940	"	"	(1) "	"	"
(48#) 1701190957	"	"	(1) "	"	"
(49#) 1701191019	"	"	(1) "	"	"
(50#) 1701191035	"	"	(1) "	"	"
(51#) 1701191335	"	"	(1) "	"	"
(Dup) 1701191336	"	"	(1) "	"	"
(52#) 1701191350	"	"	(1) "	"	"
(53#) 1701191415	"	"	(1) "	"	"
(54#) 1701191428	"	"	(1) "	"	"
(55#) 1701191441	"	"	(1) "	"	"

R. Burrows & G. Giles continue to Sample 1-2017

Rinsate

Sample #	Analysis	Preservative	Container	Lot #	Lab
1701200730	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	n/a	HALL

Samples

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
(56#) 1701200745	Total Metals 6010C	ICE	(1) 4oz clear JAR	0822161BNS	HALL

Continued on Page 22

Read and Understood By

Robert Burrows — Signed — 1-2017 — Date

Signed — 2/9/17 — Date

22

PROJECT Firing Range SIGT Fallout Soil Sampling

Notebook No. FRSS Book #1

Continued from Page 21

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
		Samples			
(57#) 170120 0758	Total Metals 6010C	ICE	(1) 4oz JAR Clear	0822616BNS	Hall
(58#) 170120 0817	" "	" "	(1) " "	" "	" "
(59#) 170120 0827	" "	" "	(1) " "	" "	" "
(60#) 170120 0836	" "	" "	(1) " "	" "	" "
(61#) 170120 0849	" "	" "	(1) " "	" "	" "
(62#) 170120 0925	" "	" "	(1) " "	" "	" "
(63#) 170120 0939	" "	" "	(1) " "	" "	" "
(Dup) 170120 0940	" "	" "	(1) " "	" "	" "
(64#) 170120 0958	" "	" "	(1) " "	" "	" "
(MS) 170120 0959	" "	" "	(1) " "	" "	" "
(65#) 170120 1019	" "	" "	(1) " "	" "	" "

(EB)

Continued on Page n/a

Read and Understood By

Robert Burns — Signed — 1-20-17 — Date

Signed — 2/9/17 — Date

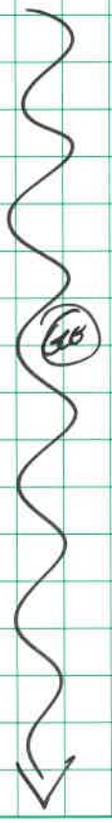
T Kenney + A Montes present. Weather is cool and windy.

Samples Rinsate

	Sample#	Analysis	Preserv	Cont	Lot#	Lab
(Rinsate)	1702070900	Total Metals 6010C	Ice, HNO_3	(1) 500 ml poly		#42C

Soil

(B1)	1702070950	Total Metals 6010C	Ice	(1) 4 oz Jar	012600 IB	#42C
(B2)	0951	"	"	"	"	"
(B3)	0952	"	"	"	"	"
(B4)	0954	"	"	"	"	"
(B5)	0956	"	"	"	"	"
(B6)	0957	"	"	"	"	"
(B7)	0958	"	"	"	"	"
(B8)	0959	"	"	"	"	"
(B9)	1000	"	"	"	"	"
(B10)	1001	"	"	"	"	"
(B3)	0953	(Dupl)	"	"	"	"
(B4)	0955	(MS)	"	"	"	"



Continued on Page —

Read and Understood By

T Kenney — Signed — 2-7-17 Date

Signed — 2/9/17 Date

24

PROJECT Firing Range STGT

TECHNICIANS LB STOP

Notebook No. FRSS # 1

Continued from Page —

T. Konoy + A Montes present. Weather is cool and cloudy.

Rinsate

Soil

Sample #	Analysis	Preserv	Cont.	Lot #	Lab
1703010745	Total Metals 6010C	Ice, HNO_3	(1) 500 ml poly	062016-244W	HALL
B1) 1703010840	"	Ice	(1) 4 oz JAR	012600138	"
B2) 0842	"	"	"	"	"
B3) 0844	"	"	"	"	"
B4) 0846	"	"	"	"	"
B5) 0848	"	"	"	"	"
B6) 0850	"	"	"	"	"
B7) 0852	"	"	"	"	"
B7) 0854	" (Dupl)	"	"	"	"
B8) 0900	"	"	"	"	"
B8) 0902	" (Dupl)	"	"	"	"
B9) 0904	"	"	"	"	"
B10) 0906	"	"	"	"	"
B11) 0908	"	"	"	"	"
B12) 0910	"	"	"	"	"
B13) 0912	"	"	"	"	"
B14) 0914	"	"	"	"	"
B15) 0944	"	"	"	"	"
B16) 0946	"	"	"	"	"
B17) 0948	"	"	"	"	"
B18) 0950	"	"	"	"	"
B18) 0952	" (Dupl)	"	"	"	"
B19) 0954	"	"	"	"	"
B19) 0956	" (MS)	"	"	"	"
B20) 0958	"	"	"	"	"
B21) 1000	"	"	"	"	"
B22) 1002	"	"	"	"	"
B22) 1004	" (MS)	"	"	"	"
B23) 1006	"	"	"	"	"
B24) 1008	"	"	"	"	"
B25) 1010	"	"	"	"	"
B26) 1012	"	"	"	"	"
B27) 1014	"	"	"	"	"
B28) 1016	"	"	"	"	"

Continued on Page —

Read and Understood By

T. Konoy
Signed

3-1-2017
Date

Signed

3/1/17
Date

Tim Kondy + ~~Marcos Avalos~~ ~~Al Montes~~ present. Weather is warm and clear. Rinsate taken from a deconed Auger, Samples taken From a deconed Auger.

Rinsate

Sample #	Analysis	Preserv	cont.	Lab
190917 0645	Total Metals 6010c	Ice, HNO3	(1) 125 ml poly	ALS

Soil

5.3) 190917 0755	"	Ice	(1) 4 oz JAR	"
6.1) 190917 0805	"	"	"	"
12.4) — 0810	"	"	"	"
18.2) — 0815	"	"	"	"
19.4) — 0820	"	"	"	"
20.2) — 0830	"	"	"	"
21.3) — 0835	"	"	"	"
6.1) — 0840	"	"	"	"
5.1) — 0850	"	"	"	"
11.1) — 0855	"	"	"	"
—	"	"	"	"

83) 190917 0940	Total Metals	Ice	(1) 4 oz JAR	ALS
~~FR~~ 5.1 — 0945	"	"	"	"
~~FR~~ 11.5 — 0950	"	"	"	"
~~FR~~ 17.1 — 0955	"	"	"	"
19.4) — 1000	"	"	"	"
20.2) — 1010	"	"	"	"
21.3) — 1015	"	"	"	"
6.1) — 1100	"	"	"	"
12.4) — 1105	"	"	"	"
18.2) — 1110	"	"	"	"

Rinsate

190918 0645	"	Ice, HNO3	(1) 125 ml poly	"

Continued on Page

Read and Understood By

T. Kondy — Signed — 9-18-19 — Date

P. Bak — Signed — 11-19-19 — Date

Soil STGT

#	Sample	Analysis	Preserv	Cont
(1.2)	190918 0735 (FB)	Total Metals	Ice	(1) 4 oz HDPE
(1.2)	— 0745	"	"	"
(1.)	— 0746 (Dupl)	"	"	"
(7.4)	— 0800	"	"	"
(13.3)	— 0805	"	"	"
(2.3)	— 0815	"	"	"
(8.1)	— 0820	"	"	"
(14.2)	— 0830	"	"	"
(14.2)	— 0831 (Dupl)	"	"	"
(3.3)	— 0835	"	"	"
(15.4)	— 0845	"	"	"
(15.4)	— 0846 (MS)	"	"	"
(15.4)	— 0847 (FB)	"	"	"
(4.2)	— 0850	"	"	"
(10.4)	— 0855	"	"	"
(16.1)	— 0900	"	"	"
(37.1)	— 0930	"	"	"
(36.2)	— 0935	"	"	"
(35.3)	— 0945 (Dupl)	"	"	"
(35.3)	— 0946 (Dupl)	"	"	"
(34.2)	— 0950	"	"	"
(33.1)	— 1000	"	"	"
(33.1)	— 1001 (MS)	"	"	"
(33.1)	— 1002 (FB)	"	"	"
(32.3)	— 1010	"	"	"
(31.3)	— 1020	"	"	"
(25.3)	— 1030	"	"	"
(26.4)	— 1035	"	"	"
(27.1)	— 1045	"	"	"
(27.1)	— 1046 (Dupl)	"	"	"
(28.1)	— 1055	"	"	"

Continued on Page

Read and Understood By

Signed — Date 9-18-19 — Signed — Date 11-19-

Tim Kondy, MATT GARCIA, Kyle WILLIAMS, & Tony TOFFER. THE WEATHER IS OVERCAST & COOL. SAMPLES COLLECTED WITH A DECONED AUGER

RINSATE

SAMPLE #	ANALYSIS	PRESERV	LOT#	CONT	LAB
190924 1245	TOTAL METALS 6010C	ICE/HNO3		(1) 125ml poly	ALS

SOIL SAMPLES

SAMPLE#	ANALYSIS	PRESERV	LOT#	CONT	LAB
190924 1305 (22.1)	TOTAL METALS	ICE	0722A-15R	(1) 4oz JAR	ALS
190924 1315 (23.4)	"	"	"	"	"
1322 (24.2)	"	"	"	"	"
1327 (29.4)	"	"	"	"	"
1332 (30.4)	"	"	"	"	"
1333 (30.4) (FB)	"	"	"	"	"
1340 (43.2)	"	"	"	"	"
1341 (43.2) (MS)	"	"	"	"	"
1346 (42.4)	"	"	"	"	"
1351 (41.1)	"	"	"	"	"
1355 (40.1) ~~(Dup)~~	"	"	"	"	"
1356 (40.1) (Dup)	"	"	"	"	"
1405 (39.1)	"	"	"	"	"
1415 (44.4)	"	"	"	"	"
1421 (45.4)	"	"	"	"	"
1430 (46.1)	"	"	"	"	"
1435 (47.4)	"	"	"	"	"
1440 (48.1)	"	"	"	"	"
1441 (48.1) (FB)	"	"	"	"	"
1445 (53.3)	"	"	"	"	"
1450 (52.3)	"	"	"	"	"
1451 (52.3) ~~(MS) (Dup)~~ (Dup)	"	"	"	"	"

Continued on Page

Read and Understood By

Signed — Date: 9-24-19

Signed — Date: 9-24-19

28
PROJECT FR - 9TGT

Notebook No. FR 9S #1
Continued from Page

T. Kondy A Montes present... Weather is Hot and Sunn
Samples collected with a decond Auger.

RinSate

Sample #	Analytes	Preserv	Cont.	Lab
190926 0700	Total Metals	Ice, HNO_3	(1) 125-mlp-cly	ACE

Soil Samples

			Total Metals	Ice	(1) 4 oz JAR	A
(58.3)	190926	0840	"	"	"	"
(52.1)	—	0847	"	"	"	
(56.4)	—	0852	"	"	"	
(55.4)	—	0858	"	"	"	
(54.3)	—	0904	"	"	"	
(49.3)	—	0911	"	"	"	
(50.3)	—	0918	"	"	"	
(51.1)	—	0924	"	"	"	
(65-1)	—	0944	"	"	"	
(65-1)	—	0945	(MS) "	"	"	
(64.2)	—	0951	"	"	"	
(64.2)	—	0952	(Dup) "	"	"	
(64.2)	—	0953	(FB) "	"	"	
(63.3)	—	1000	"	"	"	
(62.1)	—	1007	"	"	"	

Continued on Page

Read and Understood By

T. Kondy — Signed
9-26-2019 — Date
P. Bahn — Signed
11-14 — D

T. Kondy + A. Montes present. Weather is clear, sunny, hot and breezy. Samples taken with a decon'd Auger.

Sample #			Analysis	Preserv	Cont.	Lab
	19092613 00		Rinsate Total Metals	Ice, HNO_3	(1) 125 ml poly	ALS
			Soil			
(3)	19092613 42		Total Metals	Ice	(1) 4 oz JAR	ALS
(3)	— 1346		"	"	"	"
(4)	— 1350		"	"	"	"
(1)	— 1356		"	"	"	"
(2)	— 1402		"	"	"	"
(0.3)	— 1410		"	"	"	"
(1.1)	— 1415		"	"	"	"
(7.1)	— 1420		"	"	"	"
(8.3)	— 1425		"	"	"	"
(9.4)	— 1435		"	"	"	"
(9.4)	— 1436	(Dup)	"	"	"	"
(9.4)	— 1437	(FB)	"	"	"	"

9-27-19 T. KONDY + T. TORRES PRESENT

			Analysis	Preserv	Cont.	Lab
	19092708 30		Rinsate Total Metals	Ice, HNO_3	(1) 125 ml poly	ALS
			Soil			
(3)	19092708 05		"	Ice	(1) 4 oz JAR	ALS
(1.2)	— 0812		"	"	"	"
(2.3)	— 0818		"	"	"	"
(3.4)	— 0823		"	"	"	"
(4.1)	— 0830		"	"	"	"
(5.3)	— 0838		"	"	"	"
(6.2)	— 0846		"	"	"	"
(7.2)	— 0855		"	"	"	"
(0.2)	— 0915		"	"	"	"
(1.1)	— 0922		"	"	"	"
"	— 0923	Dup	"	"	"	"
"	— 0924	(MS)	"	"	"	"
"	— 0925	(FB)	"	"	"	"

Continued on Page

Read and Understood By

T. Kondy — Signed

9-27-19 — Date

T. Bahr — Signed

11-19-19 — Date

FR-200 Soil

Sample #		Analysis	Preserv	COA
(22.1)	1909270932	Total Metals	Ice	(1) 4 oz JAR
(23.3)	— 0938	"	"	"
(1.3)	— 0945	"	"	"
(2.1)	— 0951	"	"	"
(24.4)	— 1000	"	"	"
(25.2)	— 1006	"	"	"
(26.3)	— 1015	"	"	"
(27.4)	— 1024	"	"	"
"	— 1025 (Dup)			
"	— 1026 (FB)			

9-30-19 Tr. Kondy + M. Aquas present

		Rinsate		
	1909300700	Total Metals	Ice, HNO3	(1) 125 ml poly

		Soil		
(41.3)	1909300840	Total Metals	Ice	(1) 4 oz JAR
(42.4)	— 0855	"	"	"
(43.1)	— 0906	"	"	"
(44.1)	— 0918	"	"	"
(40.2)	— 0932	"	"	"
(39.1)	— 0949	"	"	"
(38.1)	— 1013	"	"	"
(28.3)	— 1024	"	"	"
(29.2)	— 1040	"	"	"
"	— 1041 (MS)	"	"	"
16.3	— 1054	"	"	"
"	— ~~1056 (Dup)~~ 55 (Dup) 10-1-19	"	"	"
"	← ~~1057 (FB)~~ 56 (FB)	"	"	"
15.2	— 1315	"	"	"
7.1	— 1325	"	"	"
6.4	— 1333	"	"	"
14.1	— 1340	"	"	"
13.3	— 1347	"	"	"
12.2	— 1355	"	"	"

Continued on Page

Read and Understood By

T. Kondy — Signed — 9-30-2019 — Date

R. Bahr — Signed — 10-1-19 — Date

T. Kondy + M. Wales present. Weather is cool and cloudy. Samples taken with a decanal dipper

Rinsate

Sample #	Analysis	Preserv	cont.	Lab
191001 0730	Total Metals	HCl, HNO_3	(1) 125 ml poly	ALS

Soil FR-WB2

	Sample #		Total Metals	HCl	(1) 4oz JAR	ALS
(24)	191001		"	"	"	"
(38.3)	191001	0836	"	"	"	"
(39.2)	—	0840	"	"	"	"
(40.4)	—	0847	"	"	"	"
(41.4)	—	0902	"	"	"	"
(42.4)	—	0911	"	"	"	"
(43.4)	—	0919	"	"	"	"
(44.4)	—	0930	"	"	"	"
(45.2)	—	0944	"	"	"	"
(44)	—	0945	(Dup) "	"	"	"
(11)	—	0946	(FB) "	"	"	"
(46.2)	—	1010	"	"	"	"
(47.3)	—	1017	"	"	"	"
(37.3)	—	1024	"	"	"	"
(32.3)	—	1032	"	"	"	"
(31.1)	—	1039	"	"	"	"
(36.3)	—	1044	"	"	"	31
(35.3)	—	1050	"	"	"	"
(34.2)	—	1323	"	"	(1) 8 oz JAR	"
(33.4)	—	1330	"	"	"	"
(57.2)	—	1338	"	"	"	"
(11)	—	1339	(Dup) "	"	"	"
(11)	—	1346	(FB) "	"	"	"
(56.1)	—	1347	"	"	"	"
(55.3)	—	1353	"	"	"	"
(11)	—	1354	(MS) "	"	"	"
(54.2)	—	1400	"	"	"	"

Continued on Page

Read and Understood By

T. Kondy — Signed — 10-1-19 — Date

F. Bahr — Signed — 11-19-19 — Date

Sample #	Analysis	Preserv	cont	Lo
		Soil		
(53.1) 191001 1410	Total Metals	Ice	(1) 8 oz JAR	A
(66.3) — 1415	"	"	"	
(65.2) — 1435	"	"	"	
		Rinsate	10-2-19	
191002 0700	Total Metals	Ice, HNO3	(1) 125 ml poly	
		Soil		
(64.2) 191002 0810	Total Metals	Ice	(1) 8 oz JAR	
(63.2) — 0815	"	"	"	
(62.1) — 0823	"	"	"	
(61.4) — 0832	"	"	"	
(") — 0833 (Dupl)	"	"	"	
(") — 0834 (FB)	"	"	"	
(60.3) — 0842	"	"	"	
(59.2) — 0850	"	"	"	
(58.4) — 0900	"	"	"	
(72.2) — 0920	"	"	"	
(71.3) — 0924	"	"	"	
(70.4) — 0930	"	"	"	
(69.4) — 0936	"	"	"	
(68.4) — 0945	"	"	"	
(67.1) — 0951	"	"	"	
(30.1) — 1020	"	"	"	
(") — 1021 (Dupl)	"	"	"	
(") — 1022 (FB)	"	"	"	
(29.4) — 1026	"	"	"	
(28.3) — 1034	"	"	"	
(") — 1035 (MS)	"	"	"	
(27.3) — 1043	"	"	"	
(26.1) — 1050	"	"	"	
(25.1) — 1315	"	"	"	
(24.1) — 1321	"	"	"	
(23.3) — 1327	"	"	"	
(22.4) — 1335	"	"	"	

Continued on Page

Read and Understood By

T. Kowalski — Signed — 10-2-19 — Date

R. Bahr — Signed — 11-19-1 — Date

Soil

Sample #		Analysis	Preserv	cont	Lab
(13)	191002 1345	Total Metals	Ice	(1) 8 oz JAR	ALS
(0.3)	— 1400	"	"	"	"
"	— 1401 (Dup)	"	"	"	"
"	— 1402 (FB)	"	"	"	"

10-3-19 RM State

	191003 0700	"	Ice, HNO3	(1) 125 ml poly	ALS

Soil

19.3	191003 0802	"	Ice	(1) 8 oz JAR	ALS
18.2	— 0808	"	"	"	"
17.2	— 0814	"	"	"	"
16.4	— 0822	"	"	"	"
15.3	— 0830	"	"	"	"
14.2	— 0836	"	"	"	"
13.3	— 0848	"	"	"	"
(11)	— 0849 (MS)	"	"	"	"
12.4	— 0904	"	"	"	"
11.3	— 0914	"	"	"	"
10.3	— 0927	"	"	"	"
(11)	— 0928 (Dup)	"	"	"	"
(11)	— 0929 (FB)	"	"	"	"
9.1	— 0938	"	"	"	"
8.3	— 0947	"	"	"	"
7.3	— 1000	"	"	"	"
6.3	— 1030	"	"	"	"
5.3	— 1036	"	"	"	"
4.4	— 1045	"	"	"	"
3.4	— 1053	"	"	"	"
(1)	— 1054 (MS)	"	"	"	"
2.3	— 1325	"	"	"	"
1.2	— 1339	"	"	"	"
(1)	— 1336 (Dup)	"	"	"	"
(1)	— 1337 (FB)	"	"	"	"

Continued on Page

Read and Understood By

Signed — Date 10-3-19

Signed — Date 11-19-19

Tim Kopp + AC Monts present. Weather is cool (40's) cloudy and a slight breeze. Samples collected with a decon'ed Auger.

Rinsate

Sample #			Analysis	Preserv	cont.	Lab
191119	1115		Total Metals	ice, HNO3	(1) 125 ml poly	ALS

Soil Samples

70.3	191119	1257	"	ice	(1) 4 oz JAR	"
69.4	—	1301	"	"	"	"
68.3	—	1306	"	"	"	"
67.2	—	1311	"	"	"	"
66.4	—	1316	"	"	"	"
71.2	—	1323	"	"	"	"
72.4	—	1330	"	"	"	"
72.4	—	1331 (Dup)	"	"	"	"
73.3	—	1334	"	"	"	"
73.3	—	1335 (MS)	"	"	"	"
74.1	—	1339	"	"	"	"
75.3	—	1342	"	"	"	"
9.3	—	1349	"	"	"	"
59.1	—	1355	"	"	"	"
59.1	—	1356 (FD)	"	"	"	"
60.4	—	1401	"	"	"	"
61.4	—	1405	"	"	"	"
80.1	—	1407	"	"	"	"
79.2	—	1410	"	"	"	"
78.3	—	1414	"	"	"	"
77.3	—	1418	"	"	"	"
76.3	—	1422	"	"	"	"

Continued on Page

Read and Understood By

T. Kopp — Signed — 11-19-19 — Date

L. Bach — Signed — 11-19-19 — Date

Appendix B
Hazardous Waste Manifests

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688308 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	13,962 ~~25,455~~	~~LBK~~	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7535, ~~#7536~~ Profile 070249410-1 (ZXRoll-offs CM)
ACT 2048

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarisgard
Signature:
Month: 02 Day: 06 Year: 2017

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature:
Month: 2 Day: 6 Year: 17

Transporter 2 Printed/Typed Name: Luis Gurule
Signature: Luis Gurule
Month: 2 Day: 7 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H132			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Thomas Mann
Signature:
Month: 02 Day: 09 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Truck Trailer
T-891 T-1057

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688309 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III, ERG #171	1	CM	11993	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7536, Profile 070249410-1 (1XRoll-offs CM)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month: 02 Day: 06 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Bowr
Signature:
Month: 2 Day: 06 Year: 17

Transporter 2 Printed/Typed Name: Robert Hurd
Signature:
Month: 2 Day: 10 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Melissa Moon
Signature:
Month: 02 Day: 14 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688313 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	16565	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7545, Profile 070249410-1 (1XRoll-off CM)
Bin # 303-22

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature: [signature]
Month: 02 Day: 09 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.: Oct 9 17

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature: [signature]
Month: 2 Day: 9 Year: 17

Transporter 2 Printed/Typed Name: Kevin Cable
Signature: [signature]
Month: 2 Day: 10 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H089			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: William Mosier
Signature: [signature]
Month: 02 Day: 13 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

ype. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NM8800019434	1	575-524-5911	014688314 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name
Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number
NMR000021162

7. Transporter 2 Company Name
Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number
CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number
NVT330010000

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	10197	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7546, Profile 070249410-1 (1XRoll-off CM)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skousen
Signature: [signature]
Month: 02 Day: 09 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☒ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature: [signature]
Month: 2 Day: 9 Year: 17

Transporter 2 Printed/Typed Name: Chris Edmonds
Signature: [signature]
Month: 2 Day: 13 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Andrea Zavala
Signature: [signature]
Month: 2 Day: 17 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688317 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP) — U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA) — U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	12,746	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7563, Profile 070249410-1 (1XRoll-off CM)

Bond # 0009-20

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard — Signature: [signature] — Month: 03 Day: 07 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brun — Signature: [signature] — Month: 03 Day: 7 Year: 17

Transporter 2 Printed/Typed Name: Jared Kinsey — Signature: [signature] — Month: 03 Day: 09 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Tabitha Mann — Signature: [signature] — Month: 03 Day: 10 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688310 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP) — U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA) — U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	14315	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7537, Profile 070249410-1 (1XRoll-off CM)
Bin # ACT 4028

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard — Signature: [signature] — Month: 02 Day: 13 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown — Signature: [signature] — Month: 2 Day: 17 Year: 17

Transporter 2 Printed/Typed Name: Robert Hund — Signature: [signature] — Month: 2 Day: 24 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Thomas Mann — Signature: [signature] — Month: 02 Day: 28 Year: 17

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DESIGNATED FACILITY TO GENERATOR

#16

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Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688311 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name
Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number
NMR000021162

7. Transporter 2 Company Name
Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number
CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number
NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	14016	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7538, Profile 070249410-1 (1XRoll-off CM)

Bendt AFI 4029

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month 03 Day 08 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature:
Month 3 Day 8 Year 17

Transporter 2 Printed/Typed Name: Jared Kinsey
Signature:
Month 3 Day 13 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Tabitha Mell
Signature:
Month 03 Day 23 Year 17

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DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688312 JJK

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	12038	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7539, Profile 070249410-1 (1XRoll-off CM)

Bond # ACT5118-01

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month 03 Day 07 Year 17

INTL
16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael BROWN
Signature:
Month 3 Day 7 Year 17
Transporter 2 Printed/Typed Name: Justin Curry
Signature:
Month 3 Day 10 Year 17

DESIGNATED FACILITY
18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H039 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Robin Mann
Signature:
Month 03 Day 13 Year 17

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DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688318 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name
Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number
NMR000021162

7. Transporter 2 Company Name
Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number
CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number
NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	15059 ~~12744~~	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7564 Profile 070249410-1 (1XRoll-off CM)

BIN # 9927-20

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I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month 03 Day 08 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature:
Month 3 Day 8 Year 17

Transporter 2 Printed/Typed Name: Robert Hurd
Signature:
Month 3 Day 8 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Robert Mann
Signature:
Month 03 Day 20 Year 17

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DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

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Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688319 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	11,649 ~~12480~~	SM K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7565 Profile 070249410-1 (1XRoll-off CM)
ACT 518-02

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I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarstgard
Signature:
Month 03 Day 07 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: FEDERICO DOMINGUEZ
Signature:
Month 3 Day 7 Year 17

Transporter 2 Printed/Typed Name: Ray Ortega
Signature:
Month 3 Day 7 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in item 18a

Printed/Typed Name:
Signature:
Month 03 Day 17 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Appendix C
Photographic Documentation
Impact Berm Excavation

Figure C.1 **STGT Transfer of Berm Soil – view to the north**

This photograph shows the transfer of STGT impact berm soil to roll off containers located on firing range floor.

Figure C.2 **Excavation of STGT From Front Berm- view to the south**

This photograph shows excavation of STGT impact berm soil from front berm (left - east side) and berm crest.

Figure C.3 **Excavation of STGT From Back Berm – view to the southwest**

This photograph shows excavation of STGT impact berm soil from back berm (right - west side).

Figure C.4 **Ammunition Example**

This photograph shows an example of ammunition recovered from the range floor using a metal detector. Distorted bullets, bullet jackets, and shell casing are visible.

Figure C.5 STGT Impact Berm Following Removal of Soil Lifts – view to the north

This photograph shows the STGT impact berm following removal of soil lifts. Front berm (right - east side), berm crest, and back berm (left - west side) are visible.

Figure C.6 **STGT Range Floor and Impact Berm– view to the west**

This photograph shows the STGT range floor and impact berm showing front end loaders and covered roll off containers.

Figure C.7 **WB-2 Soil Transfer – view to the east**

This photograph shows transfer of soil from the front of the WB-2 impact berm (west side) to a roll off container

Figure C.8 **WB-2 Excavated Soil – view to the east**

This photograph excavated soil (well sorted sand) from the central part of the WB-2 impact berm.

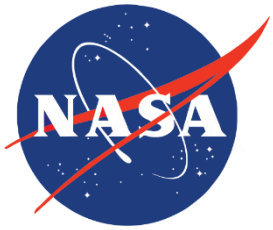
Figure C.9 **Excavation of WB-2 Impact Berm – view to the northeast**

This photograph shows excavation of WB-2 impact berm soil from the front berm (west side) in lifts.

Figure C.10 WB-2 Impact Berm Following Excavation Activities – view to the north

This photograph shows WB-2 impact berm following excavation activities. Stakes represent confirmation sample locations on front and back of berm.

National Aeronautics and Space Administration



Revised Small Arms Firing Ranges (SWMUs 29-31)
Remedy Completion Report

March 2018

Revised April 2020

Revised January 2023

NM 8800019434

Revised Small Arms Firing Ranges (SWMUs 29-31)
Remedy Completion Report

March 2018

Revised April 2020

Revised January 2023

~~NM 8800019434~~

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Timothy J. Davis
Chief, Environmental Office

Date

National Aeronautics and Space Administration

Johnson Space Center
White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012
www.nasa.gov/centers/wstf

www.nasa.gov

Executive Summary

The National Aeronautics and Space Administration (NASA) is required by the White Sands Test Facility (WSTF) Hazardous Waste Permit (Permit; NMED, 2019e) issued by the New Mexico Environment Department (NMED) to develop investigation work plans (IWPs) for identified closed hazardous waste management units (HWMUs) and solid waste management units (SWMUs) at WSTF. Three WSTF small arms ranges are identified in the Permit as SWMUs:

- SWMU 29 – Second TDRSS Ground Terminal (STGT) Small Arms Range.
- SWMU 30 – 200 Area Small Arms Range.
- SWMU 31 – Westbay (WB)-2 Small Arms Range.

In accordance with Permit Section VII.L, NASA and NMED agreed to implement the accelerated cleanup process at these units. The accelerated corrective measures (ACM) activity described in this Remedy Completion Report (RCR) is a presumptive remedy that reduced risks to human health and the environment and achieved cleanup of the SWMUs more rapidly than the IWP process. As indicated in the Permit, the remedy is expected to be final when complete. NMED disapproved this RCR on September 7, 2017 (NMED, 2017b) and directed NASA to revise the report in response to 19 comments in the disapproval. The first revision of the RCR (NASA, 2018) provided additional information required by NMED. NMED disapproved the revised RCR on February 21, 2019 (NMED, 2019a), citing the need for additional information and completion of a screening risk assessment. This revision to the RCR provides the additional information required by the NMED and includes a screening risk assessment provided as a stand-alone report.

This RCR describes the activities performed to conduct field screening at the three firing ranges in order to define the horizontal extent of each study area, recover and dispose of as many ammunition fragments as possible from the surface soil, remove potentially contaminated soil from firing range impact berms, and concurrently perform sampling activities to confirm that concentrations of hazardous constituents in the soil at the firing ranges do not pose a continuing risk to human health or the environment. The activities described in this RCR were implemented at all three historic firing ranges and focused on three elements: the firing range floors; firing range fallout areas; and, firing range impact berms (present at the STGT and WB-2 firing ranges). ACM activities specifically targeted lead (the primary contaminant of potential concern) and six other metals: antimony; arsenic; copper; iron; tin; and zinc. During ACM fieldwork, NASA performed composite soil sample sampling at specific locations established on range floor and fallout area sampling grids and confirmation sampling along the front and back faces of impact berms to provide confirmation of successful cleanup. NMED's two disapprovals indicate that composite soil sampling performed during ACM fieldwork was inadequate to make this determination (NMED, 2017b, 2019b). As part of the fieldwork associated with response to NMED comments, NASA collected discrete soil samples at each range floor and outfall area to replace the previously collected composite samples and used chemical results from confirmation (impact berm) and discrete (range floor and fallout area) soil samples to complete a screening risk assessment in accordance with the NMED *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, 2019b).

The enclosed Risk Assessment Report, White Sands Test Facility, SWMUs 29-31 (RAR; NASA, 2020b) includes a complete comparison of composite and discrete sample chemical results with established background levels found in the WSTF Soil Background Study (NASA, 2015c), approved by the NMED on September 16, 2015 (NMED, 2015c). The background comparison identified the following metals at concentrations greater than background levels:

- STGT Firing Range (SWMU 29) – copper.

- 200 Area Firing Range (SWMU 30) – copper and lead.
- WB-2 Firing Range (SWMU 31) – antimony, copper, lead, and tin.

All metals identified above are identified by the NMED and the Environmental Protection Agency (EPA) as non-carcinogenic toxic substances. The RAR evaluated the toxicity hazard to all identified human (residential, industrial worker, and construction worker) and ecological receptors. The toxicity hazard at each of the three firing ranges for all identified metals cumulatively were less than NMED target levels, indicating the toxicity hazard to human and ecological receptors is minimal. The RAR also evaluates the potential for these metals to impact groundwater beneath each firing range, and this potential was likewise determined to be minimal.

Based on the results of ACM activities, available analytical data, and the screening risk assessment results, NASA concludes that the primary objectives of planned ACM were successfully achieved. Ammunition scraps and fragments were removed from the firing range floors and fallout areas at all three firing ranges. Soil at the firing range impact berms (at the STGT and WB-2 firing ranges) that contained ammunition scraps and fragments was excavated and disposed of at a permitted disposal facility.

Based on current available data, results of the risk assessment, and the status of the three firing ranges, NASA recommends that site restoration and grading at SWMUs 29, 30, and 31 be completed.

Following review and approval of this final RCR and enclosed RAR, NASA will provide confirmation that the remedy has been completed and that the sites have been restored. At that point, NASA will request a "Corrective Action Complete" status determination for the STGT (SMWU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges.

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List of Acronyms

ACM	Accelerated Corrective Measures
ACMWP	Accelerated Corrective Measures Work Plan
AOC	Area of Concern
ASTM	American Society for Testing and Materials
bgs	Below ground surface
BTV	Background Threshold Value
CFR	Code of Federal Regulations
CoC	Chain-of-custody
COPC	Contaminant of Potential Concern
COPEC	Contaminant of Potential Ecological Concern
CWSSL	Construction Worker Soil Screening Level
cy	Cubic Yard
DQO	Data Quality Objectives
EDD	Electronic Data Deliverable
EPA	Environmental Protection Agency
ESL	Ecological Screening Level
FD	Field Duplicate
ft	Feet
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operation and Emergency Response
HIS	Historical Information Summary
HQ	Hazard Quotient
HWMU	Hazardous Waste Management Unit
IMWP	Interim Measures Work Plan
in.	Inch(es)
ISSL	Industrial Soil Screening Level
ITRC	Interstate Technology and Regulatory Council
IWP	Investigation Work Plan
JSC	Johnson Space Center
kg	Kilogram
mg	Milligram
mm	Millimeter
MS	Matrix Spike
NASA	National Aeronautics and Space Administration
ND	Not Detected
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
oz	Ounce(s)
PDF	Portable Document Files
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
QGIS	Quantum Geographic Information System
RA Guidance	Risk Assessment Guidance for Site Investigations and Remediation
RAR	Risk Assessment Report
RCR	Remedy Completion Report
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level

RSSL	Residential Soil Screening Level
SBS	Soil Background Study
SLERA	Screening Level Ecological Risk Assessment
SLHQ	Screening Level Hazard Quotient
SL-SSL	Soil Leachate Soil Screening Level
SSL	Soil Screening Level
STGT	Second TDRSS Ground Terminal
SWMU	Solid Waste Management Unit
TDRSS	Tracking and Delay Relay Satellite System
TRV	Threshold Reference Value
TSDF	Treatment, storage, and disposal facility
UCL95	95th percent Upper Confidence Limit
USCS	United Soil Classification System
USDA	United States Department of Agriculture
WB	Westbay
WMP	Waste Management Plan
WSTF	White Sands Test Facility
XRF	X-Ray Fluorescence

1.0 Introduction

The National Aeronautics and Space Administration (NASA) Johnson Space Center (JSC) White Sands Test Facility (WSTF; Environmental Protection Agency [EPA] Identification Number NM8800019434) has supported testing of space flight equipment and used hazardous materials since 1964. The facility contains five closed hazardous waste management units (HWMUs) that are under post-closure care (PCC) and 37 solid waste management units (SWMUs) within the 100, 200, 300, 400, and 600 Areas. PCC requirements are specified by the NASA WSTF Hazardous Waste Permit (Permit) issued by the New Mexico Environment Department (NMED) in 2009, and recently updated in 2019 (NMED, 2019e).

This Remedy Completion Report (RCR) addresses three historical small arms firing ranges at WSTF. These firing ranges represent SWMUs 29-31 (the Second Tracking and Data Relay Satellite System [TDRSS] Ground Terminal [STGT] Small Arms Range, the 200 Area Small Arms Range, and the Westbay®[1] [WB]-2 Small Arms Range, respectively). The target contaminants associated with the firing ranges sourced from spent lead bullets, copper bullet jackets, and brass casings that were typically distorted (referred to as "ammunition scrap" within the RCR). This RCR summarizes pre-screening field activities, ammunition scrap identification and recovery within the firing range floor and fallout areas, and impact berm soil excavation activities performed in the field between September 2015 and December 2019. Chemical analytical results for the metals concentrations in discrete soil samples were used to develop the enclosed *Risk Assessment Report Small Arms Firing Range (SWMUs 29-31)* (RAR; NASA, 2020) developed in accordance with the NMED publication *Risk Assessment Guidance for Site Investigations and Remediation* (RA Guidance; NMED, 2019b). Results and interpretation of the RAR are presented herein, along with conclusions and recommendations based on the results.

1.1 Facility Location and Description

The NASA JSC WSTF is located at 12600 NASA Road in central Doña Ana County, New Mexico approximately 12 miles northeast of Las Cruces, New Mexico and 65 miles north of El Paso, Texas (Figure 1.1).

1.2 Regulatory Requirements

The Permit issued by the NMED requires the preparation of investigation work plans (IWPs) to assess the potential impact of historical releases of hazardous waste or hazardous constituents. The Permit requires NASA to determine whether these releases may have the potential to serve as continuing sources of groundwater contamination. Attachment 16 of the Permit requires submittal of an IWP for SWMUs 29-31 by December 30, 2014.

While developing the combined IWP for these units, NASA determined that it would be more appropriate to implement interim measures at these SWMUs as indicated in Permit Section VII.G.3. On December 17, 2014, NASA proposed the development and submittal of an Interim Measures Work Plan (IMWP) for SWMUs 29-31 (NASA, 2014) rather than the IWP required by the Permit. NASA also requested additional time to develop and submit the IMWP and proposed a new due date of January 30, 2015. In early January 2015, NMED recommended that NASA consider implementing the accelerated cleanup process described in Permit Section VII.L. The cleanup activities planned for these SWMUs met the requirements established in Permit Section VII.L, so NASA subsequently submitted a proposed outline for the Accelerated Corrective Measures Work Plan (ACMWP; NASA, 2015a). Section VII.H.1.c of the Permit required the submittal of a historical information summary (HIS) in conjunction with each IWP. NASA submitted the *NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Accelerated Corrective*

[1] Westbay is a registered trademark of Nova Metrix Ground Monitoring (Canada) Ltd.

Measures Work Plan and Historical Information Summary on February 26, 2015 (NASA, 2015b) to satisfy these requirements. NMED approved the ACMWP and HIS with modification on May 29, 2015 (NMED, 2015a).

When implemented, accelerated corrective measures (ACM) at the firing ranges reduce risks to human health and the environment by removing and/or recycling the ammunition scrap and lowering concentrations of contaminants of potential concern (COPCs, [Table 1.1]) in soils to levels required by the Permit (i.e., soil screening levels [SSLs]). The ACM also reduce costs associated with cleanup and long-term monitoring of the firing ranges. The Permit required notification to NMED at least 30 days prior to commencing fieldwork associated with the ACM, which was provided by submittal of the ACMWP (NASA, 2015b).

The Permit requires that fieldwork be completed within 180 days after it is initiated. On March 8, 2016, NASA submitted the *Status Update for NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Accelerated Corrective Measures* proposing a revised cleanup strategy (NASA, 2016a). On May 11, 2016, NMED provided the *Approval with Modifications Status Update Small Arms Firing Ranges (SWMUs 29 – 31) Accelerated Corrective Measures* (NMED, 2016a). In order to comply with the additional investigation requirements in NMED's approval with modifications, NASA submitted the *Request for Extension of Time for Small Arms Firing Ranges (SWMUs 29 – 31)* on June 28, 2016 (NASA, 2016b). NMED provided the *Approval Request for Extension of Time for Small Arms Firing Ranges (SWMUs 29 – 31)* on July 28, 2016 (NMED, 2016b), with the requirement that the RCR be submitted no later than March 31, 2017.

NASA submitted the *NASA WSTF Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report* on March 30, 2017 (NASA, 2017a). On September 7, 2017, NMED provided the *Disapproval Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report* (NMED, 2017b). In order to comply with the additional investigation requirements in NMED's disapproval, NASA submitted the *Request for Extension of Time for Response to Disapproval Small Arms Firing Ranges (SWMUs 29-31)* on November 8, 2017 (NASA, 2017b). NMED provided the *Approval Request for Extension of Time for Response to Disapproval Small Arms Firing Range (SWMUs 29-31)* on December 1, 2017 (NMED, 2017c), with the requirement that the revised RCR be submitted no later than March 30, 2018.

NASA submitted the *Response to Disapproval Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report* on March 29, 2018 (NASA, 2018), that was disapproved by the NMED on February 21, 2019 (NMED, 2019a). Due to unforeseen delays in execution of field activities associated with the ongoing wastewater lagoons closure project at the co-located STGT Wastewater Lagoons (Area of Concern [AOC] 51), NASA submitted the *Request for Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Response to Second Disapproval Remedy Completion Report* on October 28, 2019 (NASA, 2019b). NMED provided the *Approval Request for Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29-31) Response to Second Disapproval Remedy Completion Report* on November 13, 2019 (NMED, 2019d), with the requirement that the revised RCR be submitted no later than February 28, 2020. NASA submitted the *Second Request for Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29 – 31) Response to Second Disapproval Remedy Completion Report* on October 28, 2019 (NASA, 2019b). NMED provided the *Approval Request for Second Extension of Time for NASA WSTF Small Arms Firing Ranges (SWMUs 29-31) Response to Second Disapproval Remedy Completion Report* on March 21, 2020 (NMED, 2020), with the requirement that the revised RCR be submitted no later than April 24, 2020.

1.3 Firing Ranges Location and Description

The three historical small arms firing ranges are all sited in the NASA controlled area; two are located at WSTF and one is located at STGT (Figure 1.2). Detailed discussions of the location and description of the firing ranges are provided in the ACMWP and HIS (NASA, 2015b).

1.4 Firing Range Components

The WSTF firing ranges incorporated three main components: the range floor; primary impact berm; and the safety fan or fallout area (ITRC, 2003). A lateral or side berm was present on the south side of the STGT firing range; however, this was not found to have been affected by any direct bullet impacts. The applicable components present at each firing range are depicted in Figure 1.2.

Primary impact berms at the STGT firing range and the WB-2 firing range are well defined. A primary impact berm was not constructed at the 200 Area firing range. The impact berms at STGT and WB-2 received the full force of impact of bullets and fragments, which penetrated up to 10 inches (in.) for native soils used for the berms (silty sandy gravel) and up to 5 feet (ft) for a well-sorted sandy soil encountered in the central part of the WB-2 berm.

At the 200 Area firing range (SWMU 30), an impact berm was not established. Instead, the natural, sloping hillside comprising outcropping limestone beds separated by thin veneers of alluvial cover along the strike of the bedding planes was used as a backstop. Penetration into the rocky backstop at this range was minimal and ammunition scrap were scattered across the fallout area.

Fallout areas represented the areas behind the impact berm and adjacent to the firing range where most bullets are frequently the result of ricochet and are typically found on or near the surface. The extent of the fallout areas at the STGT, 200 Area, and WB-2 firing ranges are discussed in Section 4.0. In addition to the primary fallout areas, an additional area of interest exists at the 200 Area firing range. As indicated in the ACMWP and HIS (NASA, 2015b), sloughing of the hillside used as a backstop is inferred to have transported bullets or bullet fragments down-slope away from the hillside along a small drainage. As with the firing range fallout areas, this area of interest was field screened with the metal detector to determine the location of bullets and bullet fragments.

1.5 ACM Field Methods

The ACM conducted at the STGT, 200 Area, and WB-2 firing ranges comprised the removal and recycling of spent ammunition scrap from range floor, fallout areas, and impact berms. At the 200 Area firing range, the hillside was used as the impact structure and no impact berm was present. The field detection equipment utilized for the identification and recovery of ammunition scrap from the firing range floors and fallout areas was a Whites Coinmaster GT metal detector equipped with a 9 in. diameter concentric coil. NASA was required to demonstrate that the equipment utilized during the metal detector survey was designed for a level of sensitivity that allowed for comprehensive survey and removal of buried firing range constituents (NMED, 2016a).

Prior to field screening with the metal detector, a field test was conducted to evaluate the capability of the equipment. The field test was performed to demonstrate that ammunition scrap clearly registered at a variety of depths in the native soil of the area. Ammunition scrap including whole bullets and fragments of shell casing were buried to depths of up to 12 in., which exceeded the maximum depth anticipated for ammunition fragments at the firing ranges. The metal detector was able to successfully identify whole bullets (approximate weight 20 grams) and small pieces of ammunition scrap (approximate weight 3 – 5 grams) to the target depth of 12 in. The primary issue with the identification of ammunition scrap in the

field was later determined not to be the capability of the metal detector, but the increased time required for the identification and location of smaller fragments during the sieving process for recovery.

User reviews for the metal detector similarly indicate a 12" depth capability on a United States quarter (weight approximately 5.7 grams). Almost all of the bullets and ammunition scrap at the STGT, 200 Area, and WB-2 firing ranges were detected and recovered at depth of 6 in. or less within the firing range floor and fallout areas. Smaller pieces of ammunitions scrap of limited weight were typically found at, or near (within 2 in.) of the surface. Bullets were only found to penetrate soil by 6 in. or greater where fired directly into the impact berms at the STGT and WB-2 firing ranges. In these cases, the composition of the berm soil had a significant effect on the depth of penetration. Impact berm ammunition scrap was not removed through manual recovery processes, but by progressively excavating the soil in 6 in. lifts until the metal detector surveys indicated no further detections.

Ammunition scrap removal was initially followed by composite soil sampling (fallout area) and confirmation sampling (impact berms) to verify that the soils within and adjacent to the firing ranges did not contain residual contamination that presented a risk to human health and the environment. Based on comments received by the NMED in both disapprovals to the RCR (NMED, 2017b, 2019a), NASA collected discrete soil samples at each firing range to assess potential residual contamination present following completion of corrective measures. The ACM is limited in scope to the shallow soil, and to the areas impacted by the three small arms firing ranges.

2.0 Types of Results

The soil sample results presented for the STGT, 200 Area, and WB-2 firing ranges fall into three categories: firing range floor soil samples; firing range fallout area soil samples; and, impact berm soil samples. Because no berm or backstop existed for the 200 Area firing range, confirmation berm samples were not collected. Instead, a comprehensive search for ammunition scrap was performed across the outcropping limestone located behind the former firing range within the surrounding fallout area.

2.1 Firing Range Floor Soil Sampling

Established sampling grids provided comprehensive sampling coverage of the footprints of former range floors. Firing range floor samples were collected during an individual sampling event to evaluate the concentrations of target metals soil samples in the range floor between the maximum distance firing line and the berm/backstop. Initially, each soil sample was composited from five locations within each grid cell. It was ultimately determined that composite sampling was not fully representative of contaminants of potential concern (COPC) presence. Discrete soil samples were required to confirm that corrective measures at the firing ranges were successful (NMED, 2017b). NASA collected discrete soil samples in 2019 from each grid cell that was composite sampled during initial ACM fieldwork. Results of composite soil samples were replaced with results of discrete soil samples for evaluation in this RCR.

2.2 Firing Range Fallout Area Soil Sampling

Established sampling grids were constructed to provide comprehensive sampling coverage of the footprints that define the fallout areas outside of the range floors. The fallout grids were defined following the manual recovery of ammunition scrap associated with firing range operations throughout the fallout areas. The fallout areas were characteristically fan shaped, widening with distance from the firing line. Each fallout grid incorporated the location of the impact berm where present. Firing range fallout soil samples were collected during a single sampling event following the manual recovery of all ammunition scrap within the fallout area. Initially, each soil sample was composited from five locations within each grid cell. As mentioned above, it was ultimately determined that composite sampling was not fully

representative of potential COPC presence (NMED, 2017b). NASA collected discrete soil samples of the fallout area at each firing range in late 2019. Results of composite soil samples were replaced with results of discrete soil samples for evaluation in this RCR.

2.3 Firing Range Impact Berm Confirmation Soil Sampling

The firing range impact berm soil sampling was performed to provide final confirmation evaluation of the condition of the residual soil remaining following excavation of the berm. Excavation was performed in conjunction with soil screening using a metal detector of the berm surface each time a progressive soil lift was removed. Impact berm soil samples were collected during an individual soil sampling event to ensure all soil containing residual ammunition scrap had been removed from the berm. Each soil sample was collected from a single discrete location as required by NMED (NMED, 2015a). Results of discrete soil samples were evaluated in this RCR.

2.4 Soil Analytical Results

Data packages from off-site analytical laboratories consisted of two primary components: comprehensive reports submitted as Adobe portable document files (PDF) for review and archiving; and electronic data deliverable (EDD) files to facilitate transfer of chemical analytical data into WSTF's analytical database(s). The PDF reports included laboratory name, report date, sample-specific information, analyte names and Chemical Abstract Service numbers, analytical results, quality control (QC) sample results, data qualifiers and narratives, pertinent analytical notes, laboratory reviewer signatures, and a variety of other information specific to the laboratory and analytical method. The EDD included the associated electronic data.

3.0 Background

The following sections discuss historical information, previous investigations, and COPCs for the STGT (SWMU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges.

3.1 Historical Information

Results of historical research conducted on the STGT, 200 Area, and WB-2 firing ranges was presented in the ACMWP and HIS (NASA, 2015b). Refer to those submittals for details.

3.2 Previous Investigations

No previous investigations have been conducted at SWMUs 29-31. The STGT, 200 Area, and WB-2 firing ranges are not located within the known footprint of the WSTF groundwater contaminant plume.

3.3 Contaminants of Potential Concern

The ACMWP and HIS (NASA, 2015b) reported that lead bullets, with and without copper jackets, were discharged at each of the firing ranges and allowed to accumulate on site. There was no evidence that other hazardous wastes or hazardous constituents were managed or disposed of at these sites. Therefore, COPCs consist of components used in the manufacture and discharge of small arms ammunition (ITRC, 2003). The COPCs for this cleanup are provided in Table 1.1, which also provides the NMED soil screening level (SSL) and soil leachate SSL (SL-SSL) or EPA regional screening level (RSL), where available. Soil samples collected during ACM field activities were analyzed for these COPCs and compared to NMED SSLs or EPA regional screening levels.

3.4 Site Conceptual Exposure Model

To summarize the site conceptual exposure model discussed in the ACMWP (NASA, 2015b), spent ammunition scrap in soil is the source of contamination at the firing ranges, airborne transport by wind and surface transport by precipitation runoff of contaminated soil are the primary release mechanisms, and exposure pathways of ingestion, inhalation, and dermal contact with the ~~lead~~ contaminated soil are considered complete for the construction and industrial worker exposure scenarios. COPC concentrations measured at the firing ranges were directly compared to NMED construction worker soil screening levels (CWSSLs) and industrial soil screening levels (ISSLs). COPC concentrations in firing ranges soil were also compared to more conservative residential soil screening levels (RSSLs) and SL-SSLs. When no NMED SSL was available, the EPA RSL was used for comparison. Environmental conditions at WSTF are not considered conducive to dissolution of lead and subsequent migration to groundwater. Current groundwater chemical analytical data indicate that WSTF groundwater, including groundwater monitored near the firing ranges and pumped from the NASA WSTF water supply wells located downgradient, is not contaminated with the COPCs identified for this ACM.

3.5 Data Quality Objectives

The corrective measures and sampling methodology were developed based on input from NMED personnel, the Accelerated Cleanup Process requirements of the Permit (NMED, 2019e; Section VII.L), *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges* (ITRC, 2003), Guidance on *Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006), and the investigation and sampling requirement specified in Attachment 17 of the Permit. The data acquisition plan (i.e., sampling design) is based on the data quality objectives (DQO) process.

3.5.1 Problems and Objectives

The ACM problem statement is summarized in the Permit (NMED, 2019e; Section VII.L), which states that "[t]he accelerated cleanup process shall be used at sites to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered to be the final remedy for the site, and where field work will be completed within 180 days of the commencement of field activities." Based on available groundwater chemical analytical data, the depth to groundwater at the three firing ranges, and the relative immobility of lead and other COPCs through WSTF soils, NASA does not believe that groundwater has been impacted by historical operations at the sites, thus groundwater cleanup at these locations is not required as part of the ACM. Subsequent to NMED approval of the ACMWP (NMED, 2015a), it was expected that following the cleanup activities and confirmation sampling presented in this RCR, the remedy would be complete and no further investigatory or corrective actions would be required at the firing ranges.

There are known and suspected quantities of COPCs in the soil at the historical firing ranges that constitute SWMUs 29-31. As the priority of the ACM, cleanup activities were performed to remove as much contamination as possible from the soil at these sites. As part of ACM activities, soil sampling was performed for the firing range floor, firing range fallout area, and impact berm (where applicable) at each SWMU to determine if residual soil contamination presents a risk to human health or the environment. The problem statement for the remedy completion of SWMUs 29-31 is: confirm that soil beneath, and where applicable downgradient, of the three historical firing ranges does not contain hazardous constituents at concentrations above regulatory limits as a result of past activities.

3.5.2 Information Inputs

The primary decision after cleanup of SWMUs 29-31 is whether ACM activities effectively reduced the risk to human health or the environment. Alternative actions for the decisions include:

- Consider a "Corrective Action Complete" status determination.
- If needed, perform additional remedial activities to complete the corrective measures implementation, thus mitigating source(s) of continuing contamination or human health risk.

The COPC concentrations measured in soil following ACM activities at SWMUs 29–31 are the primary inputs to the decision. COPCs for this investigation were identified using two primary information sources:

- Available literature that provides information regarding the assessment and cleanup of small arms firing ranges.
- Detailed information pertinent to the operational history and use of materials documented in the SWMUs 29-31 HIS (NASA, 2015b) through a variety of historical documents and reports, personnel interviews, and personnel questionnaires.

3.5.3 Spatial Extent of Investigation

This investigation addresses, and is limited to, the shallow surface soils beneath SWMUs 29-31 and associated areas, as applicable. This includes the Small Arms Ranges at STGT (SWMU 29), the 200 Area (SWMU 30), and WB-2 (SWMU 31; Figure 1.2), as well as any nearby areas impacted by historical activities at these SWMUs. The extent of ammunition scrap was conclusively determined during field activities utilizing the initial metal detector surveys that defined the fallout areas as part of the pre-screening investigation phase. This allowed definition of the horizontal boundaries of each study area, which had to be clearly defined in order to successfully complete ACM activities.

3.5.4 Performance or Acceptance Criteria

The performance or acceptance criteria are as follows: ACM activities continued until cleanup levels as described in Permit Attachment 15 for direct exposure routes under the NMED ISSL and CWSSL scenarios were achieved for site soils as determined by analytical testing. NASA also performed a comparison of ACM soil sample results to the NMED RSSL scenario. Following completion of corrective measures, final confirmation soil sampling as directed by NMED (Comment 7; NMED, 2017b), final updating of the RCR, completion of an RAR, and any subsequent site restoration activities, a "Corrective Action Complete" status determination for each of the firing ranges will be requested. The request will be provided as a separate submittal.

4.0 Scope of Activities

This section provides a summary of all activities performed as part of accelerated corrective measures at the firing ranges (SWMUs 29-31).

4.1 Safety and Health Measures

Safety and health measures employed during ACM field activities were conducted in accordance with requirements of Occupational Safety and Health Administration Standards for Hazardous Waste Operations and Emergency Response (HAZWOPER; 29 Code of Federal Regulations [CFR] 1910.120 [a] – [o], 2013), the environmental contractor's Corporate-wide Safety and Health Plan with site-specific

documentation to address potential hazards for the project, and the ACMWP. Daily Tailgate Safety meetings were conducted, recorded, signed by the daily project crew, and are maintained in the project file. Additional details on safety and health measures used during ACM field activities are available in the ACMWP (NASA, 2015b).

4.2 Field Documentation

ACM field activities were documented using a field logbook, field data records, and/or any required site-specific procedural documentation. Pertinent logbook notes documenting the field activities are included as Appendix A. Logbook entries included, as applicable, information such as:

- Standard daily header – project name, logbook number, date, weather conditions, team members present and their affiliations (including subcontractors), sample location identification, day's task(s), daily safety meeting topics, personal protective equipment (PPE) to be used, equipment in use, and any calibration information, if applicable.
- Daily activities (time and observations recorded) – site arrival and departure, cleanup or investigation activities planned and completed, visitors and the purpose of their visit, field and laboratory sample information, soil type, soil conditions, decontamination (i.e., method, equipment cleaned), hazardous waste management procedures and waste quantities, and reference data sheets or maps, if applicable.
- Daily summary – action items, materials used, changes or deviations made from planned protocol, and a summary of plans for the next day of fieldwork.
- Signatures (field personnel and logbook reviewer) and relevant dates.

Field records included Daily Tailgate Safety meeting forms, observations of soil conditions, location surveys using Global Positioning System (GPS), and sample documentation. For analytical samples, the date, location, depth, sample type, collection method, identification number, sampler, and any circumstances, events, or decisions that could impact sample quality were documented. In addition to the field logbook entries for sampling events, chain-of-custody (CoC) forms were completed for analytical samples and maintained with project documentation.

Evidential records for the entire project are maintained in hard copy or electronic form and consist of:

- Project ACMWP with any revisions.
- Site-specific internal procedural documentation or plans.
- Project logbooks.
- Field data records (i.e., surveyed site location).
- Sample CoC forms.
- Correspondence with NMED.
- Final analytical data packages.
- Reports.
- Hazardous Waste Manifests documenting the off-site shipment and disposal of excavated soil.
- Miscellaneous related records such as meeting sign-in sheets, photos, maps, drawings, etc.

4.3 Decontamination

Decontamination procedures were performed by personnel who have completed the HAZWOPER (29 Code of Federal Regulations [CFR] 1910.120 [a] – [o]) 40-hour training personnel wearing appropriate PPE. The decontamination of heavy equipment was performed under the supervision of the site supervisor.

Individual smaller-scale decontamination areas were constructed adjacent to each firing range to collect and contain soil brushed from the sampling equipment. Small, non-disposable sampling equipment was decontaminated at these small decontamination areas. Smaller reusable sampling equipment that contacted soil samples was decontaminated, first by hand washing the item with non-phosphate detergent such as Alconox®[2], rinsing with WSTF potable water, and finally by rinsing with purified water. Field screening instruments, such as the metal detector were wiped with a clean rag moistened with WSTF potable water before use at the next firing range. Solid waste materials removed from the equipment and the wipes used were managed as indicated in the ACMWP. All soil sampling equipment was decontaminated after completion of sampling activities within each grid cell and between collection of discrete soil samples.

Heavy equipment used for the impact berm excavation component of the ACM was decontaminated prior to commencement of activities at the STGT and WB-2 firing ranges. Heavy equipment was also decontaminated following excavation activities at the STGT and WB-2 firing ranges. General decontamination guidance available in American Society for Testing and Materials (ASTM) D5088-02 (ASTM, 2008) was followed for this project. The decontamination of heavy equipment was performed at the existing concrete decontamination pad in the 600 Area.

Soil was removed from heavy equipment using a shovel. The removal of any solids from the heavy equipment was performed over Department of Transportation-compliant roll-off boxes lined with plastic sheeting used to collect the excavated berm soil. All solid materials were removed from the equipment prior to leaving the firing range areas.

4.4 Investigation-Derived Waste Management

As required by Permit Attachment 20 (Section 20.2.13), a Waste Management Plan (WMP) was provided with the ACMWP (NMED, 2019e). The WMP provided a description of potential wastes that would be generated from the small arms firing ranges (SWMUs 29-31) ACM and procedures for waste management, waste characterization, and waste disposition. Waste generated during the project included:

- Metal ammunition scraps and fragments from each of the three small arms firing ranges.
- Environmental media – soil progressively excavated in lifts from the surface of firing range back berms at the STGT firing range (SWMU 29) and the WB-2 firing range (SWMU 31).
- Decontamination water from soil sampling and excavation equipment.
- Sampling debris:
  - Non-dedicated sampling equipment
  - Disposable PPE
  - Plastic sheeting

[2] Alconox is a registered trademark of Alconox, Inc.

- Rags

4.4.1 Waste Management Plan Deviations

NASA requested to modify the clean-up strategy for bullets and bullet fragments at SWMUs 29-31 in a March 8, 2016 project status update (NASA, 2016a) that was provided to the NMED. The strategy was approved with modifications by the NMED on May 11, 2016 (NMED, 2016a). The revised strategy included excavation and disposal of lead contaminated environmental media in lieu of mechanically separating spent small arms bullets and bullet fragments from impacted soil berms at the WB-2 and STGT firing ranges. This new strategy required a change to the waste characterization and management procedures identified for environmental media in the WMP. Specific deviations from the WMP procedures as a result of the revised clean-up strategy, and rationale for the changes were:

- **Environmental media definition** – The WMP identified environmental media as soil spoils from mechanical separation of bullets and bullet fragments. As described in NASA's revised clean-up strategy (NASA, 2016a), the mechanical separation of bullets and bullet fragments originally proposed in the ACM was substituted with the removal of impacted soil from the firing range berms. The change was made for technical and financial reasons. After initial field screening, NASA determined that off-site disposal was practical and the preferred clean-up method at other small arms firing ranges.
- **Environmental media characterization** – In lieu of managing soil spoils from sieving as unregulated material as described in the ACM, contaminated soil was instead excavated, characterized as hazardous waste, and managed in accordance with 20.4.1.300 NMAC and 40 CFR 262.17 (2017). The revised scope of the project, to include the generation of lead contaminated soil, required a change to the waste characterization originally stated in the WMP for environmental media.
- **Final characterization and disposal of metal ammunition scraps and fragments** – NASA proposed in the original WMP to recycle ammunition scraps and fragments at the conclusion of the project. Bullets, bullet fragments, and casings were accumulated and managed as materials for recycle during the project, but a cost-effective recycling path for this waste stream was not identified. NASA evaluated the cost to recycle the amount of bullets, bullet fragments, and casings accumulated during the project and determined it to be more cost effective and expedient to properly dispose of this waste stream as hazardous waste. After this decision was made, bullets, bullet fragments, and casings collected during the project were consolidated with lead contaminated soil in a roll-off container and shipped off-site for treatment and disposal as hazardous waste. A small amount of bullets and bullet fragments recovered from the STGT and WB-2 firing ranges during 2019 ACM screening efforts were combined with other lead recyclable materials that were generated at the active WSTF firing range.

4.4.2 Waste Characterization

Initial waste characterization for this project was provided in the WMP submitted with the ACMWP (NASA, 2015b). Deviations to the waste characterization described in the WMP for environmental media and metal ammunition scraps and fragments as a result of implementing the revised clean-up strategy were summarized in Section 4.4.1. Final waste characterization was conducted in accordance with the requirements of the WSTF Hazardous Waste Permit and Waste Analysis Plan, Permit Attachment 12 (NMED, 2019e).

Metal ammunition scraps and fragments consisted of bullets, bullet fragments, and casings collected from the firing range floors and fallout areas and were initially characterized as recyclable materials, which are exempt from hazardous waste management requirements per 40 CFR 261.6(a)(3)(ii). The ammunition

scraps and fragments were collected manually and hand-sieved from the firing range floors and fallout areas at the STGT, 200 Area, and WB-2 firing ranges. The majority of this material was subsequently re-characterized as hazardous waste exhibiting the lead D008 toxicity characteristic once it was determined it would not be recycled. A small amount of bullets and bullet fragments recovered from the STGT and WB-2 firing ranges during 2019 ACM screening efforts continued to be managed as recyclable material. These were combined with other lead recyclable materials that are routinely generated at the active WSTF firing range.

Environmental media (soil) generated from removal of STGT and WB-2 firing ranges berms contained lead ammunition scraps and fragments. Though the soil itself was not inherently waste-like, it was managed as exhibiting a characteristic of hazardous waste through application of the EPA Contained-in policy (EPA, 1998). The contaminated soil was characterized as hazardous waste exhibiting the lead D008 toxicity characteristic because of the presence of lead ammunition scraps and fragments.

Wastewater was generated during decontamination of tools, non-disposable sampling equipment, and excavation equipment. The water used for decontamination activities had a neutral pH that would not cause metals from soil or equipment to leach into the waste. The decontamination water also did not contain any visible metals. Given results of samples collected during the soil investigation at SWMUs 29-31, it was concluded that the decontamination water did not contain metal concentrations that would exceed the 40 CFR 261.24 (2012) toxicity characteristic threshold concentrations for COPC for this project (lead [D008]: 5.0 mg/L; arsenic [D004]: 5.0 mg/L). Using this information, the decontamination water was characterized as non-hazardous solid waste.

Sampling debris generated during the project included non-dedicated disposable sampling equipment, PPE, plastic sheeting, and rags. Analysis of results from the SWMU 29-31 soil investigation indicated that any debris that came into contact with the ammunition scraps and fragments or environmental media would not exceed the maximum concentration of contaminants for the COPC metal constituents found in Table 1 of 40 CFR 261.24 (lead [D008]: 5.0 mg/L; arsenic [D004]: 5.0 mg/L). NASA determined the sampling debris did not exhibit hazardous waste toxicity characteristics, and the sampling debris were characterized as non-hazardous solid waste.

4.4.3 Waste Accumulation, Management, and Disposal Activities

Metal ammunition scraps and fragments were accumulated in 1-gallon plastic bags, which were sealed and placed into a 55-gallon container. The ammunition scraps and fragments were initially managed as materials for recycle, or scrap metal, that were exempt from hazardous waste management requirements per 40 CFR 261.6(a)(3)(ii) (2012). Bullet and bullet fragments recovered from the STGT and WB-2 firing ranges during 2019 ACM screening efforts were combined with other lead recyclable materials that were generated at the active WSTF firing range. These materials are pending recycling. For the remainder of ammunition scraps and fragments generated during this project, NASA determined it was not economically feasible to recycle these materials. After this determination was made, NASA began managing the ammunition scraps and fragments as hazardous waste and emptied a 55-gallon container with these materials into the 20-cubic yard (cy) roll-off container of contaminated soil from the STGT Firing Range. This waste was managed in accordance with the requirements of 20.4.1.300 NMAC and 40 CFR 262.17 (2017) and subsequently shipped to a RCRA permitted treatment, storage, and disposal facility (TSDF) for proper treatment and disposal of the waste.

Contaminated soil was managed as hazardous waste exhibiting the lead D008 toxicity characteristic and was managed in accordance with 20.4.1.300 NMAC and 40 CFR 262.17 (2017). The lead contaminated soil was placed into 20-cy roll-off containers that were lined with plastic sheeting. The liner was sealed after adding waste to each container, and the roll-off containers were transported off-site to a RCRA permitted TSDF for treatment and disposal. Four 20-cy roll-off containers and four 1-cy Super Sacks with

a combined weight of 57,569 kilograms (kg) were shipped from the WB-2 firing range for disposal. A total of six 20-cy roll-off containers with a combined weight of 79,823 kg were transported from the STGT firing range for disposal. One roll-off from the STGT firing range also contained the ammunition scraps and fragments collected from fallout areas and range floors from the initial phase of the project. Lead contaminated soil removed from the WB-2 and STGT impact berms was shipped off-site for treatment and disposal at a RCRA permitted TSDF operated by US Ecology in Beatty, Nevada. The hazardous waste manifests documenting hazardous waste transport (ACT Environmental Services, Chaparral, New Mexico) and subsequent treatment and disposal (US Ecology, Beatty, Nevada) are provided in Appendix B.

Water used to decontaminate soil sampling and excavation equipment was collected in a 55-gallon container and managed as non-hazardous waste. Prior to August 2015, decontamination water was discharged to the STGT Wastewater Lagoons, subsequent iterations of decontamination water was discharged to the WSTF sanitary sewer system. Sampling debris were collected in a 55-gallon container and managed as non-hazardous waste throughout the project period. Once sampling and investigation activities had concluded, the debris were bagged and placed in a solid waste dumpster and transported to a permitted Subtitle D landfill for disposal.

4.5 Accelerated Corrective Measures

ACM activities performed comprised three primary phases of work:

- Pre-screening activities comprised preparatory firing range floor soil sampling, the delineation of the firing range fallout area boundaries, and partial manual ammunition scrap recovery. These activities were proposed in the original ACMWP (NASA, 2015b).
- Following a subsequent status update provided by NASA (NASA, 2016a) and associated modifications and requirements provided by NMED (NMED, 2015a, 2016a), ACM field activities comprised supplemental firing range fallout area soil sampling and continued manual ammunition scrap recovery.
- The final phase of work consisted of excavation activities focused on impact berm cleanup in conjunction with the conclusion of manual ammunition scrap recovery. The cleanup and sampling activities were planned in accordance with Permit Section VII.L and are based primarily on *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges* (ITRC, 2003), with additional consideration of project DQOs and other requirements of Permit Attachment 17.

Basic sampling grids for each of the range floors were established for each firing range in the ACMWP. Figure 4.1, Figure 4.2, and Figure 4.3 provide the sampling grids established for the STGT firing range (SWMU 29), the 200 Area firing range (SWMU 30), and the WB-2 firing range (SMWU 31), respectively.

4.5.1 Chronology of Events

A summary of the chronology of field events related to soil sampling and ammunition scrap recovery at the STGT, 200 Area, and WB-2 firing ranges is provided below.

STGT Firing Range (SWMU 29)

- Prescreening activities
  - Firing range floor sampling grid – soil samples collected 9/14/15 – 9/16/15 and shipped to the analytical laboratory on 9/23/15. Samples for X-Ray Fluorescence (XRF) analysis delivered to WSTF Laboratory same day as collection.

  - Fallout area – manual recovery of fallout area ammunition scrap performed 9/15/15 – 3/1/16.
  - Range floor and berm of southern lagoon had previously been off limits, cleared to screen for scrap ammunition with metal detector completed 11/13/19 – 11/18/19.
- ACM field activities
  - Fallout area sampling grid – soil samples collected 1/17/17 – 1/20/17 and shipped to the analytical laboratory on 1/24/17.
  - Fallout area – manual recovery of fallout area ammunition scrap performed 5/16/16 – 3/15/17.
  - Firing range floor – manual recovery of range floor ammunition scrap performed 3/6/17 – 3/7/17.
  - Fallout area and range floor resampled for discrete soil samples. Samples collected 9/18/19 – 9/26/19 and shipped to analytical laboratory 9/26/19.
  - Cleared to survey cells located in southern lagoon floor and adjacent berms; collected soil samples from said grid cells 11/19/19. Samples shipped to analytical laboratory on 11/20/19.
- ACM excavation activities
  - Impact back berm/backstop – soil excavation performed 2/8/17 – 2/27/17.
  - Impact berm/backstop – confirmation soil samples collected 3/1/17 and shipped to the analytical laboratory on 3/2/17.

<u>200 Area Firing Range (SWMU 30)</u>

- Prescreening activities
  - Firing range floor sampling grid – soil samples collected 9/4/15 and shipped to the analytical laboratory on 9/9/15. Samples for XRF analysis delivered to WSTF Laboratory same day as collection.
  - Fallout area – manual recovery of fallout area ammunition scrap performed 9/4/15 – 9/14/15.
- ACM field activities
  - Fallout area sampling grid – soil samples collected 1/3/17 – 1/5/17 and shipped to the analytical laboratory on 1/10/17.
  - Firing range floor – manual recovery of range floor ammunition scrap performed 1/3/17 – 1/5/17.
  - Fallout area and range floor resampled for discrete soil samples. Samples collected 9/26/19 – 9/30/19 and shipped to analytical laboratory 10/1/19.
- ACM excavation activities
  - No impact berm/backstop, no work performed.

<u>WB-2 Firing Range (SWMU 31)</u>

- Prescreening activities
  - Firing range floor sampling grid – soil samples collected 8/27/15 – 9/4/15 and shipped to the analytical laboratory on 9/9/15. Samples for XRF analysis delivered to WSTF Laboratory same day as collection.

  - Fallout area – manual recovery of fallout area ammunition scrap performed 8/27/15 – 9/3/15.
- ACM field activities
  - Fallout area sampling grid – soil samples collected 11/15/16 – 11/16/16 and shipped to the analytical laboratory on 11/21/16.
  - Firing range floor – manual recovery of range floor ammunition scrap performed 11/15/16 – 11/16/16.
  - Fallout area and range floor resampled, discrete soil samples. Samples collected 10/1/19 – 10/3/19 and shipped to analytical laboratory 10/7/19.
  - Recovery of remaining trace ammunition scrap at the former impact berm 10/20/19 - 10/21/19. Due to the high density of ammunition scrap, it was determined that the best course of action was to excavate soil from the impact berm for removal and off-site disposal at a permitted TSDF for treatment and disposal.
- ACM excavation activities
  - Impact back berm/backstop – soil excavation performed 2/1/17 – 2/6/17.
  - Impact back berm/backstop – soil confirmation samples collected 2/7/17 and shipped to the analytical laboratory on 2/9/17.
  - Final soil excavation and scrap recovery from front of WB-2 berm area 12-12-19. Approximately 4 cy of soil and scrap removed, placed into Super Sacks, and transferred to a permitted TSDF for treatment and disposal.

4.5.2 Soil Sampling Procedures

4.5.2.1 Composite and XRF Samples

Soil samples were collected following the guidelines outlined in the ACMWP (NASA, 2015b). During the pre-screening project phase only, soil samples were collected for analysis by both the WSTF Laboratories using a XRF instrument and a contracted off-site analytical laboratory using SW-846 Method 6010C. The results of the samples evaluated using the XRF were compared with the off-site chemical analysis of the corresponding soil sample. All remaining ACM project phases utilized an off-site contracted analytical laboratory for soil sample analysis.

In order to obtain representative soil samples from the firing range floors and fallout areas, five subsamples from each sample grid cell were collected and composited. Each subsample was collected from a vertical soil column of approximately 6 in. Subsamples were collected using a standard shovel and were placed in a stainless-steel bowl to facilitate thorough mixing. The composited sample was then collected with a decontaminated stainless-steel trowel to fill sample containers for submittal to the off-site chemical analytical laboratory and for further preparation prior to analysis using the XRF instrumentation. Unprepared (unsifted) samples were provided to the chemical analytical laboratory and sifted and unsifted samples to the WSTF Laboratories for the XRF analyses. Unused soil was returned to the subsample locations, and the sampling equipment decontaminated prior to compositing and collection of the next sample.

After collecting the sample for the off-site analytical laboratory (described below), a polyethylene baggie was filled with unprepared soil and a second with soil prepared by sifting using a 2-millimeter (mm) mesh to remove large objects, then grinding with a pestle to reduce particle size to less than 0.250 mm. Both baggies were labeled with the date and sample location. The moisture content of WSTF soils averages 5-8 percent therefore further preparation by drying the sample was not considered necessary. The soil samples

were analyzed using a ThermoNiton XL3t 980 Goldd+ portable XRF spectrometer (s/n 84659). XRF detection limits were less than the applicable regulatory limits, thus providing adequate characterization of specific COPC concentrations in the soil (NASA, 2015b).

The portion of the composited sample not prepared for XRF analysis was placed in a 4-ounce sample container provided by the off-site laboratory. Excess soil around the top of the sample containers was removed to ensure proper lid fit and container closure, and the jars were labeled and sealed with CoC seals. The NMED does not consider results of composite samples fully representative of COPC concentrations remaining in soils (NMED, 2017b, 2019a), so results of composite samples are not evaluated in this RCR.

4.5.2.2 Discrete Samples

Initially, composite soil samples were collected from the range floor and fallout area of each firing range, and discrete soil samples were collected from the impact berms at the STGT and 200 Area Firing Ranges. An impact berm was not constructed at the 200 Area Firing Range. Based on NMED comments (NMED, 2017b, 2019a) stating that composite samples are not appropriate to characterize COPC concentrations in soils, NASA collected discrete soil samples at each range floor and fallout area following completion of ACM activities (ammunition scrap removal).

Discrete soil samples were submitted to an off-site analytical laboratory and analyzed by SW-846 Method 6010C. Sample collection methods are described as follows.

NASA collected discrete soil samples from each grid cell (Figure 4.4, Figure 4.5, and Figure 4.6) that were not discretely sampled during initial ACM fieldwork. To accomplish this, each grid cell was evenly divided into quadrants which were numbered “1” through “4,” with quadrant 1 as the northwest corner, quadrant 2 as the northeast corner, quadrant 3 as the southwest corner, and quadrant 4 as the southeast corner. A spreadsheet was generated via Excel random number generator, which was used to identify the target quadrant within each grid cell for sampling. A discrete soil sample was then be collected from the approximate center of each randomly selected quadrant. Sampled locations were named in the following manner: cell “STGT 4.2” indicates STGT site, Cell number 4, northeastern quadrant approximate center.

Discrete soil samples were collected using hand tools (hand auger or shovel) that was decontaminated before initial use and between each sample location. Collected soil samples were placed in a 4-ounce sample container provided by the off-site laboratory. Excess soil around the top of the sample containers was removed to ensure proper lid fit and container closure, and the jars were labeled and sealed with CoC seals. In total, 229 discrete soil samples were collected from the three firing ranges.

4.5.2.3 Sample Quality

All samples collected were handled in a manner that maintained their integrity. The following applied to soil sampling performed for this ACM:

- The inside of soil sample containers was not touched. Dedicated chemical resistant gloves were donned prior to sample collection to prevent cross-contamination.
- All samples were collected in a manner that minimizes the introduction of foreign material (e.g., dust, rain, and snow).
- Laboratory-specified holding times, containers, and preservatives were utilized.
- Equipment was decontaminated before initial use and between individual sample collection locations to prevent contamination and cross-contamination of samples.

- Multiple use sampling equipment was decontaminated in accordance with the applicable site-specific internal procedural documentation and ASTM D5088-02 (ASTM, 2008).

Field quality control samples were collected as described below to ensure high quality data were generated during the cleanup.

- Field rinsate (equipment) blanks were collected from the sampling tooling, (1) at the onset of each day prior to sampling activities, (2) between each firing range project area, and (3) when the equipment tooling was required to leave the project site prior to completion of the project.
- Field duplicate (FD) samples were collected at 10% of soil sampling locations designated for chemical analysis. Duplicate samples were analyzed for the same parameters as the primary samples.
- Matrix spike (MS) samples were collected at 5% of soil sampling locations designated for chemical analysis. MS samples were analyzed for the same chemical analytical parameters as the primary samples.

Comprehensive internal procedures for sample collection, shipping, and management were utilized to ensure appropriate sample management. These procedures provide specific information on sample management and related documentation, including instructions for sample custody (internal to NASA and external during shipment), storage, packaging, shipment, delivery tracking, and related recordkeeping.

4.5.3 Manual Recovery of Ammunition Scrap

The ammunition scrap cleanup objectives within the firing range fallout areas (pre-screening phase) and on the firing range floors (ACM fieldwork phase) were accomplished using manual recovery methods. Where ammunition scrap, including bullets, jackets, and casings were observed or identified with field equipment during field screening, the materials were manually recovered in order to mitigate the finding at that location. Comprehensive ammunition scrap recovery was achieved by manually separating bullets and bullet fragments from indigenous soils and berms impacted by firing range activities as described in this section. However, when ammunition scrap density appeared high in localized areas of the impact berms, it was determined that the most effective means of removal would be excavation and off-site disposal of the contaminated soil. Care was taken to limit the amount of soil removed and limit disturbance of the specific location and site.

4.5.3.1 Screening Survey Sections

To ensure that each fallout area and firing range floor was properly screened for the manual recovery of ammunition scraps and fragments, NASA established individual survey sections within each area. The size and shape of individual survey sections varied depending on the density of visual ammunition scrap present. Where a higher density of ammunition scraps or fragments were observed in the fallout areas or firing range floors, survey sections were smaller in size. Individual survey sections were established with the objective of clearing less than 150 ammunition scraps or fragments, and thus comprised areas of approximately 500 to 1,000 square ft based on professional observation of ammunition scrap density. Survey sections of this size were more easily identified, screened, and cleared of ammunition scrap than larger sections.

Each survey section was outlined on the ground surface with a scraping tool prior to beginning the manual recovery process. The overall pattern of screening across the fallout areas followed a mosaic of interlocking or overlapping survey sections with irregular boundaries impacted by the location of surficial topography, drainage, and vegetation. These survey sections covered the entire target screening areas.

4.5.3.2 Location of Ammunition Scraps and Fragments in Survey Sections

After clearly identifying each survey section, the commercial metal detector was used to locate ammunition scraps and fragments for manual removal. Field personnel walked linear traverses of approximately 5 ft in width (a comfortable sweeping distance for the metal detector while walking). Each traverse was extended the length of the survey section and overlapped the adjacent section by at least 6 in. to ensure comprehensive coverage of each section.

Each ammunition scrap or fragment identified by a positive response from the metal detector was marked with a pin flag. Particular care was taken when using the metal detector in the vicinity of native vegetation where ammunition scraps or fragments were often concentrated in groups around the base of creosote, mesquite, or other bushes.

The pin flags placed within each survey section were then located on a base map using a portable field tablet equipped with Quantum Geographic Information System (QGIS) software. The accuracy of this equipment was assessed to be within three feet of horizontal distance based on continuous comparison of landmarks on the tablet's photographic base map to the same landmark in the field. Coverage of each survey section was visually confirmed by assessing distribution of the linear transverses and pin flag locations before beginning manual removal of ammunition scraps or fragments from the section.

4.5.3.3 Manual Removal of Ammunition Scraps and Fragments

Field personnel returned systematically to each of the pin flag locators for ammunition scrap or fragment removal. Each individual pin flag was removed and soil at the location was excavated with a stainless steel trowel and sifted through a sieve, from which ammunition scraps or fragments were recovered. The location was scanned with the metal detector during excavation to confirm that all potential ammunition scraps or fragments had been excavated. Soil that passed through the sieve was scanned with the metal detector to confirm the removal of ammunition scraps or fragments before being returned to the excavation. A final scan was performed to ensure all ammunition scraps or fragments had been removed from that location. Once sieved and recovered, the ammunition scrap was placed in a one-gallon bag for proper management. This process was repeated at each location until all pin flags had been removed and the survey section was clear.

4.5.3.4 Confirmation of Ammunition Scrap and Fragment Removal

As previously stated, each location with a positive response from the metal detector was reevaluated with the metal detector following soil excavation and sieving. The field coverage for each survey section was confirmed by marking each traverses on the ground, and continually mapping progress of the traverses on the field tablet. Finally, field personnel performed a final sweep across each section with the metal detector to confirm the recovery of all of the ammunition scrap before proceeding to the next adjacent survey section. In order to confirm that removal of the potential contaminants was successful, and soil contaminant levels were below acceptable values, discrete sampling of each individual grid location then was conducted for each of the firing range locations.

4.5.3.5 Potential for Remaining Ammunition Scraps and Fragments

NASA believes that the manual recovery methods previously described provided the most efficient mechanism for removal of the largest quantity of ammunition scraps and fragments from potentially impacted soil at the firing ranges. The metal detector used to locate scraps and fragments was consistently able to identify and facilitate the removal of even smaller fragments of less than 0.1 in. diameter. The use of overlapping survey sections and overlapping linear traverses within those sections ensured optimal

coverage of potentially impacted areas. Subsequent confirmation screening of each individual location and of each survey section with the metal detector minimized the potential for unrecovered ammunition scraps or fragments. Analytical data from discrete soil sampling of the range floors and fallout areas was also used to verify that minimal residual ammunition scraps and fragments remained in the soil following manual removal efforts.

Using the available information, it is not possible to evaluate whether all ammunition scraps and fragments were removed. As explained in the HIS (NASA, 2015b), no written records of bullet usage are available. NASA attempted to estimate the weight of bullets discharged at the firing ranges based on long-term employee interviews performed in 1998 (during initial SWMU identification) and from a combination of 1998 information and additional interviews conducted during preparation of the HIS. There are significant discrepancies between the 1998 and 2015 estimates, such as the increased estimate of 168 pounds at the 200 Area firing range (SWMU 30) in 1998 and up to 2,250 pounds in 2015. The lack of documentation related to actual discharges and the contradictory information obtained from employee interviews introduces significant uncertainty into any estimate of the weight or volume of ammunition scraps or fragments present at the firing ranges. Furthermore, it is not possible to estimate the quantity of scraps or fragments that did not impact the berms and would thus have been present in soil at the range floors and fallout areas. Finally, the weight and volume of scraps and fragments in soil at the impact berms was not quantified during removal of the soil for off-site disposal. Any attempt to reconcile the volume or weight of ammunition scraps and fragments at the firing ranges with the volume or weight of material recovered would be highly speculative.

4.5.4 Excavation Recovery of Ammunition Scrap from Impact Berms

Front end loaders were used to scrape off the surficial soil in individual 4 in. to 6 in. lifts from the impact berms and transfer the soil to Department of Transportation-approved roll-off boxes that were lined with 10-mil black plastic sheeting (Appendix C). After the excavation of each individual lift, a metal detector survey of the berm face was performed and pin flags used to delineate all areas where residual bullet fragments were identified. Following the removal of the initial lifts from the berm face with a large front end loader, a smaller capacity front end loader was used to target smaller specific areas of the berm face. This process continued until the entire berm face was confirmed to be essentially clear of ammunition scrap through the results of the metal detector survey. The berm soil comprising native gravelly sandy silt (STGT) and a combination of native gravelly sandy silt and imported well sorted sand (WB-2) containing ammunition scraps was subsequently transferred to 20 cy roll-offs that were filled with up to approximately 10 cy at the request of the transportation subcontractor due to loading and hauling considerations.

4.5.5 Pre Screening Field Activities

The following pre-screening activities were performed in order to evaluate the firing range floors, perform manual ammunition scrap recovery, and delineate the horizontal boundaries of the firing range fallout areas:

- Preparation of the three firing range sites (restoring vehicular access and clearing the range floors of primary vegetation and any existing debris) in order to ensure access to surface soils for screening and associated cleanup activities. The on-site geologist supervised the removal of these materials to ensure that the soil comprising the range floor was not disturbed.
- Transfer of the firing range floor soil sampling grids presented in the ACMWP (NASA, 2015b) to the field using GPS and flagging equipment. The known extent of the range floors was overlain

with the sampling grid that was used to direct the systematic collection of discrete soil samples for laboratory chemical analysis.

- Surveying and mapping of the field area with a metal detector to refine the horizontal study area boundary is presented in the ACMWP (NASA, 2015b) for each of the three firing ranges (firing range floor and surrounding fallout area). As much of the ammunition scrap was recovered as feasible during the preliminary mapping. The location of the recovered bullets was mapped using QGIS software on a portable field tablet. The location of detectable metals was plotted at each site, and the area subject to ACM identified. The ammunition scrap locations and fallout areas were updated and submitted to NMED as part of the status update for the NASA WSTF small arms firing ranges (NASA, 2016a), and were later used to delineate the discrete soil sampling grid for the fallout areas.

Field screening was conducted at each site to determine the actual extent of the potentially contaminated soil at and near each firing range using a commercially available metal detector set appropriately to detect ammunition scrap within the shallow surface soil. The metal detector was capable of achieving resolution of the shallow subsurface at depths up to approximately 1 ft without breaking ground. Bullets and ammunition scrap penetrated the range floor to depths of less than 1 ft, and were generally found in the top 4 in. or less of surface soil.

4.5.5.1 Firing Range Floor Soil Samples

Basic sampling grids for each of the range floors were established for each firing range in the ACMWP. Figure 4.1, Figure 4.2, and Figure 4.3 provide the initial sampling grids established for the STGT firing range floor (SWMU 29), the 200 Area firing range floor (SWMU 30), and the WB-2 firing range floor (SMWU 31), respectively. At the 200 Area and WB-2, the range floors utilized grid cells measuring 25 ft by 25 ft, while the range floor at STGT utilized grid cells measuring 50 ft by 50 ft. Each range floor grid cell was subject to discrete soil sampling. Gloves and other disposable materials contacting the samples were collected and managed for the appropriate waste characterization and waste disposition (ACMWP Section 6.0; NASA, 2015b).

4.5.6 ACM Field Activities

Following the field screening activities at each of the three firing ranges, the results of the field activities were evaluated and provided to NMED in a status update (NASA, 2016a). Following the receipt of the NMED's approval with modifications (NMED, 2016a), the following ACM fieldwork activities were performed:

- In accordance with NMED's concern that the potential for "munition constituents" still existed on the range floors, additional metal detector screening (as performed for field screening in the fallout areas) was performed on each of the firing range floors to identify and remove all source ammunition scrap.
- Additional soil sampling was conducted across each fallout area where ammunition scrap was detected during the field screening activities, including the area of interest in the 200 Area firing range wash. The existing grid system was extended at each firing range to accomplish this. Composite soil samples were collected from each grid cell for laboratory chemical analysis.
- Ammunition scrap recovery activities continued at all three SWMUs until all potential source materials were manually identified with the metal detector and removed to the extent practical.

The sampling grids for each of the firing range floors were extended to include all of the fallout areas and the area of interest in the 200 Area firing range wash. Figure 4.4, Figure 4.5, and Figure 4.6 provide the

comprehensive sampling grids finalized for the STGT (SWMU 29), the 200 Area (SWMU 30), and the WB-2 (SMWU 31) firing ranges, respectively. At the 200 Area and WB-2 firing ranges, the fallout areas and area of interest in the 200 Area firing range along a small wash utilized grid cells measuring 50 ft by 50 ft. The fallout area at the STGT firing range utilized grid cells measuring 100 ft by 100 ft due to the significant area covered by the ammunition scrap fallout behind the impact berm. Each supplemental grid cell was again subject to discrete soil sampling described above in Section 4.5.2.2.

Each discrete sample was collected from a vertical soil column of approximately 6 in. The discrete soil sample was placed in a 4 oz sample container for submittal to the off-site chemical analytical laboratory. Unused soil was returned to the sample location, and the sampling equipment was decontaminated prior to collection of the next sample. Gloves and other disposable materials contacting the samples were collected and managed for the appropriate waste characterization and waste disposition (ACMWP Section 6.0; NASA, 2015b).

4.5.7 Excavation Field Activities

The impact berms at the STGT firing range (SWMU 29; Figure 4.1) and the WB-2 firing range (SWMU 31; Figure 4.3) are well defined. Ammunition scrap on the surface and shallow subsurface of the impact berms had been previously identified (NASA, 2015b). To remove the ammunition scrap, surficial soil was excavated from the face of the berm in lifts (Appendix C) until no evidence of bullet penetration was detected by the field geologist, either visible or following a metal detector survey. The metal detector was used to verify that additional bullets or bullet fragments were not present in the upper 12 in. of soil within the exposed berm. Once the visual inspection and metal detector indicated the absence of ammunition scrap, no further excavation was performed and confirmation sampling was performed within the upper 6 in. of the berm face.

Following the approval with modifications by NMED of the revised ACM strategy (NMED, 2016a), the following soil cleanup activities were performed:

- Impact berm/backstop excavation at the STGT and WB-2 firing ranges in the form of progressive lifts with the recovery of ammunition scrap. The extent of each lift was defined by a metal detector survey, with the final survey indicating the successful removal of ammunition scrap. Lifts were performed from the front, top and back of the impact berms as a result of the irregular distribution of ammunition scrap in these areas. No impact berm exists at the 200 Area firing range and no berm samples were collected.

- Following all of the impact berm excavation activities, confirmation sample collection was conducted on soil considered to be “clean” on both the front and back sides of the berms for laboratory chemical analysis. Soil sample XRF data was not collected during confirmation sampling activities of the impact berms. This strategy was originally intended to support soil sifting methodologies and confirm the successful treatment of impact berm soils in real time. The revised ACM strategy (NASA, 2016a) proposed the removal of potentially contaminated soil from the impact berm off site to an approved waste management facility. Confirmation soil samples collected from the final berm face were not composited as requested by NMED (NMED, 2015a).

Impact berm confirmation soil samples were not composited as this may have resulted in metals concentrations that were not representative of the actual metals concentrations remaining in the soil. The sampling locations for the impact berms/backstops at the firing ranges were collected as outlined in the ACMWP (NASA; 2015b) at 10 ft horizontal intervals along the berm face, approximately 3 to 5 ft above the surface of the range floor in order to intercept the most likely impact elevation within the berm.

Figure 4.4 and Figure 4.6 provide the location for the confirmation soil samples for the STGT firing range (SWMU 29) and the WB-2 firing range (SMWU 31), respectively. With direction from NMED (NMED, 2015a), the location of soil samples and duplicate samples was biased to focus on areas that would be expected to contain potentially higher metals concentrations (toward the center of the berm).

Each soil sample was collected directly from the berm face to a depth of approximately 6 in. into the berm. The confirmation soil samples were collected with a decontaminated stainless-steel scoop and transferred to 4 oz. sample containers for submittal to the off-site chemical analytical laboratory. Gloves and other disposable materials contacting the samples were collected and managed for the appropriate waste characterization and waste disposition (ACMWP Section 6.0; NASA, 2015b).

4.5.8 Data Review

After receiving soil data analytical packages from the contractor laboratory, a quality assurance and quality control (QA/QC) specialist evaluated the sample data, field, and laboratory QC results for acceptability with respect to the project quality objectives. Chemical analytical data was compared with the project quality objectives and evaluated using the data validation guidelines contained in EPA guidance documents, the latest version of SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," and industry-accepted QA/QC methods and procedures (EPA, 2013).

The following information (where required and applicable) was compiled and used to conduct a comprehensive review of the sample analytical data:

- The NMED-approved ACMWP (NASA, 2015b).
- Field sampling and geologist logs.
- Laboratory reports.
- Statements of work and the laboratory Quality Management Plan.
- Electronic Data Deliverable Files.
- Standard Operating Procedures.
- Database tools.

4.6 Deviations

4.6.1 Waste Characterization and Management

Deviations from the waste characterization determination and management procedures originally described in the Waste Management Plan provided with the ACMWP (NASA, 2015a) were required to implement the NMED approved revised clean-up strategy for lead contaminated soil (NASA, 2016a). Instead of mechanically separating lead from soil as identified in the ACMWP, NASA removed lead contaminated soil from the berms at the WB-2 and STGT firing ranges. This required re-characterization of the environmental media and a change of its status from an unregulated material to a hazardous waste. Lead contaminated soil was managed onsite has a hazardous waste during the project, and shipped off site to a permitted TSDF for treatment and disposal.

4.6.2 Waste Disposal

NASA also elected to dispose of the bullets, bullet fragments, and casings collected from the firing range floors and fallout areas instead of recycling these items as originally proposed in the ACMWP. A cost-

effective recycling solution was not identified for the lead and brass ammunition scraps and fragments. After the decision to dispose of the bullets, bullet fragments, and casings was made, this waste was characterized as hazardous and consolidated with lead contaminated soil in a roll-off container at the STGT Firing Range. This roll-off with lead contaminated soil and ammunition scraps and fragments was transported off site for treatment and disposal at a permitted TSDF. Refer to Section 4.4 for details.

5.0 Field Investigation Results

The results of the physical characterization of soil during field work and chemical laboratory analysis are presented in this section.

5.1 Surface Conditions

Surface conditions at WSTF are typically characterized by the U.S. Department of Agriculture (USDA) Soil Classification (USDA, 1999) Nickel-Tencee Association (60% Nickel gravelly fine sandy loam and 25% Tencee very gravelly loam). The alluvium is classified as the piedmont slope facies of the Camp Rice Formation, which forms part of the Quaternary Santa Fe Group (Seager, 1981).

5.1.1 STGT (SWMU 29) and WB-2 (SWMU 31) Small Arms Firing Ranges

The STGT (SWMU 29) and WB-2 (SWMU 31) firing ranges are located within soils of the Nickel-Tencee Association. The Nickel series includes deep, well drained soils associated with old, coalescent alluvial fans. The soils are formed in gravelly, medium textured alluvial sediments. The upper 5 ft are characterized by light brown to pink gravelly to fine sandy loam. Gravel content is approximately 50%. The Nickel-Tencee unit soils are gently sloping and are in similar positions on alluvial fans. Tencee soils dominate the older, more stable areas where the source of alluvial material was limestone bedrock. Firing range floor soils generally comprised sandy silts with gravel (Unified Soil Classification System [USCS] symbol ML). The soil was inorganic, loose, dry, poorly sorted, and contained subrounded clasts from granules to pebbles in size. The floor of the STGT firing range partially consisted of a patchy veneer of pebble-sized gravel clasts with a maximum thickness of 2 in.

The primary soil type used for the construction of the impact berms at SWMU 29 and SWMU 31 was native gravelly sandy silt (USCS symbol ML). The soil was inorganic, loose, dry, poorly sorted, and contained a range of subangular to subrounded clasts from granules to boulders in size. Approximately 100% of the STGT (SWMU 29; Figure 4.1) impact berm and 60% of the WB-2 (SWMU 31, Figure 4.3) impact berm consisted of this native material. The remaining 40% at WB-2 comprised a well sorted medium grained sand that was concentrated in the central front portion berm. Ammunition fragments were observed to display limited penetration of the gravelly sandy silt to a depth of approximately 6 in., whereas penetration of the sand at the WB-2 berm was observed up to a depth of 5 ft.

5.1.2 200 Area (SWMU 30) Firing Range

Soils in the vicinity of the 200 Area (SWMU 30) firing range belong to the Lozier-Rock Outcrop Complex. The unit consists of very shallow, well drained soils which formed from weathered limestone material. The upper 5 ft are characterized by strongly calcareous brown, light brown, and pale brown stony loams. The Lozier-Rock Outcrop Complex unit is approximately 45% Lozier Stony Loam and 35% Rock Outcrop. The Lozier soils are moderately sloping to moderately steep and irregularly intermingled with limestone outcrops. Rock outcrops occur as steep scarps, breaks, and ledges in the area. Shale outcrops, arroyos, and recent alluvial deposits make up about 20% of the area (NASA, 1996).

The 200 Area firing range floor soils comprised a sandy silt with gravel (USCS symbol ML) that was capped with a veneer of 1/8 in. grey crusher fines up to 1 in. in thickness. The crusher fines were loose and dry. No impact berm was constructed at the 200 Area firing range and the backstop comprised the Lozier-Rock Outcrop Complex. Immediately behind the firing range, the backstop comprised outcropping Permian Hueco limestone capped with a patchy veneer of gravelly sandy silts that reached a thickness up to 1 ft typically along the strike of bedding planes.

5.2 Chemical Analytical Results

Chemical analytical results from soil samples were reviewed for the seven metals listed as COPCs in the ACMWP (NASA, 2015b) and in Table 1.1: antimony, arsenic, copper, iron, lead, tin, and zinc. Discrete chemical analytical soil samples from the impact berms at the STGT and WB-2 Firing Ranges were analyzed by Hall Environmental Analytical Laboratory in Albuquerque, New Mexico for the target metals by SW-846 Method 6010B. Discrete chemical analytical soil samples collected from the range floors and fallout areas at each firing range were analyzed by ALS Laboratories in Rochester, New York for the target metals by SW-846 Method 6010C.

A total of eight sets of data were collected from the three firing ranges in order to perform the activities summarized in this RCR. Each set of data corresponds to either the firing range floor, fallout area, or impact berm at the STGT firing range (SWMU 29), 200 Area firing range (SWMU 30), or WB-2 firing range (SWMU 31). These data sets were combined to create a single analytical dataset for each SWMU that were evaluated in accordance with the NMED RA Guidance (NMED, 2019b). Results of these SWMU-specific evaluations are detailed in the *Risk Assessment Report Small Arms Firing Ranges (SWMUs 29-31)* (NASA, 2020b), enclosed with this RCR.

The XRF data collected in conjunction with the laboratory analytical data (Section 4.5.2) provided lead results that were comparable to the laboratory analytical results. As a result, for the limited situations where laboratory analytical data was not collected for a cell (STGT firing range floor cells #2, #7, and #11 and WB-2 firing range floor cells #2, #6, #7, and #20), the XRF data is considered reliable. XRF data were not evaluated herein, as NASA only evaluated data from discrete soil sample analyses at each firing range.

There were no data quality exceptions that negatively impacted analytical data quality or project objectives. The original laboratory reports and soil metals analytical results are included as an enclosure to this report. NASA completed a risk assessment in accordance with the RA Guidance (NMED, 2019b) in the stand-alone RAR (NASA, 2020b) enclosed with this RCR. A summary of the risk assessment results for metals for the components of each firing range is provided below.

The risk assessment requires comparison of discrete and confirmation sampling data and background threshold values (BTV) established in the WSTF soil background study (SBS; NASA, 2015c, approved by NMED [NMED, 2015c]) to determine COPCs at concentrations greater than the associated BTV, which are then evaluated for site risk. Three background soil areas are referenced on Figure 1.2: Area #1 (upgradient of STGT); Area #3 (upgradient of the 200 Area); and, Area #4 (upgradient of WB-2).

Elevated metal concentrations reported in the WSTF SBS (NASA, 2015c) are due to the source rocks for the alluvial sediments found at each of the firing ranges. Host rocks in the Loman Canyon and Bear Canyon areas, upgradient of WSTF, have been eroded and deposited across the mountain front pediment that incorporates the three firing range areas as alluvial fan debris. Several small epigenetic base and precious metal vein deposits upgradient of WSTF within the southern San Andres Mountains located along the Quartzite Mountain fault zone have been described in detail by Dunham (1935) and summarized by Seager (1981). The base metal sulfide deposits are associated with a variety of subsidiary

metals, most notably arsenic and tellurium. The ability of arsenic to bind to sulfur promotes its occurrence with sulfide bearing mineral deposits such as those found within the area. Naturally occurring arsenic is also associated with volcanic glass of rhyolitic composition, which is the host rock that characterizes Quartzite Mountain located 1,500 ft upgradient of the 200 Area. Evidence of this can be seen in the established WSTF BTV values obtained by soil samplings conducted previously in relevant associated areas, as detailed in the WSTF SBS (NASA, 2015c).

5.2.1 Potential Bias Due to Sample Collection Conditions

In the ACMWP approval with modifications (NMED, 2015a), NMED indicated that compositing soil samples may result in contaminant concentrations that are not representative of concentrations remaining in the soil. NASA recognizes that compositing may dilute the concentrations of a contaminant to below its threshold detection limit and prevent adequate comparisons of soil analytical data to established background concentrations. The potentially low-biased soil analytical data are also inadequate for use in human health and ecological risk screenings required by NMED RA Guidance (NMED, 2019b). Results from composite sampling initially performed at each firing range floor and outfall area are provided in an enclosure to this report, however, as NMED does not consider results of composite samples fully representative of COPC concentrations remaining in soils (NMED, 2017b, 2019a), results of composite samples are not evaluated in this RCR.

NASA collected confirmation samples from the impact berms at the STGT and WB-2 firing ranges in January and February 2017. Additional discrete samples were collected from range floor and outfall area sample grids at each of the firing ranges during September, October and November 2019 (Section 8.1). Results of discrete soil samples collected at each firing range (floor, impact berm, and outfall area) were evaluated in accordance with the RA Guidance (NMED, 2019b).

5.2.2 Risk Assessment Overview

Execution of the screening risk assessment in accordance with the RA Guidance (NMED, 2019b) begins with a comparison of discrete and confirmation sampling data and BTV established in the WSTF SBS (NASA, 2015c, approved by NMED [NMED, 2015c]). This comparison will determine those COPC constituents at concentrations greater than the associated BTV. The COPC constituents identified as above background are then evaluated for site risk and toxicity hazard. Three background soil areas are referenced on Figure 1.2: Area #1 (upgradient of STGT); Area #3 (upgradient of the 200 Area); and, Area #4 (upgradient of WB-2).

In accordance with NMED second disapproval Comments #10, 11, and 12 (NMED, 2019a) to the Response to Disapproval Small Arms Firing Ranges (SWMUs 29-31) Remedy Completion Report (NASA, 2018), comparison of only arsenic concentrations with background at each firing range is not in accordance with the RA Guidance (NMED, 2019b). The NMED correctly stated that all COPCs at each firing range require comparison with established BTVs. For this reason, the ProUCL output files provided as an appendix to the previous submittal have been deleted from this version of the RCR. Full comparison of all COPCs at each firing range are detailed in the enclosed RAR (NASA, 2020), and include ProUCL output files supporting these comparisons in appropriate appendices to the RAR.

The RAR (NASA, 2020b) Section 5.2 presents the comparison of the STGT (SWMU 29) soil analytical data with established background threshold values (BTV) for background Area 1. This comparison identified copper as the only COPC exceeding background at SWMU 29. Copper is designated as a toxicity hazard, and is not designated as a carcinogen. Figure 5.1 presents the COPC (copper) concentration at each discrete sample location, including the berm sample locations.

Section 5.3 of the RAR presents the comparison of the 200 Area (SWMU 30) soil analytical data with Area 3 BTVs. This comparison identified copper and lead as the COPCs exceeding background. As with copper, lead is only characterized as a toxic hazard, not a carcinogen. Figure 5.2 presents the COPC (copper and lead) concentration at each discrete sample location.

Section 5.4 of the RAR presents the comparison of the WB-2 (SWMU 31) soil analytical data with Area 4 BTVs, and identified antimony, copper, lead, and tin at the COPCs exceeding background. Similar to copper and lead, antimony and tin are designated toxic hazards only. Figure 5.3 presents the COPC (antimony, copper, lead, and tin) concentration at each discrete sample location, including the berm sample locations.

Section 7.1 of the RAR describes the methods used to evaluate human health toxicity hazard posed by all identified non-carcinogenic COPC concentrations at each SWMU. The NMED RA Guidance (NMED, 2019b) has established SSLs for residential (RSSL), industrial (ISSL), and construction worker (CWSSL) receptors. The COPC concentrations are compared with the respective SSL to determine the Hazard Quotient (HQ) for each COPC, and all COPC HQs are added to determine the cumulative HQ for the SWMU. The NMED also established SL-SSLs to evaluate the potential for leachate to impact groundwater beneath the site.

Section 7.2 of the RAR describes the methods used to evaluate toxicity hazard to ecological receptors in accordance with Volume II of the RA Guidance (NMED, 2017a). A site evaluation is conducted at each SWMU by qualified biologist to characterize the site environment, and identify observed animal and plant populations. Constituents identified at concentrations greater than background are designated constituents of potential ecological concern (COPEC), identical to COPCs identified for each SWMU. Initially, NASA completed a Tier I screening level ecological risk assessment (SLERA), comparing identified COPEC concentrations with Tier I ecological screening levels (ESL) to determine screening level hazard quotients (SLHQ). Should cumulative Tier I SLHQs exceed the NMED target hazard of 1, a more detailed evaluation is warranted. In these cases, NASA completed a Tier II SLERA, using site-specific and constituent-specific information to evaluate COPECs against Tier II threshold limit values (TRV) and determine the cumulative SLHQ for each COPEC.

5.2.3 STGT (SWMU 29) Firing Range Toxicity Hazard

5.2.3.1 STGT (SWMU 29) Firing Range Human Health Toxicity Hazard

A total of 108 discrete soil metals samples were collected from randomly selected quadrants within the 80 STGT firing range grids and impact berm (Figure 4.1). A summary of the metals results is provided in Table- 5.1 and the single identified COPC (copper) concentrations for each location are shown on Figure 5.1. The maximum copper concentration identified in STGT (SWMU 29) firing range discrete soil samples (1.94E+01 milligrams per kilogram [mg/kg]) does not exceed the NMED RSSL, ISSL, CWSSL, and SL-SSL. The resultant toxicity hazard was less than the NMED target hazard of 1, which indicates concentrations at the site are unlikely to result in adverse health impacts; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations were likewise less than the NMED SL-SSLs for copper and lead which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted.~~The calculated HQ for each receptor population is less than the NMED target hazard of 1, so hazard to receptor populations from copper at the STGT (SWMU 29) firing range is minimal. The maximum copper concentration is less than the NMED SL-SSL (9.15E+02 mg/kg), and the potential for groundwater impacts from leaching of copper is minimal~~.

5.2.3.2 STGT (SWMU 29) Firing Range Ecological Toxicity Hazard

NASA completed a Tier I SLERA for the STGT (SWMU 29) firing range, using the maximum COPEC (copper) concentration to generate SLHQs for the deer mouse, horned lark, and plant receptor populations. The NMED target hazard of 1 was not exceeded for each receptor.~~,~~ So a Tier II SLERA is not warranted for SWMU 29.

~~The Tier II SLERA for the STGT (SWMU 29) firing range was completed based on the 95th upper confidence limit (UCL95) for the COPEC copper. Results of the Tier II SLERA identified SLHQs for the deer mouse, horned lark, and plant receptor populations that are each less than the NMED target hazard of 1, which indicates~~ COPEC concentrations at the site are unlikely to result in adverse ecological impacts; therefore, do not warrant further site-specific evaluation.~~ The identified hazard to ecological receptor populations from copper in soils at the STGT (SWMU 29) firing range is minimal.~~

5.2.4 200 Area (SWMU 30) Firing Range Toxicity Hazard

5.2.4.1 200 Area (SWMU 30) Firing Range Human Health Toxicity Hazard

A total of 44 discrete soil metals samples were collected from randomly selected quadrants within the 200 Area firing range grids (Figure 4.2). A summary of the metals results is provided in Table 5.2 and the two identified COPCs (copper and lead) concentrations for each location are shown on Figure 5.2. The maximum COPC concentrations identified in the 200 Area (SWMU 30) firing range discrete soil samples (copper at 1.55E+01 mg/kg, and lead at 8.83E+01 mg/kg) do not exceed the respective NMED RSSL, ISSL, CWSSL, and SL-SSLs. Lead hazard quotients are not included in the cumulative toxicity hazard sum because lead screening levels are based on blood lead levels, rather than an oral reference dose as are other constituents. The resultant lead hazard quotient and copper toxicity hazard were both less than the NMED target hazard of 1, which indicates concentrations at the site are unlikely to result in adverse health impacts; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations were likewise less than the NMED SL-SSLs for copper and lead which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted~~The cumulative HQ, the sum of the copper and lead HQs, for each receptor population is less than the NMED target hazard of 1, so hazard to receptor populations from the 200 Area (SWMU 30) firing range COPCs is minimal. The maximum copper and lead concentrations are less than the respective NMED SL-SSLs (9.15E+02 mg/kg and 2.70E+02 mg/kg, respectively), and the potential for groundwater impacts from leaching of copper and lead is minimal~~.

5.2.4.2 200 Area (SWMU 30) Firing Range Ecological Toxicity Hazard

NASA completed a Tier I SLERA for the 200 Area (SWMU 30) firing range, using the maximum COPEC (copper and lead) concentrations to generate SLHQs for the deer mouse, horned lark, and plant receptor populations. The NMED target hazard of 1 was exceeded for the deer mouse and horned lark receptors, and neared exceedance (9.57E-01) for plant receptors.

The Tier II SLERA for the 200 Area (SWMU 30) firing range was completed based on the UCL95 values for the two COPECs copper and lead. Results of the Tier II SLERA identified SLHQs for the deer mouse, horned lark, and plant receptor populations that are each less than the NMED target hazard of 1, which indicates COPEC concentrations at the site are unlikely to result in adverse ecological impacts; therefore, do not warrant further site-specific evaluation~~. The identified hazard to ecological receptor populations from copper and lead in soils at the 200 Area (SWMU 30) firing range is minimal~~.

5.2.5 WB-2 (SWMU 31) Firing Range Toxicity Hazard

5.2.5.1 WB-2 (SWMU 31) Firing Range Human Health Toxicity Hazard

A total of 44 discrete soil metals samples were collected from randomly selected quadrants within the WB-2 firing range grids (Figure 4.3). A summary of the metals results is provided in Table 5.3 and the four identified COPCs (antimony, copper, lead, and tin) concentrations for each location are shown on Figure 5.3. The maximum COPC concentrations identified in the WB-2 (SWMU 31) firing range discrete soil samples (antimony at 1.20E+00 mg/kg, copper at 1.48E+01 mg/kg, lead at 1.07E+02 mg/kg, and tin at 5.80E-01 mg/kg) do not exceed the respective NMED RSSL, ISSL, CWSSL, and SL-SSLs. Lead hazard quotients are not included in the cumulative toxicity hazard sum because lead screening levels are based on blood lead levels, rather than an oral reference dose as are other constituents. Both the lead hazard quotient and the toxicity hazard (antimony, copper, and tin) were less than the NMED target hazard of 1, which indicates concentrations at the site are unlikely to result in adverse health impacts; therefore, SWMU 31 does not warrant further site-specific evaluation~~The cumulative HQ, the sum of the antimony, copper, lead, and tin HQs, for each receptor population is less than the NMED target hazard of 1, so hazard to receptor populations from the WB-2 (SWMU 31) firing range COPCs is minimal~~. The maximum antimony, copper, and lead concentrations are less than the respective NMED SL-SSLs (6.56E+00 mg/kg, 9.15E+02 mg/kg, and 2.70E+02 mg/kg, respectively). The NMED does not establish an SL-SSL for tin, so the EPA RSL for groundwater protection is used. The maximum concentration of tin does not exceed the EPA RSL of 3.00E+03 mg/kg. The maximum COPC concentrations were likewise less than the NMED SL-SSLs for antimony, copper, lead, and tin which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted~~The potential for groundwater impacts from leaching of antimony, copper, lead, and tin is minimal~~.

5.2.5.2 WB-2 (SWMU 31) Firing Range Ecological Toxicity Hazard

NASA completed a Tier I SLERA for the WB-2 (SWMU 31) firing range, using the maximum COPEC concentrations for three contaminants (antimony, copper, and lead) to generate SLHQs for the deer mouse, horned lark, and plant receptor populations. The NMED target hazard of 1 was exceeded for ecological receptors. Studies of the toxicity of tin to ecological receptors are insufficient to assign either Tier I ESLs or Tier II TRVs, so tin toxicity to ecological receptors was not evaluated.

The Tier II SLERA for the WB-2 (SWMU 31) firing range was completed based on the UCL95 values for the COPECs antimony, copper and lead. Results of the Tier II SLERA identified SLHQs for the deer mouse, horned lark, and plant receptor populations that are each less than the NMED target hazard of 1, which indicates COPEC concentrations at the site are unlikely to result in adverse ecological impacts; therefore, do not warrant further site-specific evaluation~~. The identified hazard to ecological receptor populations from antimony, copper, and lead in soils at the WB-2 (SWMU 31) firing range is minimal~~.

6.0 Remedy Completion Summary and Interpretation of Results

~~6.1 Metals Concentrations in Soil Samples~~

NASA completed collection of discrete soil samples at all firing range grids in accordance with NMED requirements (NMED, 2017b). Evaluation of soil analytical results from discrete samples was performed in accordance with comments in the second disapproval by the NMED (NMED, 2019a) and the RA Guidance (NMED, 2019b). NASA developed the enclosed RAR (NASA, 2020b), to satisfy NMED requirements stated in the second disapproval of the RCR.

Results of the RAR indicate that toxicity hazards to both human and ecological receptor populations are less than the NMED target, which indicates concentrations at the firing ranges are unlikely to result in adverse impacts to human and ecological receptors; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations at each firing range were likewise less than the

respective NMED SL-SSLs, which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted. Corrective actions completed at each firing range have effectively removed COPC constituents originating from historical use as firing ranges, and no further corrective action is warranted.

~~7.0 Host rocks in the Loman Canyon and Bear Canyon areas upgradient of WSTF have been eroded and deposited across the mountain front pediment that incorporates the three firing range areas as alluvial fan debris. Several small epigenetic base and precious metal vein deposits upgradient of WSTF within the southern San Andres Mountains located along the Quartzite Mountain fault zone have been described in detail by Dunham (1935) and summarized by Seager (1981). The base metal sulfide deposits are associated with a variety of subsidiary metals, most notably arsenic and tellurium. The ability of arsenic to bind to sulfur promotes its occurrence with sulfide bearing mineral deposits such as those found within the area. Naturally occurring arsenic is also associated with volcanic glass of rhyolitic composition, which is the host rock that characterizes Quartzite Mountain located 1,500 ft upgradient of the 200 Area. Evidence of this can be seen in the established WSTF BTV values obtained by soil samplings conducted previously in relevant associated areas, as detailed in the WSTF SBS (NASA, 2015c).~~

~~8.0 The enclosed RAR details specific actions taken to evaluate human health and ecological toxicity hazard associated with the seven target metals (antimony, arsenic, copper, iron, lead, tin, and zinc) at the three firing ranges. Comparison of the STGT (SWMU 29) firing range soil chemical data with established WSTF BTVs for background Area 1 identified one metal, copper, at concentrations greater than background. The cumulative toxicity hazard to human and ecological receptors from copper at the STGT (SWMU 29) firing range was determined to be minimal, as described in Section 5.2.3 above. Copper concentrations at the STGT (SWMU 29) firing range were below the NMED SL-SSL, indicating that leaching of copper from soils will not adversely impact groundwater beneath the STGT (SWMU 29) firing range.~~

~~9.0 Comparison of the 200 Area (SWMU 30) soil chemical data with established WSTF BTVs for background Area 3 identified two metals, copper and lead, at concentrations greater than background. The cumulative toxicity hazard to human and ecological receptors from copper and lead at the 200 Area (SWMU 30) firing range was determined to be minimal, as described in Section 5.2.4 above. Copper and lead concentrations at the 200 Area (SWMU 30) firing range were below the respective NMED SL-SSL values, indicating that leaching of these metals from soils will not adversely impact groundwater beneath the 200 Area (SWMU 30) firing range.~~

~~10.0 Comparison of the WB-2 (SWMU 31) firing range soil chemical data with established WSTF BTVs for background Area 4 identified four metals, antimony, copper, lead, and tin at concentrations greater than background. The cumulative toxicity hazard to human and ecological receptors from these four metals at the WB-2 (SWMU 31) firing range was determined to be minimal, as described in Section 5.2.5 above. Antimony, copper, lead, and tin concentrations at the WB-2 (SWMU 31) firing range were below the respective NMED SL-SSL values, indicating that leaching of these metals from soils will not adversely impact groundwater beneath the WB-2 (SWMU 31) firing range.~~

~~11.0~~7.0 Conclusions

The objective of the ACM to remove known and suspected COPCs related to ammunition scraps from the shallow soil at the STGT (SWMU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges was

successfully achieved. The strategy included the manual removal of ammunition scrap and fragments from surface soil of the range floor and fallout areas, as well as the excavation and off-site disposal of ammunition scrap and fragments with soil from the impact berms. Concentrations of metals reflected in chemical analytical results from discrete soil samples were either representative of WSTF background concentrations or did not exceed applicable regulatory criteria as detailed in the enclosed RAR (NASA, 2020b). Most of the target metals were determined to be consistent with WSTF background concentrations, are known to occur naturally at concentrations above regulatory levels in WSTF soils, and are not considered to be the direct result of historical activities at the firing ranges (SWMUs 29-31).

Project DQOs were met as follows: ACM activities continued until cleanup levels as described in Permit Attachment 15 for direct exposure routes under the ISSL and CWSSL scenario were achieved for site soils as determined by field and analytical testing. NASA also completed a screening risk assessment in accordance with NMED requirements (NMED, 2019a) and procedures in the RA Guidance (NMED, 2019b) and developed the enclosed RAR (NASA, 2020b). At each firing range, the calculated toxicity hazard from all COPC concentrations was less than the NMED target hazard of 1, which indicates concentrations at these sites are unlikely to result in adverse health impacts; therefore, do not warrant further site-specific evaluation. The maximum COPC concentrations were likewise less than respective NMED SL-SSL concentrations, which indicates there is no potential migration of contaminants from the vadose zone to groundwater; therefore, no further leachate investigation is warranted at the firing rangesToxicity hazards to both human and ecological receptors from metals identified at concentrations above background were determined to be acceptable for all three firing ranges when compared with NMED targets. Metals above background levels were also determined to pose minimal threat to groundwater beneath each firing range due to leaching and infiltration processes.

12.0 Recommendations

13.0 Confirmation Soil Sampling

14.0 As described in Section 4.6.1, discrete soil samples were not initially collected at the firing range floors and fallout areas. In order to confirm that corrective measures at the firing ranges were successful, the NMED required that NASA collect discrete soil samples (NMED, 2017b). From September through November 2019, NASA collected a discrete soil sample from each grid cell (Figure 4.4, Figure 4.5, and Figure 4.6) that was not discretely sampled during ACM fieldwork performed from 2015 through 2017. As described in Section 4.5.2.2, each grid cell was evenly divided into quadrants, and a discrete soil sample was collected from the approximate center of each randomly selected quadrant.

15.0 Risk Screening

16.0 A screening risk assessment was completed to comply with several NMED comments in the first disapproval (NMED, 2017b) and second disapproval (NMED, 2019a). The enclosed RAR (NASA, 2020b) was developed following the procedures described in the RA Guidance (NMED, 2019b).

17.08.0 Results of the RAR indicate that the toxicity hazard of metals at concentrations exceeding background at each SWMU, as identified using discrete soil sample chemical analytical results, pose minimal hazards to all identified and assumed human and ecological receptors (NASA, 2020b). Evaluation of the potential for these metals to leach to groundwater, and pose a toxicity hazard to groundwater users, is likewise minimal. Results of the risk assessment support the conclusion that corrective measures performed at the firing ranges were effective in reducing

~~**contaminant loads to the environment to levels that pose no appreciable toxicity hazards to identified receptor populations.**~~

~~17.1~~8.1 Site Restoration

Following review and approval of the final updated RCR and the completed RAR by NMED, NASA recommends that the remaining site restoration activities be performed. NASA will complete site restoration and grading activities at the STGT (SWMU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges following NMED approval of the final updated RCR and RAR. Unexcavated impact berm soil from the WB-2 and STGT firing ranges will be spread and graded to approximate the natural contours of the sites. Site grading will be completed to prevent ponding of water at each site location. Site restoration and grading activities may also include the installation of best management controls (e.g., diversion culverts, temporary berms, silt fences, etc.) to direct storm water away from the site locations to prevent storm water runoff impacts. Site restoration activities will not include any efforts to reseed the areas, though the sites may be mechanically enhanced to facilitate the natural return of vegetation.

~~17.2~~8.2 Remedy ~~Certification~~Completion

Submittal of this report for NMED review satisfies the requirements of Permit Section VII.L, Accelerated Cleanup Process. Because final site restoration is not planned until NMED concurrence is provided, NASA recommends site restoration activities be initiated following final NMED approval of the RCR. At that point, NASA will consult with NMED to determine the process, if not previously established, to develop and submit a petition for ~~a~~ "Corrective Action Complete" status determination for the STGT (SMWU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges.

~~In addition to the information presented in this report, Permit Section VILK.6.a (NMED, 2019e) requires the following:~~

- ~~"A statement, signed by a professional engineer, registered in New Mexico, that the remedy has been completed in accordance with NMED approved work plan for the remedy."~~
- ~~"As-built drawings and specifications signed and stamped by a professional engineer registered in New Mexico."~~

~~Because final site restoration is not planned until NMED concurrence is provided, NASA recommends that the two activities requiring the services of a registered professional engineer be performed in conjunction with completion of the remaining site restoration activities at the firing ranges. Within 30 days following the completion of final site restoration activities, NASA will provide confirmation that the remedy has been completed and that the sites have been restored. As that point, NASA will request a "Corrective Action Complete" status determination for the STGT (SMWU 29), 200 Area (SWMU 30), and WB-2 (SWMU 31) firing ranges.~~

~~18.0~~9.0 References

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Figures

Figure 1.1 **WSTF Location Map**

(SEE NEXT PAGE)

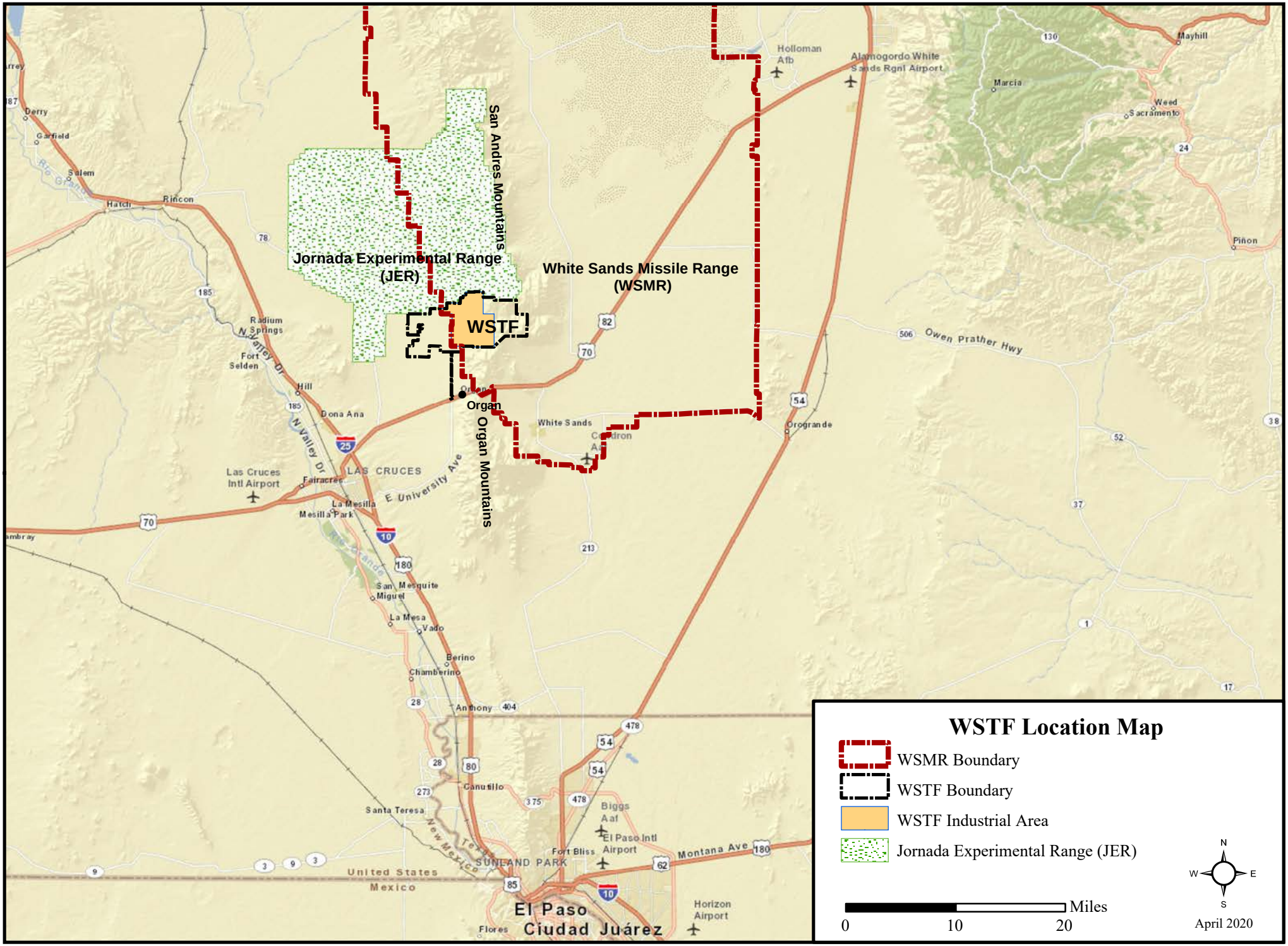
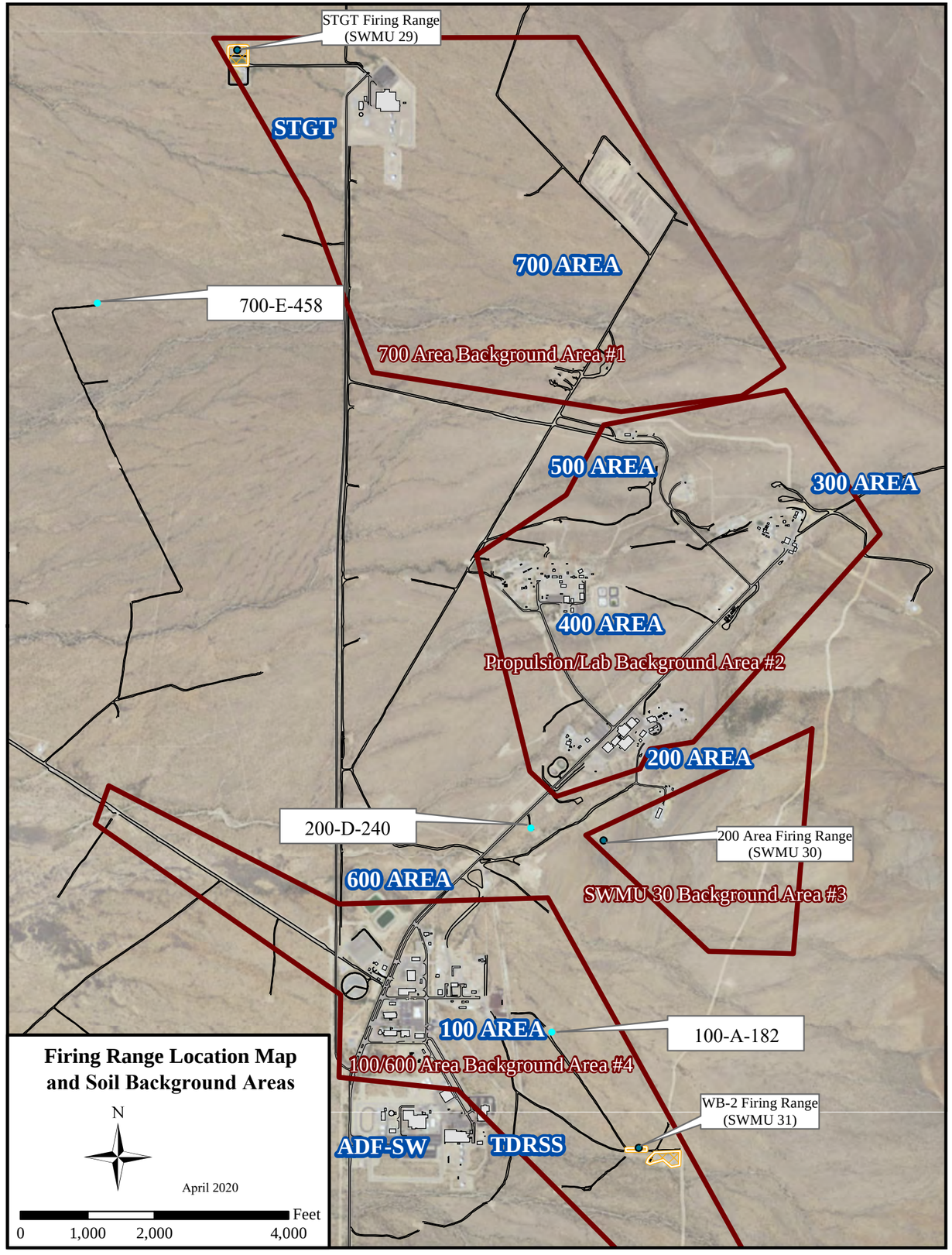
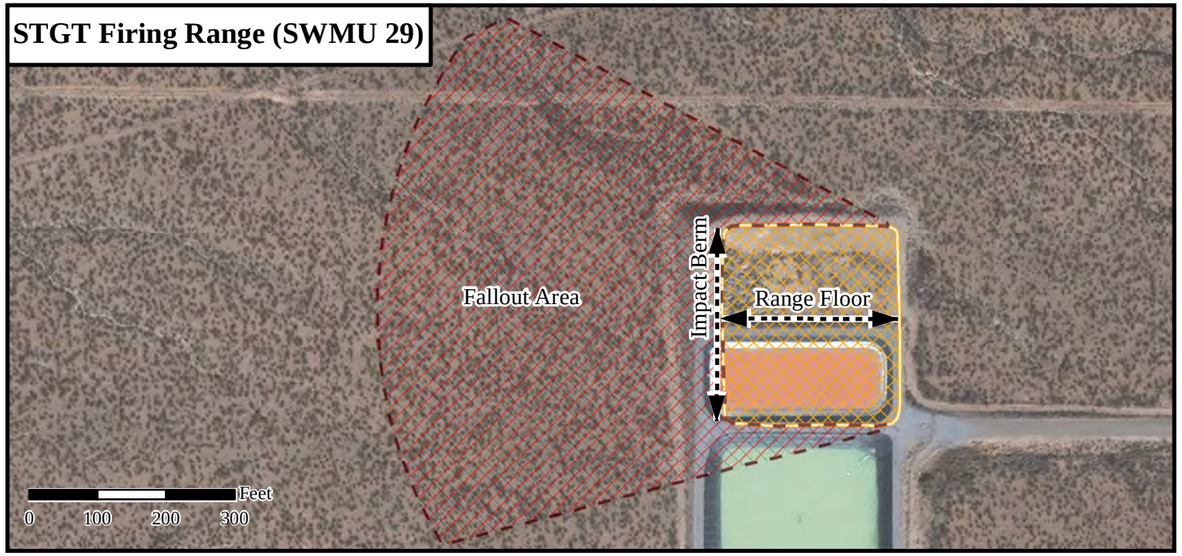
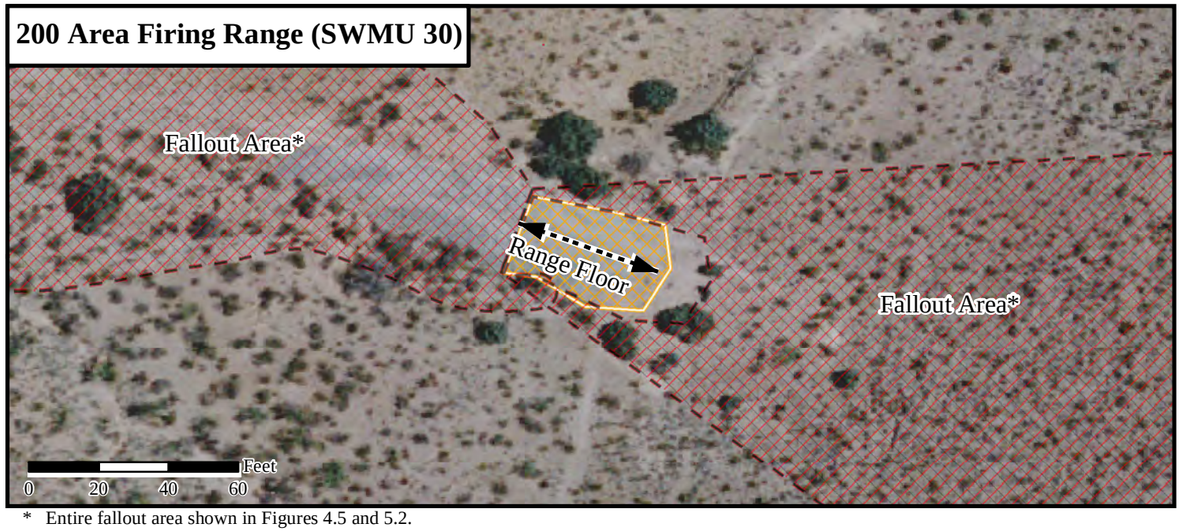

San Andres Mountains
Jornada Experimental Range (JER)
White Sands Missile Range (WSMR)
WSTF
Organ
Organ Mountains
Holloman Afb
Alamogordo White Sands Rgnl Airport
Mayhill
Marcia
Weed
Sacramento
Piñon
Owen Prather Hwy
Orogrande
White Sands
Derry
Garfield
Salem
Hatch
Rincon
Radium Springs
Fort Selden
N Valley Dr
Hill
Dona Ana
Las Cruces Intl Airport
LAS CRUCES
Fairacres
La Mesilla
Mesilla Park
E University Ave
Rio Grande
San Miguel
Mesquite
La Mesa
Vado
Berino
Chamberino
Anthony
Canutillo
Santa Teresa
New Mexico
Texas
United States
Mexico
SUNLAND PARK
Fort Bliss
Biggs Aaf
El Paso Intl Airport
Montana Ave
El Paso
Ciudad Juárez
Flores
Horizon Airport
WSTF Location Map
WSMR Boundary
WSTF Boundary
WSTF Industrial Area
Jornada Experimental Range (JER)
Miles
0
10
20
N
W
E
S
April 2020

Figure 1.2 **Firing Ranges Location Map**

(SEE NEXT PAGE)







* Entire fallout area shown in Figures 4.5 and 5.2.

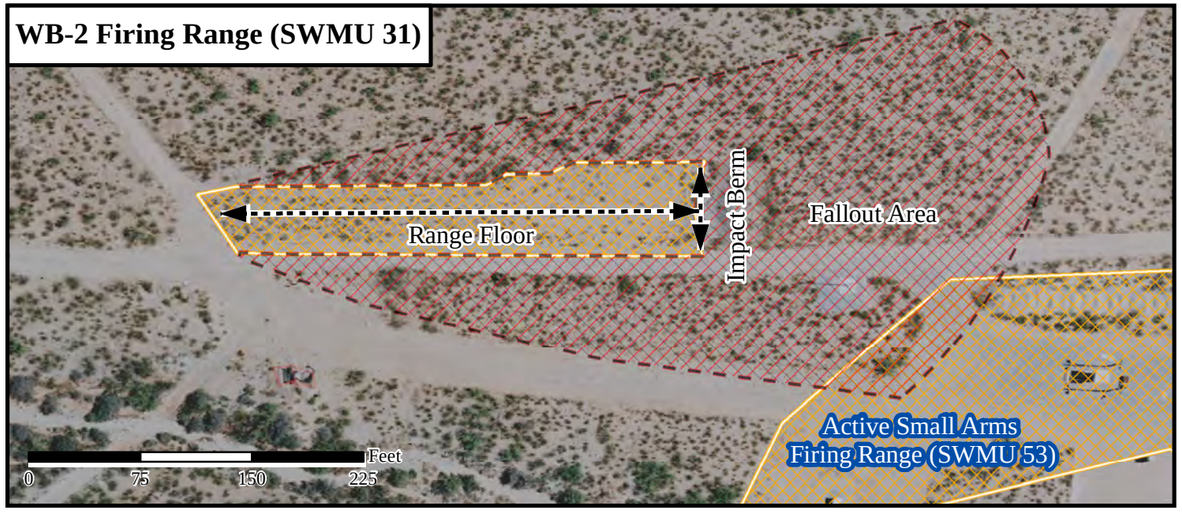
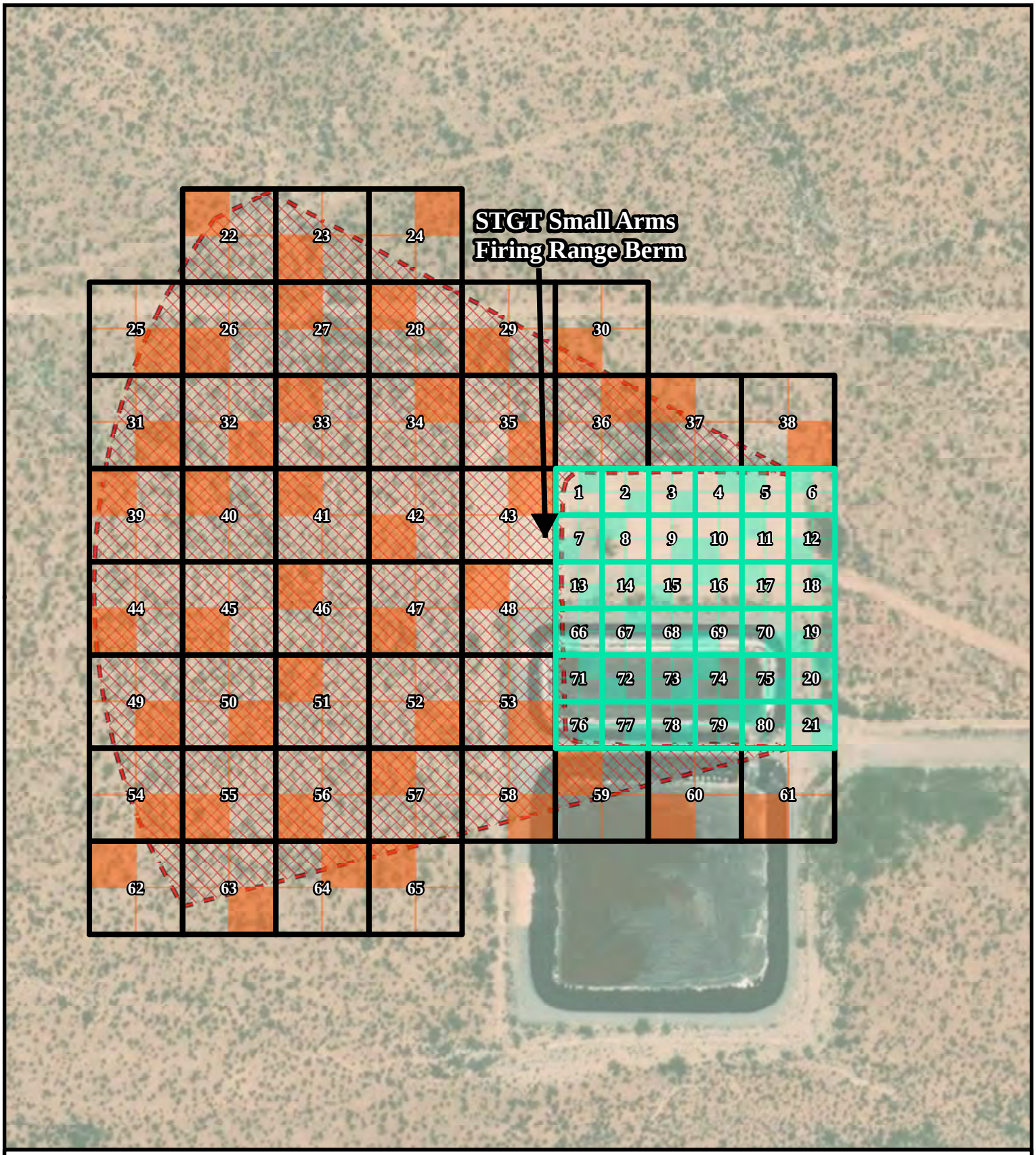


Figure 4.1 STGT (SWMU 29) Range Floor and Impact Berm Sampling

(SEE NEXT PAGE)



STGT (SWMU 29): Discrete Sample Locations

- Range Floor Sampling Grid (50' x 50')
- Range Floor Qaudrant
- Range Floor Sampling Qaudrant
- Fallout Area Sampling Grid (100' x 100')
- Fallout Area Qaudrant
- Fallout Area Sampling Qaudrant
- Fallout Extent

0 70 140 280 Feet

N
W E
S

April 2020

Figure 4.2 200 Area (SWMU 30) Range Floor Sampling

(SEE NEXT PAGE)

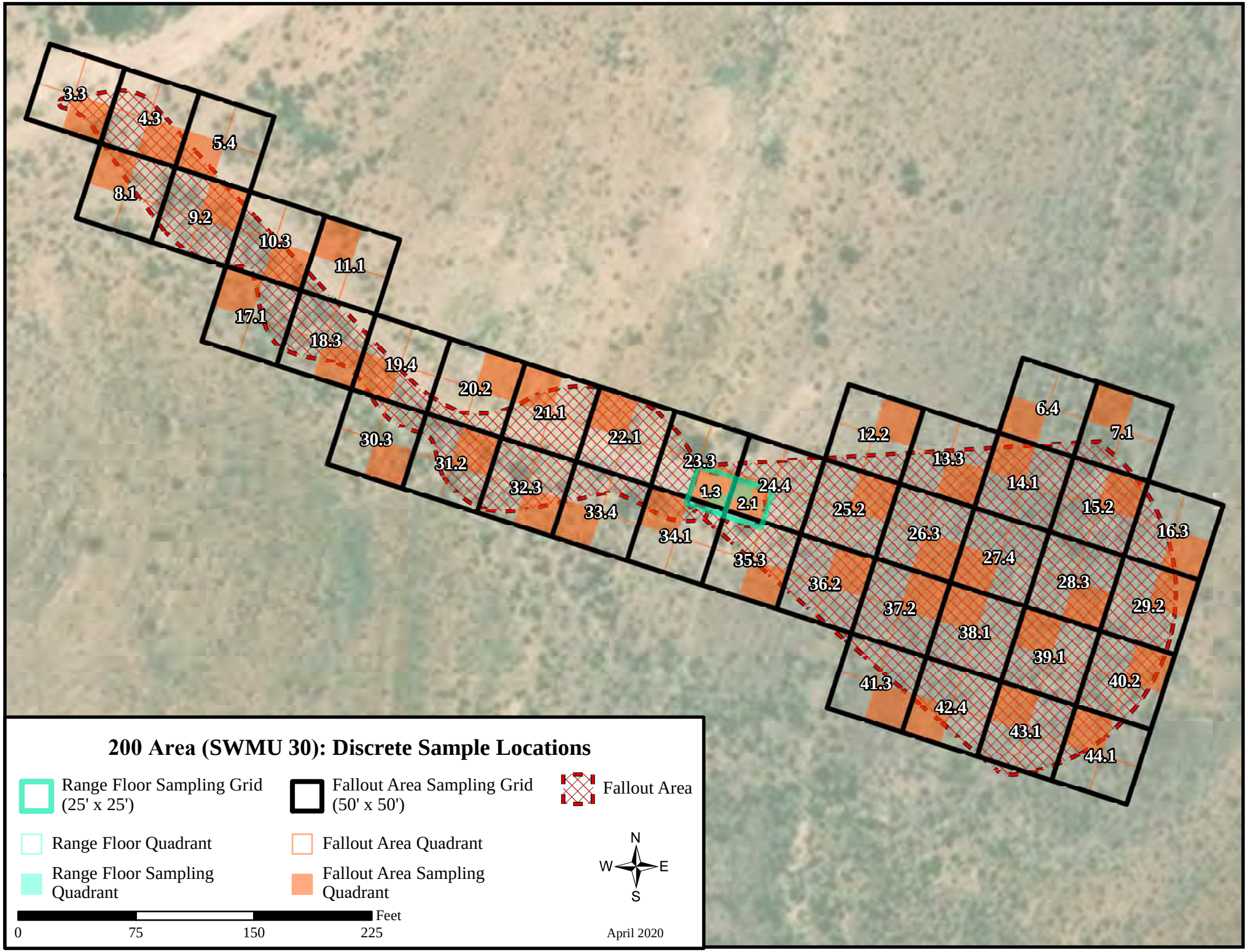

3.3
4.3
5.4
8.1
9.2
10.3
11.1
17.1
18.3
19.4
20.2
21.1
22.1
30.3
31.2
32.3
33.4
34.1
35.3
36.2
37.2
38.1
39.1
40.2
41.3
42.4
43.1
44.1
1.3
2.1
23.3
24.4
25.2
26.3
27.4
28.3
29.2
12.2
13.3
14.1
15.2
16.3
6.4
7.1
200 Area (SWMU 30): Discrete Sample Locations
Range Floor Sampling Grid (25' x 25')
Fallout Area Sampling Grid (50' x 50')
Fallout Area
Range Floor Quadrant
Fallout Area Quadrant
Range Floor Sampling Quadrant
Fallout Area Sampling Quadrant
N
W
E
S
Feet
0
75
150
225
April 2020

Figure 4.3 WB-2 (SWMU 31) Range Floor and Impact Berm Sampling

(SEE NEXT PAGE)

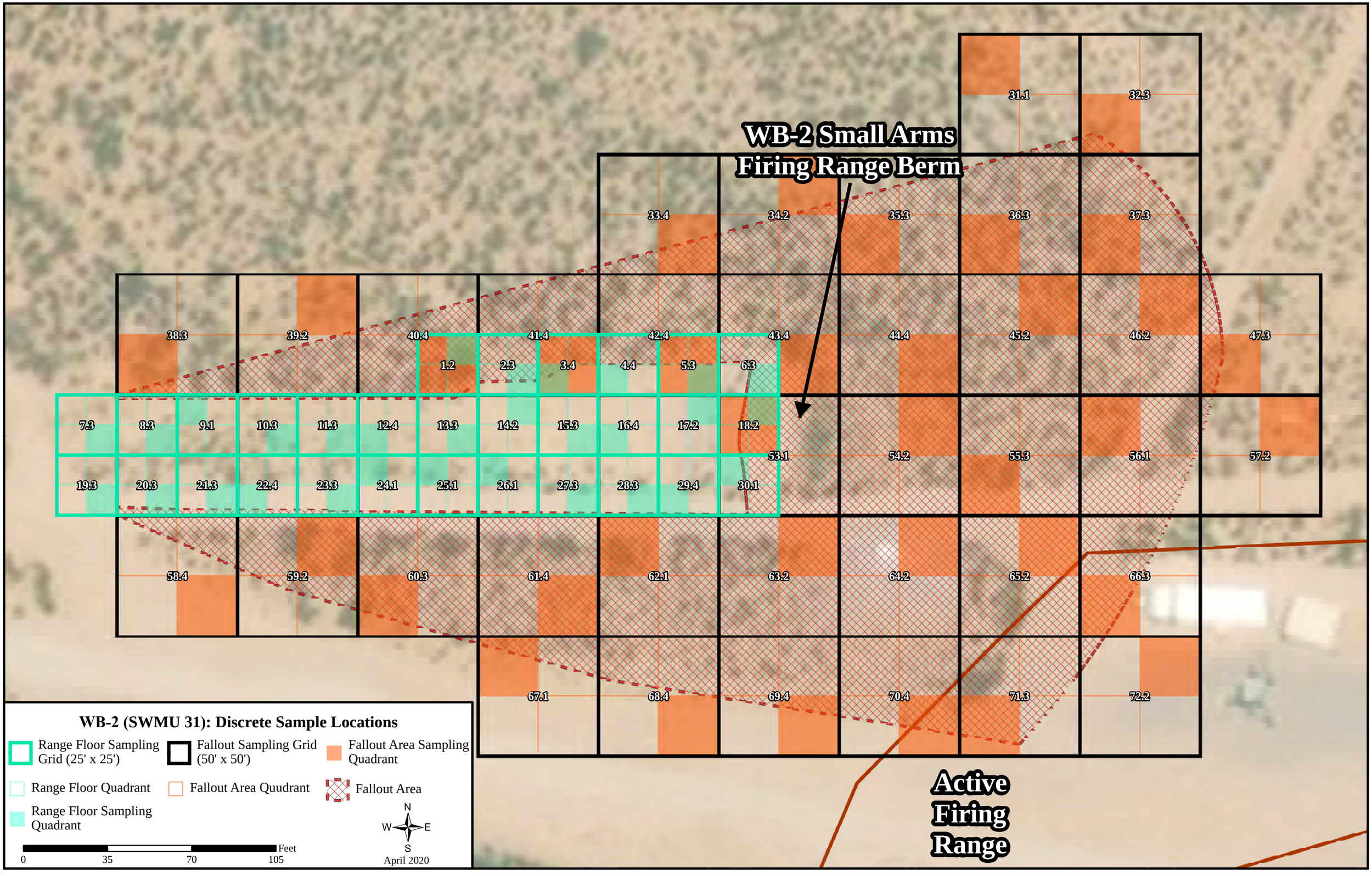
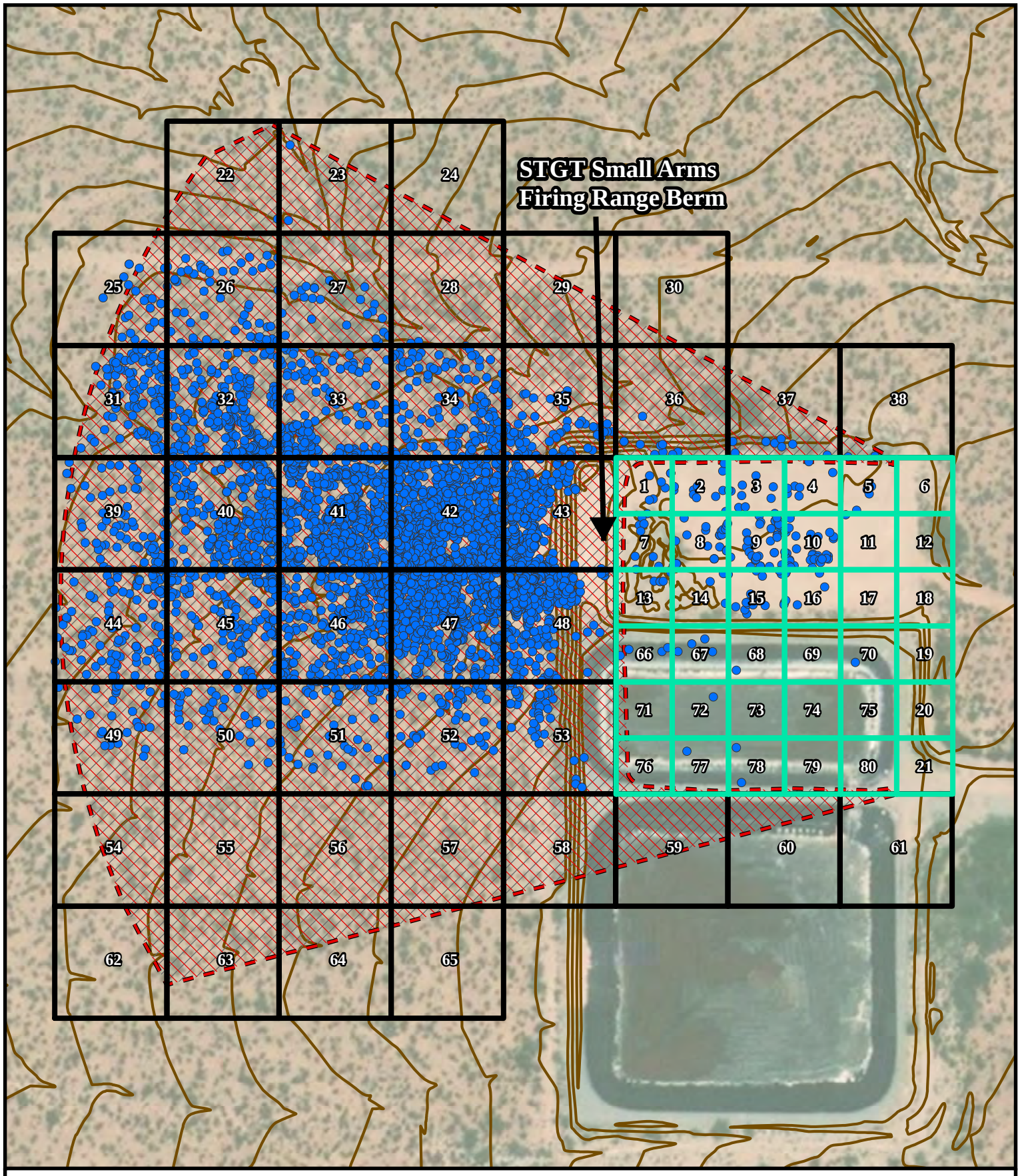

WB-2 Small Arms
Firing Range Berm
31.1
32.3
33.4
34.2
35.3
36.3
37.3
38.3
39.2
40.4
41.4
42.4
43.4
44.4
45.2
46.2
47.3
1.2
2.3
3.4
4.4
5.3
6.3
7.3
8.3
9.1
10.3
11.3
12.4
13.3
14.2
15.3
16.4
17.2
18.2
19.3
20.3
21.3
22.4
23.3
24.1
25.1
26.1
27.3
28.3
29.4
30.1
53.1
54.2
55.3
56.1
57.2
58.4
59.2
60.3
61.4
62.1
63.2
64.2
65.2
66.3
67.1
68.4
69.4
70.4
71.3
72.2
WB-2 (SWMU 31): Discrete Sample Locations
Range Floor Sampling Grid (25' x 25')
Fallout Sampling Grid (50' x 50')
Fallout Area Sampling Quadrant
Range Floor Quadrant
Fallout Area Quudrant
Fallout Area
Range Floor Sampling Quadrant
N
W
E
S
Feet
0
35
70
105
April 2020
Active Firing Range

Figure 4.4 STGT (SWMU 29) Fallout Grid and Bullet Recovery (updated)

(SEE NEXT PAGE)



STGT (SWMU 29) Fallout Area Grid and Bullet Recovery

- Recovered Bullet Location
- Range Floor Sampling Grid (50' x 50')
- Fallout Area Sampling Grid (100' x 100')
- Clean-Up Extent
- Topographic Contour (2 ft. Interval)

N
W E
S

0 60 120 240 Feet

April 2020

Figure 4.5 200 Area (SWMU 30) Fallout Grid and Bullet Recovery

(SEE NEXT PAGE)

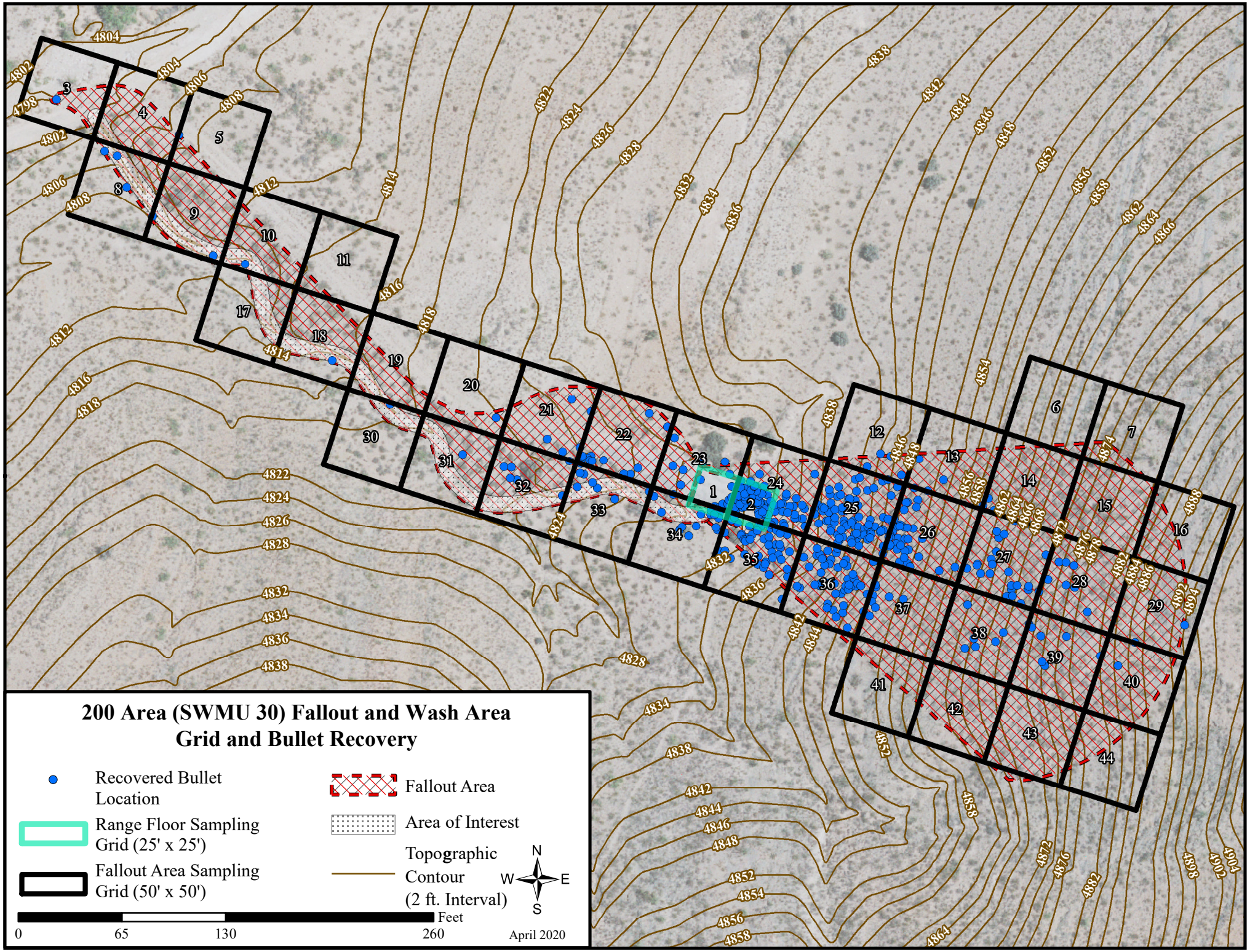
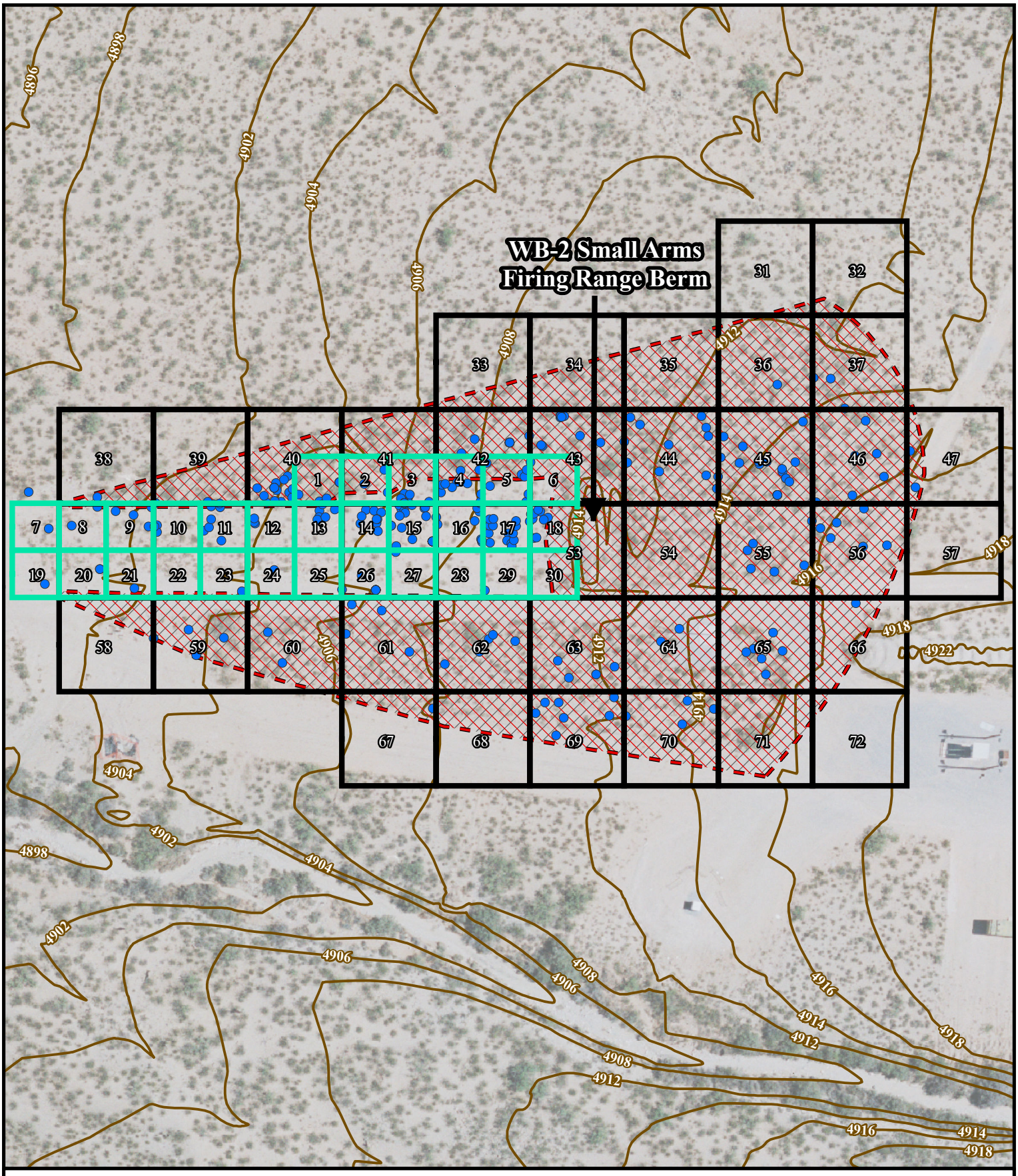

200 Area (SWMU 30) Fallout and Wash Area
Grid and Bullet Recovery
Recovered Bullet Location
Range Floor Sampling Grid (25' x 25')
Fallout Area Sampling Grid (50' x 50')
Fallout Area
Area of Interest
Topographic Contour (2 ft. Interval)
N
W
E
S
Feet
0
65
130
260
April 2020

Figure 4.6 WB-2 (SWMU 31) Fallout Grid and Bullet Recovery

(SEE NEXT PAGE)



WB-2 (SWMU 31) Fallout Grid and Bullet Recovery

- Recovered Bullet Location
- Range Floor Sampling Grid (25' x 25')
- Fallout Area Sampling Grid (50' x 50')
- Fallout Area
- Topographic Contour (2 ft. Interval)

N
W E
S

0 30 60 120 Feet

April 2020

Figure 5.1 STGT (SWMU 29) COPC Concentrations in Surface Soils

(SEE NEXT PAGE)

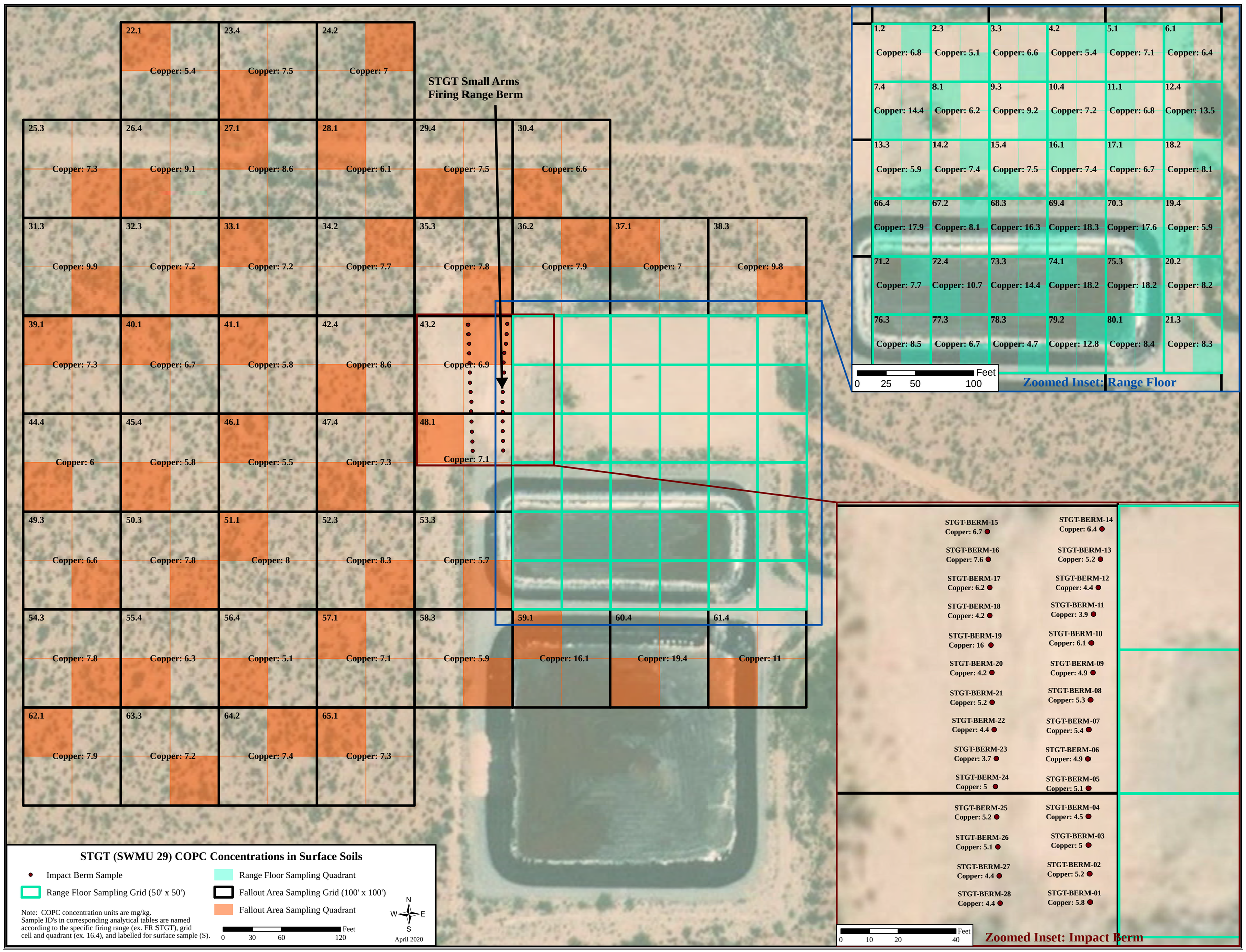

22.1
Copper: 5.4
23.4
Copper: 7.5
24.2
Copper: 7
STGT Small Arms
Firing Range Berm
25.3
Copper: 7.3
26.4
Copper: 9.1
27.1
Copper: 8.6
28.1
Copper: 6.1
29.4
Copper: 7.5
30.4
Copper: 6.6
31.3
Copper: 9.9
32.3
Copper: 7.2
33.1
Copper: 7.2
34.2
Copper: 7.7
35.3
Copper: 7.8
36.2
Copper: 7.9
37.1
Copper: 7
38.3
Copper: 9.8
39.1
Copper: 7.3
40.1
Copper: 6.7
41.1
Copper: 5.8
42.4
Copper: 8.6
43.2
Copper: 6.9
44.4
Copper: 6
45.4
Copper: 5.8
46.1
Copper: 5.5
47.4
Copper: 7.3
48.1
Copper: 7.1
49.3
Copper: 6.6
50.3
Copper: 7.8
51.1
Copper: 8
52.3
Copper: 8.3
53.3
Copper: 5.7
54.3
Copper: 7.8
55.4
Copper: 6.3
56.4
Copper: 5.1
57.1
Copper: 7.1
58.3
Copper: 5.9
59.1
Copper: 16.1
60.4
Copper: 19.4
61.4
Copper: 11
62.1
Copper: 7.9
63.3
Copper: 7.2
64.2
Copper: 7.4
65.1
Copper: 7.3
1.2
Copper: 6.8
2.3
Copper: 5.1
3.3
Copper: 6.6
4.2
Copper: 5.4
5.1
Copper: 7.1
6.1
Copper: 6.4
7.4
Copper: 14.4
8.1
Copper: 6.2
9.3
Copper: 9.2
10.4
Copper: 7.2
11.1
Copper: 6.8
12.4
Copper: 13.5
13.3
Copper: 5.9
14.2
Copper: 7.4
15.4
Copper: 7.5
16.1
Copper: 7.4
17.1
Copper: 6.7
18.2
Copper: 8.1
66.4
Copper: 17.9
67.2
Copper: 8.1
68.3
Copper: 16.3
69.4
Copper: 18.3
70.3
Copper: 17.6
19.4
Copper: 5.9
71.2
Copper: 7.7
72.4
Copper: 10.7
73.3
Copper: 14.4
74.1
Copper: 18.2
75.3
Copper: 18.2
20.2
Copper: 8.2
76.3
Copper: 8.5
77.3
Copper: 6.7
78.3
Copper: 4.7
79.2
Copper: 12.8
80.1
Copper: 8.4
21.3
Copper: 8.3
Feet
0 25 50 100
Zoomed Inset: Range Floor
STGT-BERM-15
Copper: 6.7
STGT-BERM-14
Copper: 6.4
STGT-BERM-16
Copper: 7.6
STGT-BERM-13
Copper: 5.2
STGT-BERM-17
Copper: 6.2
STGT-BERM-12
Copper: 4.4
STGT-BERM-18
Copper: 4.2
STGT-BERM-11
Copper: 3.9
STGT-BERM-19
Copper: 16
STGT-BERM-10
Copper: 6.1
STGT-BERM-20
Copper: 4.2
STGT-BERM-09
Copper: 4.9
STGT-BERM-21
Copper: 5.2
STGT-BERM-08
Copper: 5.3
STGT-BERM-22
Copper: 4.4
STGT-BERM-07
Copper: 5.4
STGT-BERM-23
Copper: 3.7
STGT-BERM-06
Copper: 4.9
STGT-BERM-24
Copper: 5
STGT-BERM-05
Copper: 5.1
STGT-BERM-25
Copper: 5.2
STGT-BERM-04
Copper: 4.5
STGT-BERM-26
Copper: 5.1
STGT-BERM-03
Copper: 5
STGT-BERM-27
Copper: 4.4
STGT-BERM-02
Copper: 5.2
STGT-BERM-28
Copper: 4.4
STGT-BERM-01
Copper: 5.8
Feet
0 10 20 40
Zoomed Inset: Impact Berm
STGT (SWMU 29) COPC Concentrations in Surface Soils
Impact Berm Sample
Range Floor Sampling Grid (50' x 50')
Range Floor Sampling Quadrant
Fallout Area Sampling Grid (100' x 100')
Fallout Area Sampling Quadrant
Note: COPC concentration units are mg/kg.
Sample ID's in corresponding analytical tables are named according to the specific firing range (ex. FR STGT), grid cell and quadrant (ex. 16.4), and labelled for surface sample (S).
Feet
0 30 60 120
N
W E
S
April 2020

Figure 5.2 200 Area (SWMU 30) COPC Concentrations in Surface Soils

(SEE NEXT PAGE)

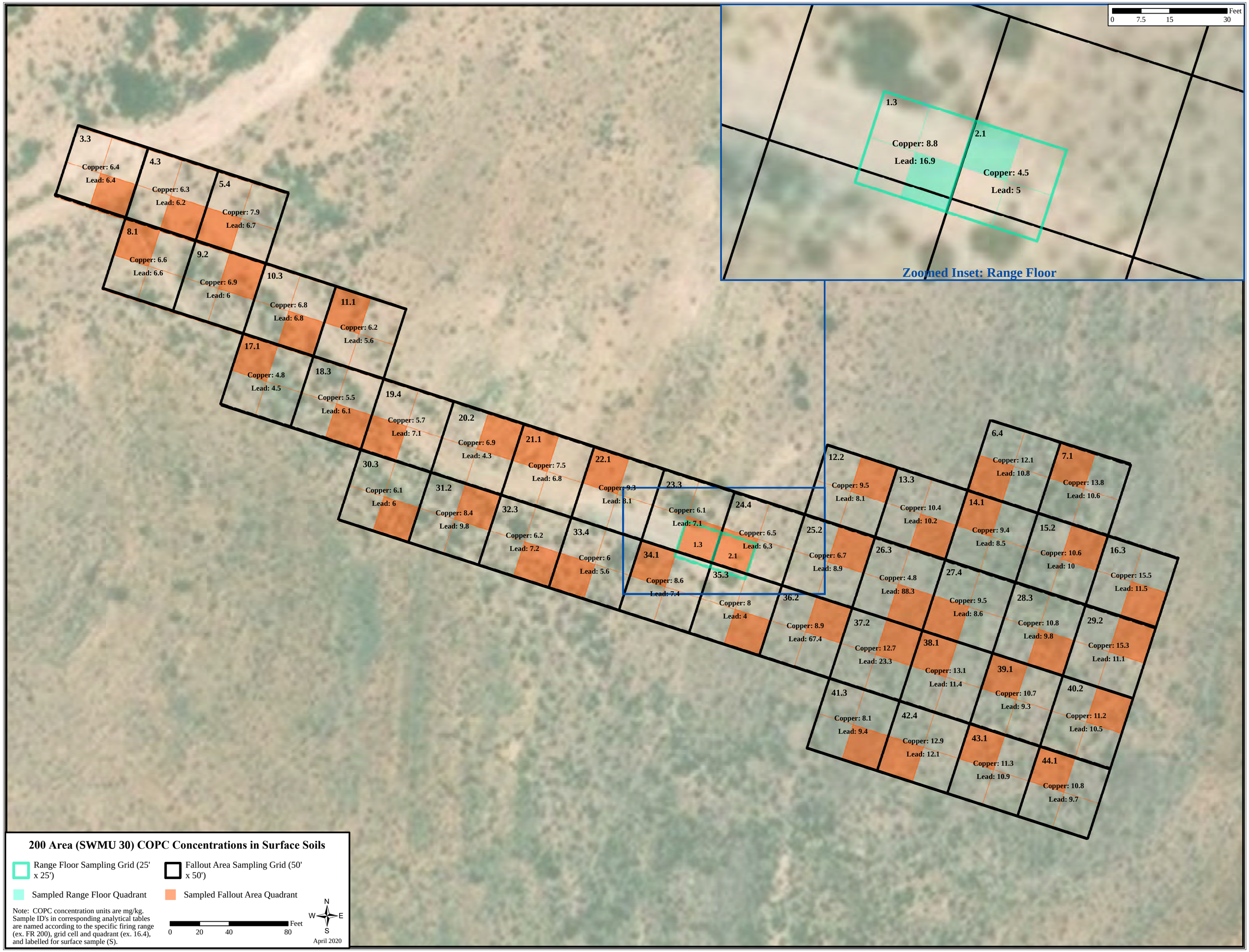

Feet
0 7.5 15 30
Zoomed Inset: Range Floor
1.3
Copper: 8.8
Lead: 16.9
2.1
Copper: 4.5
Lead: 5
3.3
Copper: 6.4
Lead: 6.4
4.3
Copper: 6.3
Lead: 6.2
5.4
Copper: 7.9
Lead: 6.7
8.1
Copper: 6.6
Lead: 6.6
9.2
Copper: 6.9
Lead: 6
10.3
Copper: 6.8
Lead: 6.8
11.1
Copper: 6.2
Lead: 5.6
17.1
Copper: 4.8
Lead: 4.5
18.3
Copper: 5.5
Lead: 6.1
19.4
Copper: 5.7
Lead: 7.1
20.2
Copper: 6.9
Lead: 4.3
21.1
Copper: 7.5
Lead: 6.8
22.1
Copper: 9.3
Lead: 8.1
23.3
Copper: 6.1
Lead: 7.1
24.4
Copper: 6.5
Lead: 6.3
25.2
Copper: 6.7
Lead: 8.9
30.3
Copper: 6.1
Lead: 6
31.2
Copper: 8.4
Lead: 9.8
32.3
Copper: 6.2
Lead: 7.2
33.4
Copper: 6
Lead: 5.6
34.1
Copper: 8.6
Lead: 7.4
35.3
Copper: 8
Lead: 4
36.2
Copper: 8.9
Lead: 67.4
12.2
Copper: 9.5
Lead: 8.1
13.3
Copper: 10.4
Lead: 10.2
26.3
Copper: 4.8
Lead: 88.3
27.4
Copper: 9.5
Lead: 8.6
37.2
Copper: 12.7
Lead: 23.3
38.1
Copper: 13.1
Lead: 11.4
41.3
Copper: 8.1
Lead: 9.4
42.4
Copper: 12.9
Lead: 12.1
6.4
Copper: 12.1
Lead: 10.8
7.1
Copper: 13.8
Lead: 10.6
14.1
Copper: 9.4
Lead: 8.5
15.2
Copper: 10.6
Lead: 10
16.3
Copper: 15.5
Lead: 11.5
28.3
Copper: 10.8
Lead: 9.8
29.2
Copper: 15.3
Lead: 11.1
39.1
Copper: 10.7
Lead: 9.3
40.2
Copper: 11.2
Lead: 10.5
43.1
Copper: 11.3
Lead: 10.9
44.1
Copper: 10.8
Lead: 9.7
200 Area (SWMU 30) COPC Concentrations in Surface Soils
Range Floor Sampling Grid (25' x 25')
Fallout Area Sampling Grid (50' x 50')
Sampled Range Floor Quadrant
Sampled Fallout Area Quadrant
Note: COPC concentration units are mg/kg. Sample ID's in corresponding analytical tables are named according to the specific firing range (ex. FR 200), grid cell and quadrant (ex. 16.4), and labelled for surface sample (S).
Feet
0 20 40 80
N
W E
S
April 2020

Figure 5.3 WB-2 (SWMU 31) COPC Concentrations in Surface Soils

(SEE NEXT PAGE)

Feet
0 10 20 40

Zoomed Inset: Range Floor

1.3 Antimony: ND Copper: 11.6 Lead: 11.4 Tin: ND
2.4 Antimony: ND Copper: 10.1 Lead: 10.4 Tin: ND
3.1 Antimony: ND Copper: 9.6 Lead: 22.5 Tin: ND
4.1 Antimony: ND Copper: 11.7 Lead: 9.4 Tin: ND
5.4 Antimony: ND Copper: 12.5 Lead: 16.5 Tin: ND
6.3 Antimony: ND Copper: 11 Lead: 33.2 Tin: ND

7.3 Antimony: ND Copper: 10.7 Lead: 9 Tin: ND
8.1 Antimony: ND Copper: 10.9 Lead: 9.4 Tin: ND
9.2 Antimony: ND Copper: 10.4 Lead: 9.8 Tin: ND
10.3 Antimony: ND Copper: 14.8 Lead: 10 Tin: ND
11.1 Antimony: ND Copper: 7.7 Lead: 7.4 Tin: ND
12.1 Antimony: ND Copper: 9.4 Lead: 8.4 Tin: ND
13.1 Antimony: ND Copper: 7.8 Lead: 12.8 Tin: ND
14.1 Antimony: ND Copper: 8.1 Lead: 7.2 Tin: ND
15.1 Antimony: ND Copper: 7.4 Lead: 7.4 Tin: ND
16.1 Antimony: ND Copper: 8.3 Lead: 7.3 Tin: ND
17.4 Antimony: ND Copper: 7.9 Lead: 16.4 Tin: ND
18.4 Antimony: 1.2 Copper: 6.8 Lead: 107 Tin: ND

19.1 Antimony: ND Copper: 5.2 Lead: 7.7 Tin: ND
20.2 Antimony: ND Copper: 8.2 Lead: 8 Tin: ND
21.3 Antimony: ND Copper: 7.7 Lead: 16.6 Tin: ND
22.2 Antimony: ND Copper: 6.8 Lead: 8.1 Tin: ND
23.3 Antimony: ND Copper: 9.2 Lead: 8.8 Tin: ND
24.2 Antimony: ND Copper: 12.6 Lead: 11.9 Tin: ND
25.1 Antimony: ND Copper: 9.4 Lead: 8.6 Tin: ND
26.4 Antimony: ND Copper: 9.8 Lead: 10.4 Tin: ND
27.4 Antimony: ND Copper: 8 Lead: 7.5 Tin: ND
28.4 Antimony: ND Copper: 9.3 Lead: 8.4 Tin: ND
29.2 Antimony: ND Copper: 8.9 Lead: 11.3 Tin: ND
30.4 Antimony: ND Copper: 10.6 Lead: 17.8 Tin: ND

Feet
0 7 14 28

WB-2-BERM-01 Antimony: ND Copper: 5.6 Lead: 11 Tin: 0.35
WB-2-BERM-010 Antimony: ND Copper: 5.7 Lead: 6.7 Tin: 0.44
WB-2-BERM-02 Antimony: ND Copper: 5.8 Lead: 4 Tin: 0.46
WB-2-BERM-09 Antimony: ND Copper: 5.9 Lead: 15 Tin: 0.57
WB-2-BERM-03 Antimony: ND Copper: 6.2 Lead: 4.8 Tin: 0.55
WB-2-BERM-08 Antimony: ND Copper: 5.3 Lead: 3.5 Tin: 0.42
WB-2-BERM-04 Antimony: ND Copper: 5.6 Lead: 4.3 Tin: 0.42
WB-2-BERM-07 Antimony: ND Copper: 5.3 Lead: 6.1 Tin: 0.49
WB-2-BERM-05 Antimony: ND Copper: 5.9 Lead: 5 Tin: 0.58
WB-2-BERM-06 Antimony: ND Copper: 6.1 Lead: 5.2 Tin: 0.43

Zoomed Inset: Impact Berm

31.1 Antimony: ND Copper: 7.3 Lead: 7.3 Tin: ND
32.3 Antimony: ND Copper: 9.3 Lead: 10.2 Tin: ND

33.4 Antimony: ND Copper: 8.8 Lead: 8.9 Tin: ND
34.2 Antimony: ND Copper: 8.2 Lead: 8.4 Tin: ND
35.3 Antimony: ND Copper: 9.5 Lead: 10.5 Tin: ND
36.3 Antimony: ND Copper: 10.6 Lead: 10.5 Tin: ND
37.3 Antimony: ND Copper: 10.1 Lead: 9.1 Tin: ND

38.3 Antimony: ND Copper: 9.7 Lead: 9.9 Tin: ND
39.2 Antimony: ND Copper: 13.2 Lead: 12 Tin: ND
40.4 Antimony: ND Copper: 12.7 Lead: 11.3 Tin: ND
41.4 Antimony: ND Copper: 9.1 Lead: 12.3 Tin: ND
42.4 Antimony: ND Copper: 12 Lead: 13.8 Tin: ND
43.4 Antimony: ND Copper: 9 Lead: 66.5 Tin: ND
44.4 Antimony: ND Copper: 11.8 Lead: 11.6 Tin: ND
45.2 Antimony: ND Copper: 10.5 Lead: 10.2 Tin: ND
46.2 Antimony: ND Copper: 9.9 Lead: 9.8 Tin: ND
47.3 Antimony: ND Copper: 8.7 Lead: 8 Tin: ND

53.1 Antimony: ND Copper: 7.2 Lead: 8.1 Tin: ND
54.2 Antimony: ND Copper: 9.2 Lead: 8.9 Tin: ND
55.3 Antimony: ND Copper: 9.1 Lead: 8.2 Tin: ND
56.1 Antimony: ND Copper: 7.5 Lead: 7.5 Tin: ND
57.2 Antimony: ND Copper: 8.2 Lead: 8.7 Tin: ND

58.4 Antimony: ND Copper: 8.2 Lead: 9.5 Tin: ND
59.2 Antimony: ND Copper: 12.3 Lead: 13.1 Tin: ND
60.3 Antimony: ND Copper: 7.4 Lead: 10 Tin: ND
61.4 Antimony: ND Copper: 10.5 Lead: 9.6 Tin: ND
62.1 Antimony: ND Copper: 10.9 Lead: 11.3 Tin: ND
63.2 Antimony: ND Copper: 8.4 Lead: 10.5 Tin: ND
64.2 Antimony: ND Copper: 6.3 Lead: 7.2 Tin: ND
65.2 Antimony: ND Copper: 7.8 Lead: 7.7 Tin: ND
66.3 Antimony: ND Copper: 7.3 Lead: 8.1 Tin: ND

67.1 Antimony: ND Copper: 9.8 Lead: 10.7 Tin: ND
68.4 Antimony: ND Copper: 12.1 Lead: 9 Tin: ND
69.4 Antimony: ND Copper: 9.6 Lead: 8 Tin: ND
70.4 Antimony: ND Copper: 7.7 Lead: 7.7 Tin: ND
71.3 Antimony: ND Copper: 8.7 Lead: 8.8 Tin: ND
72.2 Antimony: ND Copper: 8.5 Lead: 10.4 Tin: ND

WB-2 Small Arms Firing Range Berm

Active Firing Range

WB-2 (SWMU 31) COPC Concentrations in Surface Soils

- Impact Berm Sample
- Range Floor Sampling Grid (25' x 25')
- Sampled Range Floor Quadrant
- Proposed Fallout Sampling Grid (50' x 50')
- Sampled Fallout Area Quadrant

Note: COPC concentration units are mg/kg. Sample ID's in corresponding analytical tables are named according to the specific firing range (ex. FR WB-2), grid cell and quadrant (ex. 16.4), and labelled for surface sample (S).

Feet
0 15 30 60

N W E S

April 2020

Tables

Table 1.1 Contaminants of Potential Concern and Soil Screening Levels

COPC	Residential Soil, Cancer (mg/kg)	Residential Soil, Noncancer (mg/kg)	Industrial/ Occupational Soil, Cancer (mg/kg)	Industrial/ Occupational Soil, Noncancer (mg/kg)	Construction Worker Soil, Cancer (mg/kg)	Construction Worker Soil, Noncancer (mg/kg)	SL-SSL, DAF 20 (mg/kg)	Analytical Method
Antimony		3.13E+01		5.19E+02		1.42E+02	6.56E+00	SW 846 Method 6010C
Arsenic	7.07E+00	1.30E+01	3.59E+01	2.08E+02	2.16E+02	4.12E+01	5.83E+00	SW 846 Method 6010C
Copper		3.13E+03		5.19E+04		1.42E+04	9.15E+02	SW 846 Method 6010C
Iron		5.48E+04		9.08E+05		2.48E+05	6.96E+03	SW 846 Method 6010C
Lead		4.00E+02		8.00E+02		8.00E+02	2.70E+02	SW 846 Method 6010C
Tin		4.70E+04		7.00E+05			3.0E+03	SW 846 Method 6010C
Zinc		2.35E+04		3.89E+05		1.06E+05	7.41E+03	SW 846 Method 6010C

Notes:
Antimony, arsenic, copper, iron lead and zinc soil screening levels (SSL) and soil leachate SSLs (SL-SSL) obtained from NMED Guidance (NMED, 2019b).
Tin SSL and SL-SSL obtained from EPA Regional Screening Levels (RSL), November 2019 update viewed at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.
Null entries signify that a screening level has not been established for the COPC and exposure scenario.

Table 5.1 STGT (SWMU 29) Analytical Results – Discrete and Confirmation Samples

Soil Sample Location	Analyte	Detections / Total Samples	Concentration Range (mg/kg)		Area 1 BTV[1] 0'-4' Soils (mg/kg)
			Min	Max	
STGT Firing Range Floor Grids 1-21, 66-80	Antimony, Total	0/36	--	--	1.76E+00
	Arsenic, Total	36/36	2.77E+00	1.66E+01	1.2E+01
	Copper, Total	36/36	4.7E+00	1.83E+01	1.1E+01
	Iron, Total	36/36	7.24E+03	1.81E+04	3.32E+04
	Lead, Total	36/36	6.4E+00	2.3E+01	1.2E+01
	Tin, Total	0/36	--	--	NE
	Zinc, Total	36/36	2.1E+01	7.77E+01	4.56E+01
STGT Firing Range Fallout Area Grids 22-65	Antimony, Total	0/44	--	--	1.76E+00
	Arsenic, Total	43/44	2.2E+00	5.25E+00	1.2E+01
	Copper, Total	44/44	5.1E+00	1.94E+01	1.1E+01
	Iron, Total	44/44	6.33E+03	1.75E+04	3.32E+04
	Lead, Total	44/44	4.9E+00 J	1.5E+01	1.2E+01
	Tin, Total	0/44	--	--	NE
	Zinc, Total	44/44	1.73E+01	6.18E+01	4.56E+01
STGT Firing Range Impact Berm	Antimony, Total	0/28	--	--	1.76E+00
	Arsenic, Total	28/28	3.0E+00	7.1E+00 SP	1.2E+01
	Copper, Total	28/28	3.7E+00	1.6E+01 SP	1.1E+01
	Iron, Total	28/28	1.2E+04	1.5E+04	3.32E+04
	Lead, Total	28/28	2.4E+00	1.1E+01 SP	1.2E+01
	Tin, Total	0/28	--	--	NE
	Zinc, Total	28/28	1.8E+01	2.6E+01	4.56E+01

Notes:

[1] Background Threshold Value

J = the result is an estimated value less than the quantitation limit but greater than or equal to the detection limit.

SP = The matrix spike recovery and/or the relative percent difference for matrix spike duplicates was outside standard limits.

Table 5.2 200 Area (SWMU 30) Analytical Results – Discrete Samples

Soil Sample Location	Analyte	Detections / Total Samples	Concentration Range (mg/kg)		Area 3 BTV[1] 0'-4' Soils (mg/kg)
			Min	Max	
200 Area Firing Range Floor Grids 1-2	Antimony, Total	0/2	--	--	2.84E+00
	Arsenic, Total	2/2	5.2E+00	1.03E+01	2.53E+01
	Copper, Total	2/2	4.5E+00	8.8E+00	1.29E+01
	Iron, Total	2/2	5.11E+03	9.46E+03	1.89E+04
	Lead, Total	2/2	5.0E+00 J	1.69E+01	1.36E+01
	Tin, Total	0/2	--	--	NE
	Zinc, Total	2/2	1.53E+01	3.01E+01	5.43E+01
200 Area Firing Range Fallout Area Grids 3-44	Antimony, Total	1/42	6.0E-01	7.0E-01	2.84E+00
	Arsenic, Total	42/42	2.7E+00	2.13E+01	2.53E+01
	Copper, Total	42/42	4.8E+00	1.55E+01	1.29E+01
	Iron, Total	42/42	5.32E+03	1.7E+04	1.89E+04
	Lead, Total	42/42	4.0E+00 J	8.83E+01	1.36E+01
	Tin, Total	0/42	--	--	NE
	Zinc, Total	42/42	1.62E+01	4.29E+01	5.43E+01

Notes:
[1] Background Threshold Value
J = the result is an estimated value less than the quantitation limit but greater than or equal to the detection limit.

Table 5.3 WB-2 (SWMU 31) Analytical Results – Discrete and Confirmation Samples

Soil Sample Location	Analyte	Detections / Total Samples	Concentration Range (mg/kg)		Area 4 BTV[1] 0'-4' Soils (mg/kg)
			Min	Max	
WB-2 Firing Range Floor Grids 1-30	Antimony, Total	1/30	1.2E+00	--	NE
	Arsenic, Total	30/30	3.61E+00	6.8E+00	1.11E+01
	Copper, Total	30/30	5.2E+00	1.48E+01	1.17E+01
	Iron, Total	30/30	8.81E+03	1.48E+04	3.99E+04
	Lead, Total	30/30	7.2E+00	1.07E+02	1.59E+01
	Tin, Total	0/30	--	--	NE
	Zinc, Total	30/30	1.97E+01	3.9E+01	5.97E+01
WB-2 Firing Range Fallout Area Grids 31-47, 53-72	Antimony, Total	0/37	--	--	NE
	Arsenic, Total	37/37	2.96E+00	1.11E+01	1.11E+01
	Copper, Total	37/37	6.3E+00	1.32E+01	1.17E+01
	Iron, Total	37/37	7.71E+03	1.65E+04	3.99E+04
	Lead, Total	37/37	7.2E+00	6.65E+01	1.59E+01
	Tin, Total	0/37	--	--	NE
	Zinc, Total	37/37	2.47E+01	3.91E+01	5.97E+01
WB-2 Firing Range Impact Berm	Antimony, Total	0/10	--	--	NE
	Arsenic, Total	10/10	5.5E+00	3.0E+01	1.11E+01
	Copper, Total	10/10	5.3E+00	6.2E+00	1.17E+01
	Iron, Total	10/10	1.1E+04	1.5E+04	3.99E+04
	Lead, Total	10/10	3.5E+00	1.5E+01	1.59E+01
	Tin, Total	10/10	3.5E-01	5.8E-01	NE
	Zinc, Total	10/10	2.5E+01	2.9E+01	5.97E+01

Notes:
[1] Background Threshold Value

Appendix A
Field Documentation

Aug 26, 2015

Weather: Sunny, Clouds, high of 88°F

Personnel: P. Egan, R. Burrows, F. Gallegos

Task: Prep work for firing ranges field work.

Location: 100 Area, then mob to WB-2

Equipment: Only field vehicles

PPE in Use: None today, just work clothes

Safety Meeting: Kick-off meeting in Bldg. 101

0700 At office. Prep for safety meeting

0730 Start Kick-off meeting in Gemini CR. Navarro folks present:

P. Egan	R. Burrows	S. Portillo
T. Wiebe	M. Englert	G. Giles
J. Roland	F. Gallegos	C. Nichols (Labs)

0900 Kickoff meeting completed. Meet w/ techs to discuss plan for day.

- collect supplies
- Break for lunch
- meet up to deliver equip to WB-2 range, check out 200 Area Firing Range access, then P95 mask fit test

1230 Met w/ techs after lunch. P/u supplies from warehouse, drop off maps at Fire department, do some access recon @ 200 Area firing range. Head to STGT to show techs sample site. Drop drums off at WB-2 for IDW.

1445 Meet Marie, Wade, Elvia at Cafeteria training room for P95 fit test.

1505 Complete fit test. Done for day.

Summary: Prep

Tomorrow: Start sampling @ WB-2

Continued on Page 2

Read and Understood By

Pamela Egan 8/26/15
Signed Date

Signed 9/2/15
Date

August 27, 2015

Weather: Cloudy, 80°s
Personnel: P. Egan, R. Burrows, F. Gallegos
Task: Soil sampling
Location: WB-2
Equipment: Soil sampling equipment, Field Vehicles → Carboy #5
PPE in Use: Level D w/ hi Vis; Ex. Zone = Dust mask, poly apron/sleeves, safety glasses
Safety Meeting: Yes, see daily tailgate

0700 Egan collecting sample jars + other equipment. Stop @ Fire Dept. to check in for day. Head to WB-2 FR

0720 Meet techs. Techs are set up + ready to go. Go over SHP, sign 491, training roster, daily tailgate. Discuss plan for day.

We will use odd numbers in sample IDs so we don't duplicate any sample ID #s that other crews will use.

0820 Robert dons PPE + starts sampling in cell #7

Cell #7 — WSTF Labs XRF — 1508270827 - unprepared (u)
0829 - prepared (p), means sieved + ground
Frankie Decons equip
Robert Doffs PPE. Frankie Dons

0850 WSTF labs 1508270857 - u XRF
Hall " 0859 - u 6010C
Cell #19 WSTF labs " 0901 - p XRF
Frankie Doffs PPE. Robert Decons

We don't have lot #s for the Hall jars. Matt is going to see if he can track it down

Continued on Page 3

Read and Understood By

Pamela Egan 8/27/15 — Signed / Date
[redacted] 8/31/15 — Signed / Date

0930 Cell #20 - Robert Dons PPE Aug 27, 2015

Sample ID	Analysis	Lab	U/P
1508270935	XRF	WSTF	U
" 0937	"	"	P

Robert doffs Frankie Decons equipment.

0950 Cell #8. Frankie Dons PPE

Sample ID	Analysis	Lab	U/P
1508270955	XRF	WSTF	U
" 0957	6010C	Hall	U
" 0959	XRF	WSTF	P

Frankie Doffs. Robert decons

1015 Cell #9 Don PPE - Robert

Sample ID	Analysis	Lab	U/P
150827 1025	XRF	WSTF	U
" 1027	6010C	Hall	U
" 1029	XRF	WSTF	P

Robert Doff PPE. Frankie decons

1040 Cell #21 Frankie Dons PPE

Sample I.D	Analysis	Lab	U/P
1508271045	XRF	WSTF	U
" 1047	6010C	Hall	U
" 1049	XRF	WS	P

1050 J. Lawrence on site to run metal detector. Signs tailgate after getting safety briefing.

Frankie doffs PPE. Robert decons equip.

Start clean up before breaking for lunch. Decon water + contaminated debris into IDW Drums. Secure site. Set up barrier.

Continued on Page 4

Read and Understood By

Pamela Egan Signed 8/27/15 Date

Signed 8/31/15 Date

Lawrence leaves site with us. Aug 27, 2015

11:20 Break for lunch

12:30 Egan / Lawrence @ WB-2 FR

12:45 Techs arrive

Prep for next sampling event. Lawrence heads out w/ metal detector.

12:50 Cell #22 Robert Dons PPE

Sample ID	Analysis	Lab	U/P
150827 1301	XRF	WSTF	U
1303	6010C	Hall	U
1305	XRF	WSTF	P

Robert doffs PPE, Frankie decons

1320 Cell #~~18~~ 21 Frankie dons PPE

Sample ID	Analysis	Lab	U/P
~~150827 1330 3345~~			
~~10 3547~~			
~~+ 49~~			
150827 1333	XRF	WSTF	U
" 35	6010C	Hall	U
" 37	XRF	WSTF	P

Frankie doffs, Robert decons

~~PPE~~
~~1335~~
1355 Cell #23 Robert Dons PPE

Sample ID	Analysis	Lab	U/P
150827 1405	XRF	WSTF	U
1407	6010C	Hall	U
1409	XRF	WSTF	P

Continued on Page 5

Read and Understood By

Pamela Egan Signed 8/27/15 Date

~~MPC~~ Signed 8/31/15 Date

Aug 27, 2015

1410 Robert doffs PPE, Frankie decons

14:20 Start clearing up site. Secure for long weekend.

14:30 Head to WSTF Met lab to drop off XRF samples.

1500 Relinquish samples to Charles Nichols.
Techs leave for 637 to chain Hall samples to fridge + unload for day.

Egan to office

Daily Summary:

- Mobilized to WB-2
- Sampled grid cells 7, 19, 8, 20, 9, 21, 10, 22, 23
- Applied all PPE + decon procedures
- Checked in + out w/ WSTF Fire Dept.

Next Week:

- Continue w/ soil sampling.
- Put "contact" info on HazWoper sign.

8.27.15

Continued on Page

Pamela Egan
Signed

8.27.15
Date

Read and Understood By

Signed

8/31/15
Date

Weather: Sunny, slight breeze (<5 mph), ≈85°
Personnel: S. Portillo, F. Gallegos, R. Burrows, G. Giles (metal Detector)
Task: Soil Sampling @ WB-2 Firing Rrange
Location: WB-2 Firing Range
Equipment: Soil Sampling equipment, Carboy GS, Field Vehicles
PPE in Use: Level D w/high vis clothing; Ex zone = Dust mask, poly apron, sleeves, safety glasses
Safety Tailgate Briefing: UXOs discussed - Do not touch, flag them for removal.

0700: Technicians prep for field day. ~~SMP~~ Delayed start of sampling till S. Portillo on site
0750: S. Portillo Conducts Safety Tailgate briefing.
0815: Techinicians begin soil sampling. G. Giles and J. Lawerence on site for metal detecting. J. Lawrence signed visitor Log and G. Giles signed safety tailgate briefing. Checked in with WSTF Dispatch

Cell #11: Frankie dons PPE

Sample ID	Analysis	Lab	U/P
150831 0815	XRF	WSTF	U
" 0817	XRF	WSTF	P
" 0819	Total Metals	Hall	U

0835: A. Zavala on site to pick up J. Lawrence. Had him sign ~~tailgate~~ SMP visitors log
0839: Zavala & Lawrence leave site.

Cell #12: Robert dons PPE

Sample ID	Analysis	Lab	U/P
150831 0841	XRF	WSTF	U
" 0845	XRF	WSTF	P
" 0843	Total metals	Hall	U

0840: G. Giles begins metal detecting

Continued on Page 7

Read and Understood By

MP — Signed
8/31/15 — Date
Pamela Egan — Signed
9.2.15 — Date

0857: Cell #24 Frankie Dons PPE

Sample ID	Analysis	Lab	U/P
150831 0857	XRF	WSTF	U
" 0901	XRF	WSTF	P
" 0859	Total Metals	Hall	U

0920 Cell #25 Robert Dons PPE

Sample ID	Analysis	Lab	U/P
150831 0921	XRF	WSTF	U
" 0925	XRF	WSTF	P
" 0923	Total Metals	Hall	U

0945 Cell #13 Frankie Dons PPE

Sample ID	Analysis	Lab	U/P
150831 0945	XRF	WSTF	U
" 0949	XRF	WSTF	P
" 0947	Total Metals	Hall	U

0950 Take Water break

Cell #1 Robert dons PPE

Sample ID	Analysis	Lab	U/P
150831 1011	XRF	WSTF	U
" 1015	XRF	"	P
" 1013	Total Metals	Hall	U

Cell #2 Frankie dons PPE

1030

Sample ID	Analysis	Lab	U/P
150831 1033	XRF	WSTF	U
" 1035	XRF	WSTF	P

No Total Metals for this Cell

1100 Break down for lunch and Prep for afternoon samples.
1115 S. Portillo & Technicians leave, G. Giles left 10 min prior.
1245 S. Portillo arrives back at WB-2 Firing Range
1258 Technicians arrive onsite

Continued on Page 8

Read and Understood By

Signed — Date 8/31/15 — Signed Pamela Egan — Date 9.2.15

1305 Cell 14 - Robert dons PPE

Sample ID	Analysis	Lab	U/P
150831 1305	XRF	WSTF	U
1309	XRF	WSTF	P
1307	Total Metals	Hall	U

1315 Geoff arrives to continue metal detecting.

1330 Cell 26 - Frankie dons PPE

Sample ID	Analysis	Lab	U/P
150831 1331	XRF	WSTF	U
" 1335	XRF	WSTF	P
" 1333	Total Metals	Hall	U

1350 Cell 27 - Robert dons PPE

Sample ID	analysis	Lab	U/P
150831 1351	XRF	WSTF	U
" 1355	XRF	WSTF	P
" 1353	Total Metals	Hall	U

1405 Cell 15 - Frankie dons PPE

Sample ID	analysis	Lab	U/P
150831 1409	XRF	WSTF	U
" 1413	XRF	WSTF	P
" 1411	Total Metals	Hall	U

14 SP
~~13~~ 30 Proceed to clean up soil sampling equipment. Tech's to break down field equipment and take samples to Metalurgy Lab. S. Portillo to assist G. Giles in metal detecting.

14 SP
~~13~~ 45 Tech's leave for WSTF Metalurgy Lab

1313 G. Giles and S. Portillo leave site.

Summary
- Soil Sampling in Grid Cells 11, 12, 24, 25, 13, 1, 2, 14, 26, 27, & 15
- Conducted metal detecting and flagged point locations and cluster locations along the fallout fan and East of the berm. SP

Tomorrow - continue sampling and metal detecting

Continued on Page →

Read and Understood By

Signed [signature] Date 8/31/15

Signed Pamela Egan Date 9.2.15

WX: SUNNY, V LIGHTH BREEZE ~ 70°F FOG
PERSONNEL: J LAWRENCE, G. GILES, R BURROUGHS, F. GALLEGOS (UNARMED)
TASK: SOIL SAMPLING WOB-2 FIRING RANGE
LOCATION: WSTF FORMER WOB-2 FIRING RANGE
EQPT: SOIL SAMPLING EQPT, CARBOY, FIELD VEHICLES
TAILGATE SAFETY MEETING CONDUCTED
0730: F. GALLEGOS DONS PPE, PREPARES TO SAMPLE CELL #3

CELL #3

SAMPLE ID	ANALYSIS	LAB	U/P
150901 0735	XRF	WSTF	U
0739	XRF	WSTF	P
0737	TOTAL METALS	HALL	U

0750 CELL #4 R BURROUGHS DONS PPE

150901 0751	XRF	WSTF	U
0755	XRF	WSTF	P
0753	TOTAL METALS	HALL	U

0804 G GILES DEPARTS TO 100 AREA
0805 CELL #16 F GALLEGOS DONS PPE

150901 0809	XRF	WSTF	U
~~0811~~ 0813 JAC	XRF	WSTF	P
~~0813~~ 0811 JAC	TOTAL METALS	HALL	U

0812 F GALLEGOS FINDS "BRASS" (SPENT CASING) IN CELL #16
~~0815~~ JAC CELL #28 F GALLEGOS OBTAINS SAMPLE SET
0822

150901 0831	XRF	WSTF	U
0835	XRF	WSTF	P
0833	TOTAL METALS	HALL	U

0835 G GILES ARRIVES @ WOB-2 FR SITE
0840 CELL #29 R BURROUGHS DONS PPE

150901 0847	XRF	WSTF	U
0851	XRF	WSTF	P
0849	TOTAL METALS	HALL	U

CELL #17 F GALLEGOS DONS PPE

150901 0905	XRF	WSTF	U ←
0919	XRF	WSTF	P
0917	TOTAL METALS	HALL	U

Continued on Page 10

Read and Understood By

Jim Lawrence
Signed

9.2.2015
Date

Pamela Egan
Signed

9.2.15
Date

~~Cell # 5~~ JAL

	Sample #	Analysis	Lab	Prep/Unprep
0928	Cell # 5	F Gallegos Does APE		
	150901 0931	XRF	WSTF	U
	0935	XRF	WSTF	P
	0933	Total Metal	Hall	U
0949	Cell # 6	R Burroughs Does APE		
	150901 0951	XRF	WSTF	U
	0953	XRF	WSTF	P
1002	Cell # 18	F Gallegos Does APE		
	150901 1007	XRF	WSTF	U
	1011	XRF	WSTF	P
	1009	Total Metals	Hall	U
1020	Cell # 30	R Burroughs Does APE		
	150901 1025	XRF	WSTF	U
	1029	XRF	WSTF	P
	1027	Total Metals	Hall	U

1022 Twiebe arrives @ site Sampling of grids complete
1105 Twiebe, G Giles, J Lawrence, R Burroughs & F Gallegos confer; re: afternoon sampling.
1107 Twiebe departs; R Burroughs & F Gallegos depart
1138 G Giles & J Lawrence
1302 J Lawrence & G Giles Arrive @ WB-2 Firing Range Area
1310 R Burroughs & F Gallegos Arrive & Begin Excavation
1320 G Giles departs
1500 J Lawrence, R Burroughs & F Gallegos depart.

Summary

- Completed Grid-Sampling for Soils
- Continued Metal Detector Screening of "Out-lier" Area

Tomorrow

- Continue according to Plan!

Continued on Page

Read and ~~Understood~~ By

Signed — 1 Sept 2015 Date — Pamela Egan Signed — 9-2-15 Date

Weather: mostly sunny, 68°F a.m., 95°F p.m.
Personnel: P. Egan, J. Lawrence, R. Burrows, F. Gallegos
Task: Pick up lead bullets, metal detecting
Location: WB-2
Equipment in Use: Metal detector. Field vehicles
PPE in Use: Level D, gloves, high vis
Safety Tailgate: Yes, see form (snake, dust minimization, hydration.

0700 Egan at office. Call fire dept to check in for day. Get Lawrence. Head to WB-2.

0715 Conduct safety tailgate meeting @ WB-2. Discuss plan for day.

0730 Techs head off to do bullet cleanup of areas marked with pin flagging.

J. Lawrence trains Egan on metal detector.

0820 R Burrow leaves w/ F. Gallegos to take Gallegos to appt. @ clinic for physical.

0830 R. Burrows returns

1015 R. Burrows leaves to p/u F. Gallegos from clinic. Burrows + Gallegos return. Egan leaves to take J. Lawrence back to office.

10 40 Egan back on site.

Continue w/ metal detector & cleanup of flagged sites.

11:30 Break for lunch

Continued on Page 12

Pamela Egan Signed 9.2.15 Date
Read and Understood By
Jeff Lawrence. Signed 9/2/15 Date

1245 Back at site

Start detecting/cleanup again.

1500 Stop for day. Techs leave site. Egan leaves site. WSTF Fire Dept has been contacted about our departure.

Summary:

- Continued with metal detector and flagging findings.

Tomorrow:

- Continue as above. Might finish w/ WB-2FR

Pamela Egan 9.2.15

Continued on Page N/A

Pamela Egan
Signed

9.2.15
Date

Read and Understood By

Signed

9/2/15
Date

Weather: Cloudy, few rain drops
Personnel: P. Egan, G. Giles, F. Gallegos, R. Burrows
Location: WB-2 Firing Range
Task: metal detecting, flagging findings, sifting for bullets
Equipment: metal detector, computer tablet for data collection
PPE in use: Level D w/ Hi Vis
Safety: Hold safety tailgate meeting, see form.

0700 Egan @ office. Meet w/ Chuck Herd who is doing a safety check.

Head to WSTF FD to check in, then WB-2 FR work site.

0720 Hold tailgate safety meeting.

0800 Start sweeping w/ metal detector, flagging findings, and sifting for bullets.

1050 Finished sweeping WB-2 firing range.

1100 Clean up site and break for lunch.

1245 Return from lunch and start p/u equipment + IDW drums.

1330 Move Equip to STGT range (and IDW drums)

1430 Check road going to 200 Area FR. Rough road in arroyo – Need 4WD. Set up string in 1st cell.

1500 Road is clear for tomorrow. Head back to office Check out for day w/ WSTF F.D.

Summary: Finished metal detecting + p/u bullets @ WB-2 Mob to STGT/200A

Tomorrow: XRF sampling at 200A & STGT Ranges

Continued on Page N/A

Read and Understood By

Pamela Egan 9.3.15
Signed Date

Signed Date 9/4/15

PROJECT FIRING RANGES / 200 AREA FIRING RANGE — USEAT 2015 — Notebook No. 1

Continued from Page N/A

WX: CLOUDY, CALM TO VERY LT BREEZE, T~ 70°F FORECAST HI ~90°F; POSSIBILITY OF RAIN
PERSONNEL: G. GILES, J LAWRENCE, R BURROUGHS, F GALLEGOS (NAVARRO)
EQUIP: SOIL SAMPLING EQUIP, CARBOY, METAL DETECTOR
TASK: METAL DETECTING; SAMPLING OF 2 GRIDS
PPE: LEVEL D - MODIFIED W/ HI-VIZ TECHS: ARMS, EYEWEAR, SLEEVES, MASKS.
SAFETY: TAILGATE SAFETY MEETING — SEE TAILGATE FORM
0810 R BURROUGHS DONS PPE; PREPARES TO OBTAIN SOIL SAMPLES. G GILES SCREENS W/ METAL DET.

SAMPLE NUMBER	ANALYSIS	LAB	PRES/UNPRES	PRES 9.16.15
CELL #1				
150904 0815	XRF	WSTF	U	
" 0819	XRF	WSTF	P	
" 0817	TOTAL METALS	HALL	U	

0830 F GALLEGOS DONS PPE; PREPARES TO OBTAIN SOIL SAMPLES, G GILES CONTINUES SCREEN W/ METAL DETECTOR

CELL #2				
150904 0835	XRF	WSTF	U	
" 0839	XRF	WSTF	P	
" 0837	TOTAL METALS	HALL	U	

0840 G GILES CONTINUING TO SCREEN W/ METAL DETECTOR.
1045 G. Giles, T. Lawrence, F. Gallegos, R. Burrows complete screening with metal detector for the morning. 90 points flagged & excavated total.

1300 F. Gallegos, R. Burrows & G. Giles return to field screen with the metal detector. Located points from #91 to #155. Flagged on ground, located on georeferenced map on tablet, and excavated bullets.
1500 Complete lead screening for the day. All depart for Bldg. 637 & 638.

SUMMARY: Worked on 200 Area FR Project.
: Sampled 2 x sample grids.
: Performed lead screening at #155 point locations.

Continued on Page N/A

Read and Understood By

Signed: [signature] Date: 9/4/15

Signed: Pamela Egan Date: 9.16.15

0930 F. Gallegos & R. Burrows have finished their training with M. Jones.

1000 G. Giles (G62 30326) F. Gallegos & R. Burrows (pickup) arrive @ 200 Area Firing Range. Perform Tailgate Safety Briefing (Heat Stress & Wildlife). Frank has checked in W. Dr Hedgson @ 800 Area.

WEATHER: 82°F, forecast 93°F, partly cloudy, slight breeze from the south

PERSONNEL: G. Giles, F. Gallegos, R. Burrows — Nonrad Res & Eng.

OBJECTIVE: Continue with 200 Area Firing Range bullet flagging / GPS locating / recovery.

1015 Start flagging bullet locations using metal detector @ #156. Flag & recover bullets #158 – #189. South side of Scatter apron.

1100 Depart for lunch.

1245 Return from lunch. Start flagging bullet locations with metal detector @ #190. Flag & recover bullets #190 – #251. Central part of Scatter apron.

1510 Depart for office.

SUMMARY

- Scanned w/ metal detector @ 200 Area Firing Range.
- Located, flagged, GPS'd, and recovered bullets at locations #156 – #251. Total 96 locations on south and central sides of bullet Scatter apron.

Continued on Page N/A

Read and Understood By

Jeff Giles — Signed — 9/8/15 — Date

Pamela Egan — Signed — 9.16.15 — Date

0700 R. Burrows, F. Gallegos, G. Giles @ 200 Area FR. Set up equipment.

0715 Tailgate safety briefing. Slightly cooler weather → watch out for snakes: NOTE Technicians having problems wearing snake guards → legs sweat & dust is creating a rash. Need to address.

WEATHER: Cloudy (80%), hot but cooler than previous summer days. Forecast to be first day that stays under 90 degrees since May. Forecast high ≈ 85° F.

0730 Commence locating & flagging bullets. Log onto georeferenced maps using tablet (ASUS). Record points #252 - 345. Concentrating on areas upslope of the designated catchment apron.

1100 Depart for lunch.

1245 Return from lunch. Flag, log, and recover stations #346 - #401. Worked down hill from upslope areas back to firing line and started coverage in the washout/arroyo to the Southwest of the firing range floor.

1500 Departing site. Technicians truck will not start.

1510 Run to B. 637 w/ Robert to get jumper cables & charger.

1520 Back @ 200 Area Firing Range. Truck starts.

1530 All back to B. 101 Parking lot.

SUMMARY
- Flagged, logged, and recovered bullets from locations #252 - #401.

FOR MONDAY
- Finish flagging, logging, & recovery in arroyo Southwest of the 200 Area Firing Range.
- Move over to TDRSS Firing Range.

Continued on Page N/A

Read and Understood By

Signed — Date 9/10/15

Signed — Date 9-14-2015

0700 G. Giles, R. Burrows, F. Gallegos @ 200 Area setting up equipment.

0730 Tailgate safety briefing: Topics – Heat stress, rattlesnakes, spiders.

WEATHER: Partly cloudy skies (30%), 72°F, forecast high 92°F, slight breeze from Northeast <5 mph.

PERSONNEL: G. GILES
F. GALLEGOS
G. GILES
] NOVARO.

0745 Commence survey on the arroyo to the southwest of the 200 Area Firing Range which had been flagged as a potential area of interest and is shaded on the geo-referenced base map. Start with metal detector, flagging, and locating points at #402.

0930 Complete flagging points at #447. All points have been added to the geo referenced base map

0940 Take break.

0950 Start excavating and bagging bullets, casing shells, & MISCELLANEOUS.

1100 Complete excavating and bagging bullets. 200 Area Complete. Return to B.101 Parking Lot ~~for lunch~~. Recorded points #402-447 today.

1320 R BURROUGHS CALLS J LAWRENCE (NAVARRO) . JAL PREPARES TO MEET R BURROUGHS & F GALLEGOS.

1330 JAL MEETS R BURROUGHS & F GALLEGOS @ 637/638 YARD

1335 ALL DEPART TO TARSS FIRING RANGE

1350 ALL ARRIVE @ FIRING RANGE AREA. R BURROUGHS HAS FORGOTTEN SOME SAMPLING SUPPLIES. BURROUGHS & GALLEGOS DEPART. JAL STAYS w/ TRUCK (3039 G).

1422 BURROUGHS & GALLEGOS RETURN TO SITE.

1430 BURROUGHS & GALLEGOS SET-UP ON GRID-CELL # 6 TO PREPARE TO STAPLE: REMOVING STRING/TWINE TO DEMARCATE THE GRID BOUNDARY. NOTE: GRIDS AS-STAKED ARE 70 FEET! measured on 9.16.15 at 50 ft

Continued on Page 18

Read and Understood By

Signed — 9-14-2015 Date

Signed — 9.16.15 Date

1439 F. GALLEGOS DOAS PPE

SAMPLE #	ANALYSIS	LAB	PRESP/UNPRESP
CELL # 6			
150914 1441	XRF	WSTF	U
1445	XRF	WSTF	P
1443	TOTAL METALS	HALL	U

1458 R BURROUGHS DECONS SAMPLING IMPLEMENTS & DOAS PPE.

CELL # 5			
150914 1515	XRF	WSTF	U
1519	XRF	WSTF	P
1517	TOTAL METALS	HALL	U

SG 9.16.15

SUMMARY

- COMPLETED ZOO AREA FIRING RANGES
- RELOCATED TO STGT FIRING RANGE
- COLLECTED SOIL SAMPLES FROM CELLS 5,6 @ STGT FIRING RANGE

TOMORROW

- CONTINUE SAMPLE COLLECTION
- BEGIN PERIPHERY SCAN W/ METAL DETECTOR

Continued on Page

Read and Understood By

Jim Lemmon — Signed — 9-14-2015 — Date

Pamela Egan — Signed — 9.16.15 — Date

~~HGJAC~~
15 SEPT 2015

Notebook No. 1 — 19

PROJECT FIRING RANGES: STGT

Continued from Page N/A

WDX CLDY, BREEZY TEMP ~ 70°F PROJECTED HI TEMP ~ 90°F
0720 JLACORNICK (ADVARRO) DEPARTS OFFICE. WAS WAITING ON AAD'L GEO
0745 JAC ARRIVES @ STGT FIRING RANGE AREA. R BURROUGHS & F GALLEGOS PRESENT. BURROUGHS & GALLEGOS SET-UP EQUIPMENT.
0805 TAILGATE SAFETY BRIEFING CONDUCTED.
0810 F. GALLEGOS DONS PPE. BEGINS COLLECTING SOIL

SBL 9.16.15

SAMPLE #	ANALYSIS	LAB	PRESP/UNPRESP
CELL # 11			
150915 0819	XRF	WSTF	U
~~0823~~ JAC	~~XRF~~ JAC XRF	~~WSTF~~ JAC WSTF	~~P~~ P JAC
0821	~~TOTAL METALS~~ JAC	~~HALL~~ JAC	~~U~~ JAC

0835 R BURROUGHS DONS PPE & BEGINS SOIL SAMPLING

CELL # 12			
150915 0841	XRF	WSTF	U
0845	XRF	WSTF	P
0843	METALS	HALL	U

0900 F GALLEGOS DONS PPE & BEGINS SOIL SAMPLING. G. GILES ARRIVES @ SITE

CELL # 18			
150915 0903	XRF	WSTF	U
0907	XRF	WSTF	P
0905	TOTAL METALS	HALL	U

0940 R BURROUGHS DONS PPE & BEGINS SOIL SAMPLING.

CELL # 19			
150915 0945	XRF	WSTF	U
0949	XRF	WSTF	P
0947	TOTAL METALS	HALL	U

1002 G GILES BEGINS PERIPHERY SCAN W/ METAL DETECTOR.
1040 F GALLEGOS DONS PPE & BEGINS SOIL SAMPLING.

CELL # 20			
150915 1043	XRF	WSTF	U
1047	XRF	WSTF	P
1045	JAC ~~XRF~~ TOTAL METALS	HALL	U

CONTINUED ON NEXT PAGE

Continued on Page 20

Read and Understood By

Signed — 15 SEPT 2015 Date — Signed — 9.16.15 Date

15 SEPT 2015

20 Notebook No. 1

PROJECT FIRING RANGES: STGT Continued from Page 19

1055 F GALLEGOS & R BURROUGHS MOVING TO NEXT CELL: CELL #21 SGL 9-16-15

SAMPLE #	ANALYSIS	LAB	PRES/UNPRES
CELL # 21			
150915 1107	XRF	WSTF	U
1111	XRF	WSTF	P
1109	TOTAL METALS	HALL	U

1120 GATHERED TO DEPART FOR 100 AREA.
1125 ALL DEPART FOR 100 AREA.
1255 ALL BEGIN RETURN TO STGT FIRING RANGE AREA
1320 F GALLEGOS & R BURROUGHS LAY-OUT SAMPLING LINE. F. GALLEGOS DONS PPE

CELL # 17			
150915 1343	XRF	WSTF	U
1347	XRF	WSTF	P
1345	TOTAL METALS	HALL	U

1400 R BURROUGHS DONS PPE & BEGINS SOIL SAMPLING.

CELL # 16			
150915 1405	XRF	WSTF	U
1409	XRF	WSTF	P
1407	TOTAL METALS	JAL ~~WSTF~~ HALL	U

1425 F GALLEGOS DONS PPE & BEGINS SOIL SAMPLING

CELL #10	XRF	WSTF	U
150915 1433	XRF	WSTF	P
1437	TOTAL METALS	HALL	U
1435			

1445 R BURROUGHS & F GALLEGOS BEGIN POLICING SITE & BREAKING-DOWN EQUIPT.
1455 ALL DEPART FOR 100 AREA
1520 JAL & G GILES ARRIVE @ 100 AREA PARKING LOT

SUMMARY

- SAMPLED 11 CELLS FOR SOIL
- 93 POINTS IDENTIFIED w/ METAL DETECTOR & LOGGED w/ TABLET

TOMORROW

- CONTINUE ON W STGT FIRING RANGE AREA

Continued on Page

Read and Understood By

Signed 15 SEPT, 2015 Date Signed Pamela Egan 9-16-15 Date

Weather: 68°F/88°F, Partly cloudy, Breezy Sept. 16, 2015
Personnel: P. Egan, R. Burrows, F. Gallegos
Location: STGT Firing Range
task(s): XRF Sampling – 7 more cells.
Equipment: Shovels, sampling equipment, field vehicles, Carboy #5
PPE: In exclusion zone: P95 face mask, poly apron + sleeves, + Level D.
Safety: Tailgate meeting conducted, see form

0700 Egan in office. J. Lawrence says he's out of pin flags for marking bullet locations w/ metal detectors, so won't be metal detecting until we (techs) free up flags during cleanup. Maybe this afternoon.

0715 Informed techs (yesterday) that the easy-ups were in and ready to pick up from warehouse, so the techs are doing that this morning.

Techs say XRF scanner is at warehouse and they pick it up.

0745 Meet techs at 637 and head to labs. Deliver XRF scanner to Paul Spencer at Met Lab. Also let Charles Nichols + Troy Wiebe know the scanner is in and has been delivered.

0800 At STGT firing range. Hold tailgate safety meeting. Start setting up tables etc. and new E-Z ups, which are quite crappy (poor quality).

0908 Ready for sampling. Start with cell #4. Robert dons PPE.

Continued on Page 22

Read and Understood By

Pamela Egan — Signed — 9.16.15 — Date

Signed — 9/17/15 — Date

Cell #4 Robert dons PPE

u = unprepared
P = prepared

Sample #	Analysis	Lab	u/P
150916 0915	XRF	WSTF	u
" 0917	Tot. Metals	Hall	u
" 0919	XRF	WSTF	P

Frankie decons equip.

0930 Cell #3 Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 0933	XRF	WSTF	u
" 0935	Tot. Metals	Hall	u
" 0937	XRF	WSTF	P

Robert decons equip.

0950 Cell #9 Robert dons PPE

Sample #	Analysis	Lab	U/P
150916 0953	XRF	WSTF	u
" 0955	Tot. Metals	Hall	u
" 0957	XRF	WSTF	P

Frankie decons equip.

1010 Cell #15 Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 1013	XRF	WSTF	u
" 1015	Tot. Metals	Hall	u
" 1017	XRF	WSTF	P

Robert decons equip.

Continued on Page 23

Read and Understood By

Pamela Egan — Signed — 9.16.15 — Date

Jeff — Signed — 9/17/15 — Date

1030 Cell #14 Robert dons PPE

Sample #	Analysis	Lab	U/P
150916 1033	XRF	WSTF	U
" 1035	Tot. Metals	Hall	U
" 1037	XRF	WSTF	P

Frankie decons equip.

Set up to sample next cell then break for lunch.

1230 Burrows says Frankie has union business and will be delayed heading back out

1300 Head back out to firing range STGT. Crappy EZ-up is blown all over, pole bent :.

1330 Cell #8

Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 1339	XRF	WSTF	U
" 1341	Tot. Metals	Hall	U
" 1343	XRF	WSTF	P

Robert decons equip.

1350 Cell #2 Robert dons PPE

Sample #	Analysis	Lab	U/P
150916 1357	XRF	WSTF	U
	~~Tot. Metals~~	~~Hall~~	~~U~~
" 1359	XRF	WSTF	P

9.16.15

Frankie decons equip.

Continued on Page

Read and Understood By

Pamela Egan — Signed — 9.16.15 Date

Signed — 9/17/15 Date

1415 Cell #1 Frankie dons PPE

Sample #	Analysis	Lab	U/P
150916 1821	XRF	WSTF	U
" 1823	Tot. Metals	Hall	U
" 1825 PBS 9.16.15	XRF	WSTF	P

Robert decons equip.

Cell #7 Robert dons PPE.

Sample #	Analysis	Lab	U/P
150916 1443	XRF	WSTF	U
1445	XRF	WSTF	P

Frankie decons equip.

Clean up site. EZ-up fairly trashed.

Summary:

- XRF sample collection from 9 cells today.
- 1 cell remaining.

Tomorrow:

- xrf remaining cell
- metal detector in fallout area.

9.16.15

Continued on Page N/A

Read and Understood By

Pamela Egan
Signed

9.16.15
Date

Signed

9/17/15
Date

0700 F. Gallegos, R. Burrows, G. Giles @ office. Depart for STGT in 2 vehicles.

0720. @ STGT Firing Range. Checked in with guard @ gate.

WEATHER: Currently 68°F, Forcast 93°F, hot, clear skies ≈ 10% clouds, breeze 5-10 mph from the south.

PERSONNEL: F. GALLEGOS, R. BURROWS, G. GILES] Navarro Re ☒ E.

0730 Tailgate safety briefing. Heat stress e Wildlife, tripping hazards. We will take plenty of water breaks.

0745 Sun shade set up. Setting up sample lines on Final square Square cell # 13.

0800 Start sampling on cell # 13 located north of active lagoon on west side. This cell is marked for a duplicate sample for Hall Labs. Frank collecting sample, Robert working tech's notebook. Frank has all required PPE on.

10.22.15

SAMPLE #	ANALYSIS	LAB	U/P
150916 0819	WSTF XRF	WSTF	U
" 0823	WSTF XRF	WSTF	P
" 0821	TOTAL METALS	HALL	U

0845 Sampling complete. String pulled from Cell # 13.

0900 Start excavating bullet locations STGT # 1 - STGT # 93. Geoff re-loading bullets with metal detector, Frank & Robert digging, sieving, & bagging bullets

1015 All locations excavated. Start Screening & Flagging with metal detector and tablet

1100 We have completed locations through STGT # 137.

Continued on Page 26

Read and Understood By

Signed 9/17/15 Date

Signed 9.29.15 Date

1315 Back @ STGT Firing Range after weekly safety meeting (Thursday's).

1330 Setting up shade table blown down by wind in our absence.

1345 Move to back of firing berm (west side) to continue search for bullets with metal detector. Flag locations and record GPS locations in field tablet. Dig up and sieve dirt to recover bullets (Robert & Frank).

1500 Complete survey for the day. We located and excavated #STGT #138 through #STGT # 225 this afternoon.

1505 Fold down table, chairs & sunshade.

1515 Head back to B.637/100 Area Parking.

SUMMARY

- Completed sampling last STGT FR Grid Cell (#13).
- Located, flagged, recorded, & recovered bullets at stations STGT#94 through STGT #225.

Continued on Page

Read and Understood By

Signed — Date 9/17/15

Signed — Date 9.29.15

0700 G. Giles, R. Burrows, F. Gallegos arrive @ STGT FR.

WEATHER: Clear skies, 64°F right now, forecast 92°F, slight breeze from South.

PERSONNEL: F. GALLEGOS, R. BURROWS, G. GILES] Navarro Res & E.

0715 Tailgate safety briefing: heat stress, sunscreen, hats, UV protective eyewear, wildlife.

0730 Setting up sun shade & umbrellas.

0745 Start locating & flagging bullets # STGT # 226 – # STGT # 333.

0945 Take water break.

1000 Continue to locate & flag bullets # 333 – # 370.

1100 Break for lunch. Back to B.637 (Leeks) & 100 Area (Gaff).

1245 Return to STGT FR. Locate, flag, log, & collect bullets from STGT-371 to STGT-421.

1430 Secure site & depart for the day.

SUMMARY

- Located (metal detector) lead bullets, flagged locations, GPS'd to field tablet, & recovered bullets for locations:

  STGT-226 to STGT-421.

Continue on Monday 9/21/15

Continued on Page

Read and Understood By

Signed — Date 9/18/15

Signed — Date 9.29.15

0700 R. Burrows & F. Gallegos arrive @ STGT FR

0730 G. Giles arrives @ STGT FR.

0740 Tailgate safety briefing. Topics: heat stress, heat stroke, hydration, & wildlife.

WEATHER: PARTLY CLOUDY, ≈ 70°F, forecast 88°F, clouds ≈ 50%, slight breeze from the southwest.

PERSONNEL: G. GILES, R. BURROWS, F. GALLEGOS] NAVATTO R&E.

OBJECTIVE: Continue with bullet location, Flagging, Plotting (GPS), & excavation (at point STGT-422). Define length/distance) of the bullet scatter west of the main firing berm.

0800 Depart for fallout area to the west of the Firing Berm. Start with point STGT-422.

1005 Water break.

1100 Complete the mornings bullet location & Flagging activities. We covered points STGT-422 through STGT-528.

1115 Depart for lunch.

1245 Return from lunch.

1300 Resume bullet search at point STGT-529.

1510 Complete days bullet search at STGT-601. Secure site and all depart.

SUMMARY

- Located (Using metal detector) lead bullets, flagged bullets, logged bullets, and removed from the ground: STGT 422 to STGT 601

Continued on Page

Read and Understood By

Signed — Date 9/21/15 — Signed Pamela Egan — Date 9.29.15

GEOLOGISTS LB STOP

PROJECT FIRING RANGES - STGT (TUE 9/22/15)

Notebook No. FIRING RANGES 29

Continued from Page —

0700 R. Burrows & F. Gallegos arrive @ STGT Firing Range.

0715 G. Giles @ STGT Firing Range.

0730 Tailgate safety briefing. Topics: Berm slopes, rattlesnakes, hydration. Plan for the day.

WEATHER: Partly cloudy (20%) ≈ 70°F, forecast 92°F, slight breeze from the southeast. Ground is damp from yesterdays rain.

PERSONNEL: G. GILES, R. BURROWS, F. GALLEGOS] NAVARRO R&E

OBJECTIVE: Continue with location, flagging, plotting, and excavation of bullets. Will work from center line north and south to try and constrain bullet area. STGT has a much larger fallout area than originally speculated.

0800 Depart for fallout area west of the main firing berm. Start at STGT-602 and work north.

1030 Take a break. We have completed stations STGT-602 through STGT-721 to delineate the north side of the fallout area at a location where bullets can still be located within 3-5 feet of each other. This line is approximately 100 m west of the Firing Berm.

1105 Depart for lunch.

1245 Return from lunch.

1300 Resume bullet search at median point and head south this time to define the southern boundary. Start at STGT-722

1500 Complete the days bullet search at STGT-775.

1570 Secure site, all depart. We still have ≈100 flags to pick up due to damp soil that slows down the sifting process for bullets.

SUMMARY

- Located, flagged, logged, and excavated bullets at the STGT Firing Range: STGT-602 to STGT-775. A cost evaluation is now required prior to additional work.

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Read and Understood By

Signed 9/22/15 Date

Signed 9.29.15 Date

GEOLOGISTS LB START

PROJECT 100 AREA FIRING RANGE (WB-2) (TUESDAY 11/15/16)

D. FRB # 1

Page —

0645 R. Burrows & M. Garcia pulling together field sampling equipment for the 100 Area Firing Range (WB-2) Fallout area sampling. G. Giles working with Dustin teamed to get a Fallout Area grid map. Dustin flagged the cell centers in the field yesterday.

0715 We have a copy of the grid cell map and have discussed the approach with Troy Wiebe. Collecting additional field equipment, 50' tape, brushes, decon bucket.

0800 All arrive @ Cell #72 location. Security Department are out here for some short-range shooting this week. Should not affect us.

WEATHER: 45°F, forcast high 73°F, clear skies, no breeze.

PERSONNEL: G. GILES, R. BURROWS, M. GARCIA] Navarro.

0815 Perform Tailgate Safety Briefing. See form for details. PPE → Level D plus dust masks when agitating soil. No apron required for this effort as previously required for range floor. All metals samples came back at less than half of MTCA SSL's including lead.

0835 Steve Patterson passes by in truck. checks in with us.

OBJECTIVE Fallout sampling on designated grid at the 100 Area Firing Range (WB-2). Five grab samples per grid, composited in a 4oz jar for metals sample. Grid squares are 50'x50' for fallout sampling. Center location plus halfway toward each grid corner (25' median point). Start at SE cell (#72) so that we move away from bullet catcher ASAP.

0910 Collect metals rinsate 161115 0910 by pouring DI water over sampling equipment that has been decontaminated (Stainless steel trowel & bucket).

0915 G. Giles flags the 5 soil grab spots in cell #72.

0921 Sample Grid Cell #72 161115 0921 for metals by 6010C

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0948	Sample Grid Cell #71	1611150948	for metals by 6010C
0959	Sample Grid Cell #70	1611150959	for metals by 6010C
1006	Sample Grid Cell #69	1611151006	for metals by 6010C
1013	Sample Grid Cell #68	1611151013	for metals by 6010C
1020	Sample Grid Cell #67	1611151020	for metals by 6010C
1028	Sample Grid Cell #66	1611151028	for metals by 6010C
1034	Sample Grid Cell #65	1611151034	for metals by 6010C
1041	Sample Grid Cell #64	1611151041	for metals by 6010C
1048	Sample Grid Cell #63	1611151048	for metals by 6010C
1049	Sample Grid Cell #63 (DUP)	1611151049	for metals by 6010C
1056	Sample Grid Cell #62	1611151056	for metals by 6010C

1105 Securing site. Security still training a couple of new hires. Head back to B.101 for lunch.

1235 G. Giles back @ 100 Area Firing Range. R. Burrows is waiting for M. Garcia in the B.101 Parking Lot. Matt has required safety training. I will lay out sample location flags while I am waiting. Security Department are still here training (Firing). I have my Yellow Vest on.

1320 R. Burrows & M. Garcia arrive on-site at 100 Area Firing Range.

1328	Sample Grid Cell #61	1611151328	for metals by 6010C
1335	Sample Grid Cell #60	1611151335	for metals by 6010C
1343	Sample Grid Cell #59	1611151343	for metals by 6010C

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1352 Sample Grid Cell #58 161115 1352 for metals by 6010C

1407 Sample Grid Cell #57 161115 1407 for metals by 6010C

1412 Sample Grid Cell #56 161115 1412 for metals by 6010C

1415 Security Guards & trainees depart for the day. Lower their Wind sock / flag.

1416 Sample Grid Cell #55 161115 1416 for metals by 6010C.

1421 Sample Grid Cell #54 161115 1421 for metals by 6010C

1427 Sample Grid Cell #53 161115 1427 for metals by 6010C

1428 Sample Grid Cell #53 (DUP) 161115 1428 for metals by 6010C

1438 Sample Grid Cell #47 161115 1438 for metals by 6010C

1439 Sample Grid Cell #47 (MS) 161115 1439 for metals by 6010C.

1445 We are out of 4 oz soil sample mason jars. Good stopping point for the day.

1450 Packing up equipment & securing site. All depart.

1500 Back @ B.101. Email daily report to interested parties.

SUMMARY

- Performed Fallout Grid sampling at the 100 Area / WB-2 / SWMU #31 Firing Range
- Collected 21 of 38 soil samples from designated Fallout sampling grid squares
- Collected two (2) duplicate samples and one (1) Matrix spike Sample.
- For tomorrow (Wednesday), collect soil samples from the remaining 17 Fallout grid squares and commence metal detector screening of the range floor, time permitting.

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0700 G. Giles in office pulling together field equipment. R. Burrows & M. Garcia already out at 100 Area Firing Range preparing todays metals rinsate sample using DI water & our stainless steel field sampling equipment

0715 G. Giles out to 100 Area Firing Range. Perform Tailgate Safety Briefing. See Form for details. Covered the required PPE for sampling, Level D + dust mask when agitating soil during sample collection & latex gloves. Due to high temperatures, rattlesnakes & wildlife still an issue, also heat stress.

WEATHER: Currently 44°F, forecast high 75°F, partly cloudy, 20% cloud cover, NO breeze in the morning.

PERSONNEL: G. GILES, R. BURROWS, M. GARCIA] Navarro.

OBJECTIVE: Fallout sampling on designated grid at the 100 Area Firing Range (WB-2 / SWMU 31). Complete grid sampling today (We have 17 of 38 cells remaining). Commence range floor Screening with metal detector, time permitting.

0747 Collect metals rinsate 161116 0747 by running DI water over sampling equipment that has been decontaminated.

0750 Security Department & trainees arrive at Firing Range. We are out of their way by 500 ft plus, moving away to the northwest. Make contact with security Guard raising wired sock / flag.

0756	Sample Grid Cell	# 46	161116 0756	for metals by 6010C
0802	Sample Grid Cell	# 45	161116 0802	for metals by 6010C
0808	Sample Grid Cell	# 44	161116 0808	for metals by 6010C
0814	Sample Grid Cell	# 43	161116 0814	for metals by 6010C

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0823	Sample Grid Cell	#42	1611160823 for metals by 6010C
0832	Sample Grid Cell	#41	1611160832 for metals by 6010C
0841	Sample Grid Cell	#40	1611160841 for metals by 6010C
0854	Sample Grid Cell	#39	1611160854 for metals by 6010C
0905	Sample Grid Cell	#38	1611160905 for metals by 6010C
0913	Sample Grid Cell	#37	1611160913 for metals by 6010C
0914	Sample Grid Cell	#37 (DUP)	1611160914 for metals by 6010C
0921	Sample Grid Cell	#36	1611160921 for metals by 6010C
0928	Sample Grid Cell	#35	1611160928 for metals by 6010C

0930 Checking out 100 Area Firing Range berm. Numerous bullets (thousands) on the west facing berm front. Could recover these with a sieve and shovel. Will check w/ Troy on excavation & disposal plan.

0937	Sample Grid Cell	#34	1611160937 for metals by 6010C
0947	Sample Grid Cell	#33	1611160947 for metals by 6010C
0954	Sample Grid Cell	#32	1611160954 for metals by 6010C
0955	Sample Grid Cell	#32 (DUP)	1611160955 for metals by 6010C
1002	Sample Grid Cell	#31	1611161002 for metals by 6010C
1003	Sample Grid Cell	#31 (MATRIX SPIKE)	1611161003 for metals by 6010C

1005 Cody & Mike stop by. Cody will likely cover the 100 Area Firing Range tomorrow (Thursday). Provide a quick update.

1015 Cody & Mike depart for 400 Area.

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1030 Fallout grid sampling at the 100 Area Firing Range is complete. Secure site. All depart. Robert & Matt have to take care of a leaking tire. I have to talk to JRH about loading up the 100 Area Firing Range basemap.

1230 JRH is working on loading the WB-2 basemap onto the field tablet. Pull together equipment for the field bullet recovery survey of the WB-2 range floor. Replace batteries in the metal detector.

1330 R. Burrows, M. Garcia, & G. Giles out at the 100 Area WB-2 Firing range. Perform bullet survey and recovery along the road area that coincides with the South strip along the range floor. Start at WB-2 113 and finish at WB-2 135 (23 points).

1300 We have flagged and GPS'd the bullet locations in the field. Need to recover these. We do not seem to have too many bullet locations on the range floor.

SUMMARY

- Performed Fallout Grid sampling at the 100 Area/WB-2/SWMU #31 Firing Range.
- Collected the remaining 17 soil samples (total 38 from yesterday and today).
- Collected 2 more duplicate samples and 1 more Matrix spike.
- We have a total of 4 duplicates and 2 matrix spikes for 38 samples.
- Commenced metal detector survey and recovery along the range floor.

THURSDAY

- Complete the metal detector survey & recovery along the range floor. That completes the 100 Area Firing Range.
- We will move onto the 200 Area Firing Range tomorrow & perform the same activities next week.
- Metal detector, keys, notebook in my office. Tablet in JR's office. Thanks!

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Continued on Page N/A

Read and Understood By

Signed 11/16/16 Date Signed 1/24/17 Date

0630 R. Burrows & G. Giles pulling together equipment for 200 Area Firing Range fallout grid sampling. Print out Task Mtng & Tailgate Safety Briefing sheets. Pick up stainless steel bowls, trowels, pin flags, 50 ft measuring tape etc.

0700 We have most of the equipment collected. Head over to B. 637 to sort out sample jars, sample bottles, coolers etc. We need the clear 4oz jars for the soil samples & 500 ml poly containers with HNO_3 preservative for the rinsate samples. All samples will go to Hall laboratory.

0715 We have pulled together all the clear 4oz sampling jars and 500ml poly containers provided by Hall laboratory. Pack truck.

0745 Head out to 200 Area FR. Road has been washed out slightly by recent rains (this week) but we can still access the firing range.

0800 Arrive @ pullout adjacent to the 200 Area Firing Range. Perform Tailgate Safety Briefing. See sheet for details. Topics include lead dust PPE.

0815 Walk out all grid square flags to make sure they can still be located

WEATHER: Currently 38°F, forcast high 55°F, clear skies but hazy, cool, no significant breeze in the morning

PERSONNEL: G. GILES, R. BURROWS] NAVARRO

OBJECTIVE: 200 Area Fallout Grid Sampling for lead. Collect a rinsate for each sampling day. We have 42 grid squares to sample, 4 duplicates, 2 matrix spikes. Start with grid cell # 3. 5 sample locations in each cell, composited to 1 sample (center, plus ½ way from center to each corner).

0900 Preparing to sample rinsate.

0904 Collect rinsate sample 1701030904 for metals by 6010C

0910 We will start with the lowest numbered grid cell (#3) in the arroyo.

0925 Sample Grid Cell # 3 1701030925 for metals by 6010C

0938 Sample Grid Cell # 4 1701030938 for metals by 6010C

0952 Sample Grid Cell # 5 1701030952 for metals by 6010C

0955 Move up to Grid Cell # 6 on the side of the limestone hill NW of FR.

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1017 Sample Grid Cell #6 170103 1017 for metals by 6010C

1044 Sample Grid Cell #7 170103 1044 for metals by 6010C

1055 Depart for 100 Area. Break for lunch.

1230 R. Burrows & G. Giles head out to 200 Area Firing Range for afternoon sampling. We will start with Grid Cell #8

1305 Sample Grid Cell #8 170103 1305 for metals by 6010C.

1317 Sample Grid Cell #9 170103 1317 for metals by 6010C.

1320 Al Montes & M. Avalos stop by to check trip mileage on truck G63 06825

1328 Sample Grid Cell #10 170103 1328 for metals by 6010C.

1341 Sample Grid Cell #11 170103 1341 for metals by 6010C.

1405 Sample Grid Cell #12 170103 1405 for metals by 6010C.

1407 Sample Grid Cell #12 (Dup) 170103 1407 for metals by 6010C.

1423 Sample Grid Cell #13 170103 1423 for metals by 6010C.

1440 Sample Grid cell #14 170103 1440 for metals by 6010C.

1450 Measure out composite sampling locations on squares 15 & 16.

1500 Unload soil samples & rinsate to coolers in B. 1637. Return to office

SUMMARY

- Sampled at 200 Area Firing Range fallout Grid.
- Collected equipment rinsate sample.
- Sampled Grid Squares 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 (w Dup), 13, & 14 (13 soil samples total) for metals by 6010C

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Read and Understood By

Signed [signature] Date 1/3/17 Signed Pamela Egan Date 1/24/17

0630 R. Burrows & G. Giles setting up for todays soil/metals sampling. Check w/ C. Tufts on turnaround time for metals – 28 days so we have time to collect all samples and ship these out late this week or early next week.

0650 Packing up sampling supplies for the day at B.637. 4oz soil jars and 500 ml poly w/ HNO_3 for rinsate. We are keeping the samples on ice - precautionary measure for the metals rinsate.

WEATHER: Cool ≈ 48°F, forecast high 61°F, partly cloudy ≈ 20% cloud cover, no breeze in the morning.

PERSONNEL: G. Giles, R. Burrows] Navarro.

OBJECTIVE: Continue with 200 Area Firing Range fallout grid soil sampling for metals by 6010C. We will be starting at Grid Square #15 today. We anticipate sampling 15 (+) grid squares.

0730 Depart for 200 Area Firing Range.

0740 We are @ 200 Area Firing Range. Perform a Tailgate Safety Briefing. See form for details. Topics included Schedule & PPE.

0750 We are setting up to take the rinsate sample.

0759 Collect rinsate sample 1701040759 for metals by (6010C) 6010C.

0811 Sample Grid Cell #15 1701040811 for metals by 6010C.

0831 Sample Grid Cell #16 1701040831 for metals by 6010C.

0853 Sample Grid Cell #17 1701040853 for metals by 6010C.

0904 Sample Grid Cell #18 1701040904 for metals by 6010C.

0918 Sample Grid Cell #19 1701040918 for metals by 6010C.

0928 Sample Grid Cell #20 1701040928 for metals by 6010C.

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Read and Understood By

Jeff Navarro. 1/4/17 Signed Date

Pamela Egan 1/24/17 Signed Date

0940	Sample Grid Cell #21	1701040940	for metals by 6010C.
0953	Sample Grid Cell #22	1701040953	for metals by 6010C.
0954	Sample Grid Cell #22 (DUP)	1701040954	for metals by 6010C.
1008	Sample Grid Cell #23	1701041008	for metals by 6010C.
1009	Sample Grid Cell #23 (MS)	1701041009	for metals by 6010C.
1022	Sample Grid Cell #24	1701041022	for metals by 6010C.

1030 We are laying out grab sample locations in the grids.

1050 Break for lunch. Depart for 100 Area

1245 We are back at the 200 Area Firing Range.

1301	Sample Grid Cell #25	1701041301	for metals by 6010C.
1313	Sample Grid Cell #26	1701041313	for metals by 6010C.
1327	Sample Grid Cell #27	1701041327	for metals by 6010C.
1343	Sample Grid Cell #28	1701041343	for metals by 6010C.
1401	Sample Grid Cell #29	1701041401	for metals by 6010C.

1415 Packing up equipment and planning sampling for tomorrow. We will hand over to Grid Cell #30 next. Located on arroyo from Firing Range to GSA. (Gardner Spring Arroyo)

SUMMARY

- Sampled for soil metals by 6010C at the 200 Area Firing Range fallout grid.
- Collected equipment rinsate sample.
- Sampled Grid Squares 15, 16, 17, 18, 19, 20, 21, 22, 22 (DUP), 23, 23 (MS), 24, 25, 26, 27, 28, and 29 (17 soil samples total) for metals by 6010C.
- We will start at Grid Cell #30 tomorrow - probably last day of sampling.

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Read and Understood By

Signed 1/4/17 Date — Signed Pamela Egan 1/24/17 Date

0630 R. Burrows & G. Giles setting up for todays sampling activities @ 100 Area and B.637. Pack 40z jars and 500 ml poly containers. Fill 5 gallon bottle with DI water from B.637.

0700 Head out to 200 Area Firing Range.

WEATHER: Currently 44°F, forcast high 63°F, 50% cloud cover, breeze from the southwest @ 5-10 mph.

PERSONNEL: G. Giles, R. Burrows] Nonuno

OBJECTIVE: Complete 200 Area Firing Range fallout grid sampling for metals by 6010C. We have 15 grid squares remaining, w/ 2 duplicates and 1 matrix spike. We should be able to finish today.

0730 Perform a tailgate safety briefing. See form for details. Topics include plans for the day & PPE.

0736 Collect rinsate sample 1701050736 for metals by 6010C.

0801 Sample Grid Cell #30 1701050801 for metals by 6010C.

0810 Sample Grid Cell #31 1701050810 for metals by 6010C.

0821 Sample Grid Cell #32 1701050821 for metals by 6010C.

0822 Sample Grid Cell #32 (Dup) 1701050822 for metals by 6010C.

0834 Sample Grid Cell #33 1701050834 for metals by 6010C.

0845 Sample Grid Cell #34 1701050845 for metals by 6010C.

0858 Sample Grid Cell #35 1701050858 for metals by 6010C

0908 Sample Grid Cell #36 1701050908 for metals by 6010C.

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0919	Sample Grid Cell #37	1701050919	for metals by 6010C.
0936	Sample Grid Cell #38	1701050936	for metals by 6010C.
0955	Sample Grid Cell #39	1701050955	for metals by 6010C.
1010	Sample Grid Cell #40	1701051010	for metals by 6010C.

1015 We have completed this sample line. The last grid cell (#40) was at the top of the Permian 1st (Panther Seep) hill immediately behind the 200 Area Firing Range Copper fallout grid). Only one line left (Grid Cells #41 - #44). We will catch this in the afternoon. Still cold (34°F) and windy. Wind out of the south @ 10 mph.

1045 Head back to office in 100 Area for lunch. We also have the Weekly Safety Meeting at 1230 - 1330 hrs.

1315 Safety Meeting complete. Gather sampling equipment and head out to 200 Area Firing Range.

1340	Sample Grid Cell #41	1701051340	for metals by 6010C.
1353	Sample Grid Cell #42	1701051353	for metals by 6010C.
1354	Sample Grid Cell #42 (DUP)	1701051354	for metals by 6010C.
1409	Sample Grid Cell #43	1701051409	for metals by 6010C.
1410	Sample Grid Cell #43 (MS)	1701051410	for metals by 6010C.
1426	Sample Grid Cell #44	1701051426	for metals by 6010C.

1430 Pack up equipment, return to B.637, complete internal COCs, Sample jars & bottles into refrigerator.

SUMMARY
- Completed soil sampling at 200 Area Firing Range fallout grid.
- Collected equipment rinsate sample.
- Sampled Grid Cells 30, 31, 32, 32 (DUP), 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 42 (DUP), 43, 43 (MS), and 44 (18 soil samples total) for metals by 6010C.

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Read and Understood By

Signed [signature] Date 1/5/17

Signed Pamela Egan Date 1/24/17

0645 Meet up with R. Burrows in B.101 parking lot. We are pulling together field sampling equipment for today. Equipment includes metal detector, measuring tape, field logbooks etc.

0715 Head over to B.637 to pick up soil & rinsate sampling containers. We will use 4 oz jars for soils and 500ml poly containers w/ HNO_3 preservative for rinsate sample.

0745 Head out to STGT Firing Range.

0800 Tailgate Safety Briefing. See form for details. Topics include PPE & lead contaminants in soil. It has been raining a lot over the weekend and the soil is very moist.

WEATHER: 37°C, forecast high 52°F, overcast 60% cloud cover, damp, potential showers in the afternoon, slight breeze from the south.

PERSONNEL:

G. Giles
R. Burrows
] Navarro

OBJECTIVE: Soil sample at the STGT Firing Range fallout grid. We have a total 44 samples (soil) from 44 grid squares, 4 duplicates, and 2 matrix spikes. Grand total of 50 soil samples.

0815 Set Hip up to sample. First Grid square will be #22 on northwest side of fallout grid. We will move sequentially through to Grid Square #65 on the southeast side.

0834 Collect rinsate sample 1701170834 for metals by 6010C.

0908 Sample Grid Cell #22 1701170908 for metals by 6010C.

0921 Sample Grid Cell #23 1701170921 for metals by 6010C.

0937 Sample Grid cell #24 1701170937 for metals by 6010C.

0949 Sample Grid Cell #25 1701170949 for metals by 6010C.

1002 Sample Grid Cell #26 170117/002 for metals by 6010C.

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Read and Understood By

Geoff [illegible] — Signed — 1/17/17 Date

Pamela Egan — Signed — 1/24/17 Date

1040 Sample Grid Cell #27 1701171040 for metals by 6010C.

1057 Sample Grid Cell #28 1701171057 for metals by 6010C.

1110 Depart for B.101 – lunch.

1230 Depart B.101 parking lot for STGT Firing Range.

1250 Marking grid cells #29 & #30. Dustin Leonard had not done these.

1310 Sample Grid Cell #29 1701171310 for metals by 6010C.

1322 Sample Grid Cell #30 1701171322 for metals by 6010C.

1342 Sample Grid Cell #31 1701171342 for Metals by 6010C.

1400 Sample Grid Cell #32 1701171400 for metals by 6010C.

1415 Raining heavily now. Difficult to collect grab samples. Work on paperwork in truck – daily notes, sample labels, internal COC.

1500 We will continue sampling tomorrow hopefully in better weather conditions. Pack up & return to B.637/B.101.

SUMMARY

- Commenced sampling at STGT Firing Range fallout grid. Collected the following samples.
- 1 x Rinsate Sample from sampling equipment for metals by 6010C.
- 11 x Soil Samples from Grid Cells #22 – #32 for metals by 6010C. Samples were composite grab samples from the center of each grid cell and 4 other locations midway between the grid cell center and the cell corners.
- We have collected samples from 11 of 44 grid cells. 25% complete.

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Read and Understood By

Signed 1/17/17 Date

Signed 1/24/17 Date

0630 Meet up w/ R. Burrows in B.101 parking lot.
0645 Head over to B.637 to prepare rinsate sample equipment and collect sample jars & coolers.
0700 Depart for STGT Firing Range.

WEATHER: 34°F, forcast high 54°F, cold, clear skies (0% cloud cover), no breeze, damp soil conditions due to yesterdays rain.

PERSONNEL: G. GILES, R. BURROWS] Navarro

OBJECTIVE: Continue soil sampling at the STGT Firing Range fallout grid. Start at cell #33 today. We completed 11 of 44 grid cells yesterday (25%).

0730	Tailgate safety briefing. See form for details. Covered PPE & lead sampling details.	
0805	Collect rinsate sample	1701180805 for metals by 6010C.
0819	Sample Grid Cell #33	1701180819 for metals by 6010C
0820	Sample Grid Cell #33 (DUP)	1701180820 for metals by 6010C.
0837	Sample Grid Cell #34	1701180837 for metals by 6010C.
0845	Spotting the center of grid cells #35, #36, #37, & #38. Dustin had not flagged these. Layout grab sample flags.	
0937	Sample Grid Cell #35	1701180937 for metals by 6010C.
0953	Sample Grid Cell #36	1701180953 for metals by 6010C.
1008	Sample Grid Cell #37	1701181008 for metals by 6010C.
1028	Sample Grid Cell #38	1701181028 for metals by 6010C.
1050	Break for lunch. Head back to B.101.	

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Signed 1/18/17 Date

Signed 1/24/17 Date

1230 Meet R. Burrows in B.101 parking lot. Head back out to STGT Firing Range.

1300 Resume Sampling

1330 Sample Grid Cell #39 1701181330 for metals by 6010C.

1349 Sample Grid Cell #40 1701181349 for metals by 6010C.

1407 Sample Grid Cell #41 1701181407 for metals by 6010C.

1408 Sample Grid Cell #41 (DUP) 1701181408 for metals by 6010C.

1428 Sample Grid Cell #42 1701181428 for metals by 6010C.

1429 Sample Grid Cell #42 (MS) 1701181429 for metals by 6010C.

1445 We are preparing the internal COC for soil samples, We will resume soil sampling tomorrow.

1455 Secure site. Depart for B.101/B.637. Store samples in cooler at B.637. File internal COC's in door.

SUMMARY

- Continued soil sampling for metals at the STGT Firing Range fallout grid. Collected the following samples:
- 1 x rinsate from sampling equipment for metals by 6010C.
- 13 x soil samples from grid cells #33-#42, including 1 duplicate in cell #41 and 1 matrix spike in cell #42.
- We have collected samples from 22 of 44 Grid cells. 50% complete.

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Read and Understood By

Signed 1/18/17 Date Signed 1/24/17 Date

0630 Meet up w/ Robert Burrows in B.101 parking lot. I head into office to pick up field supplies.
0700 Drive over to B.637 to pick up sample jars, DI water, and coolers.
0715 Head out to STGT Firing Range. Construction on TDRSS road slows down access. They are performing major construction to fix a 8" leaking water line that has been causing problems for 2+ years (?). This may be the source of our "mound" in the water table downgradient at the Mid-plume. Mounding up to approx. 30'-50' for the last 2 years or so.
0730 Arrive @ STGT Firing Range.

WEATHER: Currently 37°F, forecast high 54°F, clear skies, 20% cloud cover, cool, slight breeze from the South in the morning, forecast says it may be windy in the afternoon, damp soil conditions.

PERSONNEL: G. Giles, R. Burrows] Navarro

OBJECTIVE: Continue soil sampling at the STGT Firing Range fallout grid. We will continue at Grid Cell #43. We have completed 21 of 44 grid cells, so are about 50% complete at this time.

0800	Collect rinsate sample	1701190800	for metals by 6010C.
0827	Sample Grid Cell #43	1701190827	for metals by 6010C.
0849	Sample Grid Cell #44	1701190849	for metals by 6010C.
0903	Sample Grid Cell #45	1701190903	for metals by 6010C.
0921	Sample Grid Cell #46	1701190921	for metals by 6010C.
0940	Sample Grid Cell #47	1701190940	for metals by 6010C.
0957	Sample Grid Cell #48	1701190957	for metals by 6010C.
1019	Sample Grid Cell #49	1701191019	for metals by 6010C.
1035	Sample Grid Cell #50	1701191035	for metals by 6010C.

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Read and Understood By

Signed 1/19/17 Date

Signed 1/24/17 Date

1050 Break for lunch. Head back to B.101

1230 We have the weekly safety meeting in the B.100 Downstairs CR.

1300 Depart B.100 for the STGT Firing Range.

1335 Sample Grid Cell #51 1701191335 for metals by 6010C.

1336 Sample Grid Cell #51 (DUP) 1701191336 for metals by 6010C.

1355 Sample Grid Cell #52 1701191355 for metals by 6010C.

1415 Sample Grid Cell #53 1701191415 for metals by 6010C.

1428 Sample Grid cell #54 1701191428 for Metals by 6010C.

1451 Sample Grid Cell #55 1701191451 for metals by 6010C.

1500 Pack up equipment and depart for B.637.

1570 Place soil sample jars in fridge. Add Internal COC to the folder on the fridge door. Sampling activities complete for the day.

SUMMARY

- Continued soil sampling for metals at the STGT Firing Range fallout grid. Collected the following samples:
- 1 x rinsate from sampling equipment for Metals by 6010C.
- 14 x Soil Samples from Grid Cells #43 – #55 including 1 duplicate Sample.
- We have collected samples from 33 of 44 Grid Cells. 75% complete.

Continued on Page —

Read and Understood By

Signed 1/19/17 Date

Signed 1/24/17 Date

0630 Meet up in B.101 parking lot. Collect gear and notebooks.
0645 Depart for B.637. Pick up DI water, sample containers, & coolers.
0655 Head out to STOT Firing Range.
0705 Arrive @ STOT Firing Range.

WEATHER: 36°F, forecast high 52°F, cloudy = 60% clouds, forecast rain in the afternoon, breeze out of the south @ 5-10 mph.

PERSONNEL: G. GILES, R. BURROWS, NAWOTTO

OBJECTIVE: Continue with STOT Firing Range fallout grid soil sampling. We have completed ≈ 33 of 44 cells (75%). Rain forecast for later today. We will see if we can finish!

0715 Tailgate Safety Briefing. See form for details. Topics: PPE & weather.

0730	Collect rinsate sample	1701200730	for metals by 6010C.
0745	Sample Grid Cell #56	1701200745	for metals by 6010C.
0758	Sample Grid Cell #57	1701200758	for metals by 6010C.
0817	Sample Grid Cell #58	1701200817	for metals by 6010C.
0827	Sample Grid Cell #59	1701200827	for metals by 6010C.
0836	Sample Grid Cell #60	1701200836	for metals by 6010C.

NOTE: For Grid cells #59, #60, & #61 2 sample locations were used for the grab samples. Each location was 12.5' from the center of the north edge of the grid cell. These locations were approximately centered on the berm road that runs between the 2 lagoon cells.

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Read and Understood By

Signed — Date 1/20/17 — Signed Pamela Egan — Date 1/24/17

0849	Sample Grid Cell #61	1701200849	for metals by 6010C.
0925	Sample Grid Cell #62	1701200925	for metals by 6010C.
0939	Sample Grid Cell #63	1701200939	for metals by 6010C.
0940	Sample Grid Cell #63 (DUP)	1701200940	for metals by 6010C.
0958	Sample Grid Cell #64	1701200958	for metals by 6010C.
0959	Sample Grid Cell #64 (MS)	1701200959	for metals by 6010C.
1019	Sample Grid Cell #65	1701201019	for metals by 6010C.

1030 We have completed the sampling of all 44 grid squares. We also have 4 x duplicates (≃10%) and 2 x Matrix spikes (≃5%).

1035 Packing away field equipment in truck. Pack soil sample jars in coolers, fill out internal CoC's etc.

1055 Secure site. All depart for office.

SUMMARY

- Completed STGT Firing Range fallout grid sampling. Collected the following samples:
  - 1 x rinsate from sampling equipment for metals by 6010C.
  - 12 x soil samples from grid cells #56 - #65 including 1 duplicate and 1 matrix spike.
- We have sampled all 44 grid cells. 100% complete.

Continued on Page N/A

Read and Understood By

Signed 1/20/17 Date

Pamela Egan Signed 1/24/17 Date

0630 G. Giles in office setting up for berm excavation activities at WB-2. JR Hennessey set up project start at 0730 hrs this morning at the WB-2 Firing Range.

0645 Locate Field maps of berm, Form 491 filled out by Pam Egan yesterday, metal detector, Field notebooks etc.

0650 Check in with JR and Steve Maestas in Compliance. Steve will be at the WSTF Form 491/Tailgate Safety Briefing this morning.

0700 Check in with Reed Elliott & Alex @ Photolab. Reed will be down this morning. Suggest about 0830 hours.

WEATHER: Cold ~ 30°F, Forcast high 65°F, clear skies, no clouds, no breeze in the morning.

PERSONNEL:

G. GILES	Navatto	M. PLEMMONS	Jacobs
S. MAESTAS		P. MUNOZ	
T. KONDY		B. HENNA.	
A. MONTES		A. IRION*	

* ON-SITE TEMPORARILY SO DID NOT SIGN TSB OR 491

OBJECTIVE: Scrape suficial 6" off WB-2 Firing Range berm and assess for residual bullets. Repeat process if necessary. We will assess berm surface with a metal detector. Once we have excavated berm portion of concern, Perform confirmatory soil sampling for lab.

0730 All meet at WB-2 Firing Range berm.

0735 Perform a tailgate Safety Briefing and go over WSTF Form 491. Topics covered include PPE – Level D modified. We will wear dust masks when required. Operator in Front End loader cab (M. PLEMMONS) will be ok without dust maske. On the positive, soil from berm is damp due to recent rains and no significat dust anticipated.

0800 A. Irion departs. S. Maestas, T. Kondy & A. Montes set 6-mil black PVC liners in 8 x roll off boxes set adjacent to the Firing Range berm on the west side. Fill roll offs from front end first per subcontractor request. Fill only approximately 50% of dumpster.

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Read and Understood By

Signed — Date 2/1/17

Signed — Date 3/6/18

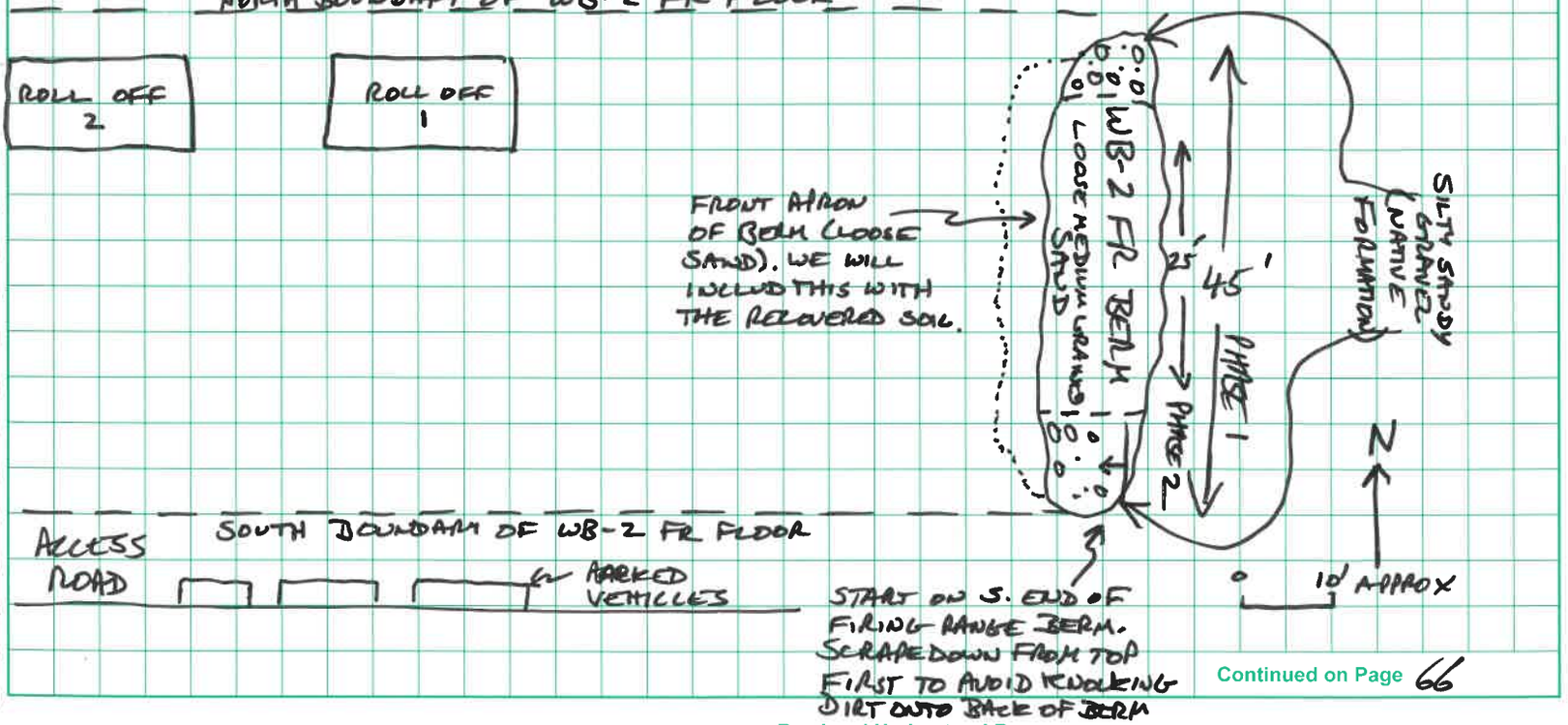
0825 We are still waiting on a copy of the dig permit for the WB-2 berm. Mickey said Arturo Zavala will have this brought to the project site ASAP.

0830 Call Reed Elliot and re-set photography time to 0930 hours. Steve, Tim, & Al have set lines and depart. Steve says he will return later this morning.

0845 Brian acquires a copy of the dig Permit and brings it up to the site. Dated November 2016.

0850 M. Plemmons starts scraping berm. To avoid knocking any bullets onto back side of berm, we are dragging down the top of the berm and then scooping up from the bottom. Start with a 6"-8" first lift. Brian & Mickey performing the field operations. We have the metal detector on hand to check the berm as we scrape it away.

0900 M. Plemmons filling the first dumpster on the east side of the berm. Scraping away from south to north along the berm.



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Read and Understood By

Signed 2/1/17 Date

Signed 3/6/18 Date

0930 Brain calls me over to the scraped portion of berm. We still have bullet detections w/ metal detector every 2-4'. I request we continue excavating as we are and not to sweep more here yet. We may be able to excavate and remove the residuals by hand easily. This is very soft graded medium sand.

0935 Security Department stop by to check in.

0940 Read Elliott on-site to take photographs of berm blading and transfer of soil to roll-off boxes.

0955 We are close to completing the first 8" lift. The east dumpster (Roll off 1 on the figure/sketch) is approx 50% full. The west dumpster (Roll off 2) is approx 30% full.

1015 Read Elliot departs. He will send photographs to me. Tim K and Al H back on-site.

1020 I have swept the entire berm front with the metal detector. We still have a high frequency of bullets in the central berm area that comprises soft sand. Place 2 rocks 25 feet apart and ask Mickey to perform a second 6" pass. See sketch for "Phase 2" excavation marked.

1025 Call S. Macsta to advise on how full roll-offs are. Steve said OK to fill both dumpsters to 50-55% full.

1045 We have finished the "Phase 2" berm scrape. We still have bullets within the sand but a relatively small volume. We will attempt to remove these manually in the afternoon

ROLL OFF 1 20'x8'x3.5' soil ≃ 50% full: container #7535
≃ 21 cubic yards

ROLL OFF 2 20'x8'x4' soil ≃ 55% full: container #7536
≃ 24 cubic yards

1050 Secure site. All depart to 100 Area for lunch.

1245 Return to WB-2 Firing Range. I picked up several sieves and a bucket for manual recovery. Saw T. Kordy & A. Montes @ B. 101 parking lot. They have to run to the Mid-Plume to get a drum for S. Macsta. Heavy equipment working on active range floor adjacent.

1250 Fill out logbooks for Roll Off boxes. Put logbooks in Sealable 5-gal bucket per S. Macsta directions.

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/1/17 — 03/06/18

1300 Commence picking up residual bullets visible on top and back side of berm. Recover approximately 250-300 bullets.

1400 Tim Hordy and M Montes arrive on-site to help with bullet clean up. We will now use the metal detector, trowel, & sieve to help locate bullets.

1445 We have recovered another 50-60 bullets. We are finding these in-situ in the sand at least 6" below the current berm face. Steve Maestas contacts Tim Hordy and says Compliance suggest taking another lift of the front of the berm.

1450 Steve Maestas is covering the soil in the roll off boxes to the best extent possible by folding over the 6-mil plastic liner.

1455 G. Gilles Services site. Request to M. Plemmons that they come out in the morning to assist with the next lift.

SUMMARY

- Perform WB-2 Firing Range berm excavation activities.
- Remove Phase 1 lift of 6"-8" across entire berm front face (45 ft)
- Scan berm face with metal detector. Identify a continued presence of bullets in central 25 ft of berm.
- Remove Phase 2 lift of 6" across the central 25 ft of the berm.
- Scan berm face with metal detector.
- At this point we have approx. 21 cuyd of soil in Roll off #1 and 24 cuyd of soil in Roll off #2. Total approx. 45 cuyds of soil.*
- Perform double visual pass of berm crest and back berm. Remove approximately 250-300 bullets.
- Using a metal detector, trowel, and sieve, remove another 50-60 bullets from the front of the berm. We are able to dig down another 6" and still find bullets. Quantity = small clusters of 1-4 bullets per foot.
- Reduced bullet quantity from 1,000's on the surface to a few hundred remaining.
- Compliance suggest another soil lift. Alert M. Plemmons that we will perform another 6" lift tomorrow.

* Note: This total amount revised to ≈20 cuyds. See P. 69.

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/1/17

03/06/18

0700 G. Giles in office setting up for today's WB-2 berm excavation activities. Pete Rios (Jacobs) emailed me yesterday to confirm they will be ready to go on additional excavation work this morning at 0730 hrs. Pick up field equipment and truck.

0715 Depart for WB-2 Firing Range.

0725 Arrive @ WB-2 Firing Range. Jacobs personnel are already on-site.

WEATHER: 32°F, forecast high 66°F, cool, clear skies, no clouds, no breeze.

PERSONNEL: G. GILES, T. KOWDY, A. MONTES — Navarro; M. PLEMMONS, B. HEIM — Jacobs

OBJECTIVE: Continue with WB-2 berm excavation and sampling. We will commence with an additional 6"-8" lift and perform confirmatory metal detector survey of the front berm face.

0730 Tailgate Safety Briefing. See form for details. Topics include potential lead dust and PPE.

0745 Mickey Plemmons has compressed dirt in the two roll off boxes to create more room for us.

0800 S. Patterson arrives on-site. Reviews WSTF Form 491 and Safety Briefing. Signs Tailgate Safety Briefing form.

0810 Mickey & Brian are performing the Phase 3 8" lift off the WB-2 berm face.

0835 Complete Phase 3 lift. Check the berm face with metal detector. We are still finding frequent native billets in the berms front face.

0850 Mickey and Brian starting the Phase 4 lift. We will take another 8" of the central berm and pack this into the roll off boxes.

0920 We have completed the Phase 4 lift. We have now removed 3 x 8" lifts and 1 x 6" lift, total 30" from the front of the WB-2 berm. This represents approximately ¼ (25%) of the WB-2 berm total volume.

0935 Dumpsters are similar capacity to yesterday. Mickey compacted the dirt, so we will leave the total volumes at:

Roll off 1 = 21 cubic yards
Roll off 2 = 24 cubic yards
Total 45 cubic yards

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Read and Understood By

Signed — Date 2/2/17 — Signed — Date 03/06/18

0945 Mickey & Brian depart. They have left the front end loader on-site at WB-2. If we need to perform further excavation, we can do this. T. Hordy, A. Montes, & G. Giles start manually collecting bullets from the front face of the berm.

1045 We have completed manual collection efforts. We are finding ≈ 5–10 bullets per cubic foot of dirt and there are still hundreds (but not thousands) of bullets in the berm face. S. Maestas on-site to check out dumpsters/roll offs. Pull plastic liner over the top of the soil in the dumpsters. Tim and AA will tape an additional piece of plastic over the middle seam between the two folded sides later today, they do not quite cover the soil (1 ft open strip down axis of roll off).

1050 All depart for 100 Area.

NOTE: Recalculated volume estimate for soil in the roll off boxes. Mickey Plemmons was able to compact the soil added today without increasing the volume in the roll offs significantly.

New calculation: Volume = $\frac{20' \times 6' \times 3'}{27}$ = 13 cuyds.

Approx 13 cuyds in each roll off. Listed on logbooks as ≈10 cuyds or 10 tons within each roll off total ≈ 20 cuyds.

1300 After discussions with JR Hennessey & Steve Maestas, we reviewed the "revised strategy letter" for the firing range cleanup. We will transport the soil off-site at an estimated bid/unit cost of $7,250 per roll off.

JR recommends & sets up for Monday Morning next week – picking up the two full rolloffs and dropping off two more empties (ACT corp). They will be on-site at ≈ 0800 hrs Monday 2/6/17. At this time we will remove additional lifts from the berm face.

1315 Contact Pete Munoz via email to confirm Tuesday availability Monday.

SUMMARY
– We have removed 4 lifts total (≈ 30 inches) from the WB-2 Firing Range berm.
– Total ≈ 20 cuyds soil. Excavation will resume on Monday 2/6/17

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Read and Understood By

Signed 2/2/17 Date — Signed 03/06/18 Date

0800 – JR reports that ACT were here early at 0630 hrs this morning removing the 2 x full roll offs and replacing them with 2 x empty roll offs.

0810 – Alarm sounds for 1st Monday of the month check-in. G. Giles checks in at B. 101.

0820 – Head out to WB-2 Firing Range. ACT are removing the 2nd full roll off. Pass them (going out) on the WB-2 access road. Steve Maestas is escorting them.

0825 G. Giles on-site @ WB-2. Jacobs personnel are already here (M. Plemmons & B. Heim).

WEATHER: 46°F, forecast High 70°F cool in morning, cloudy skies ≃ 90% cloud cover, no breeze in the morning.

PERSONNEL: G. GILES, A. MONTES] Navarro — M. PLEMMONS, B. HEIM] Jacobs.

0830 Check inside of roll offs. One (west side) is fine (clean). The roll-off on the east side is dirty - coated with oil on inside with several drum bungs in bottom of container.

0845 Call Troy Wiebe in office to locate a technician. T. Roady out today. No techs available. Call Al Montes. He will come over and help us place a liner in the west roll off. Troy calls to say it is OK if Jacobs & I do this per Craig, but Al is on his way out.

0900 A. Montes on-site. Tailgate Safety Briefing. See form for details. Discussed PPE and pinch points.

0920 Liner is in place on west roll off. A. Montes departs. Mickey and Brian take a 6"-8" lift of central 30' of berm. Call S. Maestas again on east roll-off. Al and Mickey noticed a 2" diameter hole in the bottom at the front also where oil has drained out onto the front of the roll off.

0935 First 6" to 8" lift complete. Check w/ metal detector (used new batteries 8 x AA). Still full of bullets. They may have added dirt to form front over time?

Continued on Page

Read and Understood By

Signed — Date 2/6/17 — Michael Mamp — Signed — Date 03/06/18

0940 Call S. Maestas. He will come out & check on east roll off. Mickey and Brian continue w/ next 6-8" lift. We spotted 2 rocks on top of the berm 30' apart defining the residual bullet area. This approximately coincides w/ the soft medium sand to native formation boundary on the north and south sides of the berm - hence this is the central 30' of the 45' berm.

0950 Check in w/ Troy in office to let him know we are still excavating. This roll off is deep = 20' x 6' x 6'.

1000 Mickey & Brian have finished the 2nd 8" lift today. Scan w/ metal detector → we will continue with a third lift. S. Maestas on-site to check roll off.

1010 S. Maestas has checked roll off. Takes photos of roll-off interior w/ bungs and puncture at the front of the roll off. He will double check w/ JR. Steve says AT has the liner for the second roll off.

1015 We have finished the 3 lift from the berm today.

1025 We have inspected berm front with the metal detector. It is a little better. We have two sections that are a problem right now that may correspond to the former locations of targets. These are both about 10 feet wide in the central berm area, separated by a 5' clean area in the middle. The cut in the middle is also a little deeper - so maybe scraping away of the two 10' sections will resolve the problem. S. Maestas departs.

1027 Commence on the 4th excavation of the day. Mickey has packed down the active roll off and we are about 40% filled on this one.

1040 4th lift complete. Scan front (west) side of berm w/ a metal detector. We are all clean! Handful of bullets left max → removed these in residue at front of berm by hand. We have approx 13-15 cu yds of dirt in the container (roll off), 80% full. Back side of berm still an issue

1050 Secure site. Break for lunch.

1100 Check w/ Troy on additional excavation. We will take a thin layer of soil off the back side (1"-2") and see if we can fit this in the west dumpster.

1230 Meet M. Plemmons & B. Heim back @ WB-2. Mickey will try to fit the 1"-2" layer in the first dumpster.

1300 A. Montes on-site with the liner for the 2nd roll off. Looks like we will have to start on this one.

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Read and Understood By

Signed — Date 2/6/17 — Signed — Date 03/06/18

1305 S. Moestas on-site. Gives us the go-ahead to start on second roll off. We have placed about ½ of the first layer of dirt from the back side (east) of the berm in the first container 2½-4" lift.

1345 We have lined the second roll off and placed the other half of the first east side lift in there.

1350 Scan the back side (east) berm with the metal detector. We have a section over 36', in the center of the 45' berm where they must have combed bullets over when repairing the berm. We will perform a second 4"-6" lift here and add to our second (east) roll off box. A1 departs to get white plastic that we use to cover the dirt/soil in the roll offs. We will seal up the first container. S. Moestas departs, he will be back for another check on the status of the lead-bearing soil in the roll offs.

1400 We have started the second 4"-6" lift on the east side.

1410 A. Montes back on-site w/ white plastic. We are sewing plastic to the liner to cover the top of the soil in container #7545. We have ≈ 15 cubic yards of soil (15 tons) in here.

1430 Finish sewing PVC over top of liner. Check berm on east side after second lift. We look to be down to a handful of bullets left. We can manually locate these with the metal detector tomorrow when we perform confirmatory sampling.

1500 Add compliance labels and start date to the 2 roll offs. A1 departs.

Rolloff West side = #7545 15 cubic yards / 15 tons
Rolloff east side = #7546 2 cubic yards / 2 tons.

1510 Secure site. Depart

SUMMARY

- Complete excavations at WB-2 Firing Range berm to remove lead contaminated soil.
- We removed another ≈ 30" in 4 lifts from the central 30' of the berm. In all, we have removed about 60" of soil (5 ft) from the berm front (west side).
- Confirm no lead present with metal detector scan.
- Remove ≈ 8"-10" in 2 lifts from the back side (east) of the berm.
- Confirm no lead present with a metal detector scan.
- We removed 15 cubic yards from the west side and 2 cubic yards from the east. —

Continued on Page

Read and Understood By

Signed — Date 2/6/17

Michael Naranjo — Signed — Date 03/06/18

0800 G. Giles in office setting up confirmatory berm sampling event at the WB-2 Firing Range. Pull together truck, metal detector, sampling notebooks etc. I in Kondy and A1 Montes will be performing the sampling.

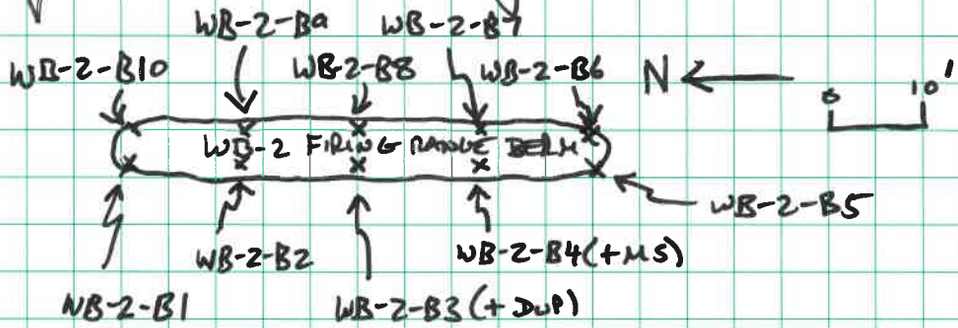
0830 T. Kondy and A. Montes leave to collect shovel, trowel, steel bowls, 4oz jars, and 500 ml poly container with HNO_3. We will collect a rinsate and then 10 samples from the berm with a QA/QC duplicate and matrix spike. Tim & Al collect the rinsate 1702070900.

0900 G-Giles, T. Kondy, A. Montes on access road to WB-2 Firing Range. Fire Dept have set up a road block with a chain about ½ mile west of the Firing Ranges. Call WSF Fire Dept as directed on Sign at x5641.

0910 Fire Dept give OK to proceed through gate. Leave gate down and call when we are out of there (Hang gate back up).

0920 All at Firing Range. Tim and Al preparing labels. I am spotting sample location stakes in the WB-2 Firing Range box. The AWP calls for confirmatory berm sampling at 10' intervals at a height of 3'-5' above the range floor.

WB-2 BERM SAMPLING SKETCH



0940 Labels ready, sample location stakes in place.

0950 Commence sampling soil on berm:

WB-2-B1	1702070950	metals by 6010C.		
WB-2-B2	1702070951	"	"	"
WB-2-B3	1702070952	"	"	"
WB-2-B3(DUP)	1702070953	"	"	"
WB-2-B4	1702070954	"	"	"
WB-2-B4(MS)	1702070955	"	"	"
WB-2-B5	1702070956	"	"	"
WB-2-B6	1702070957	"	"	"
WB-2-B7	1702070958	"	"	"

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Read and Understood By

Signed 2/7/17 Date — Signed 03/06/18 Date

WB-2-B8	1702070959	metals by 6010C.
WB-2-B9	1702071000	" " "
WB-2-B10	1702071001	" " "

1015 We have packed up samples in cooler on ice and will transfer these to the refridgerator in R. 637.
1030 Secure site, all depart. Hook up chain & gate on access road. Confirm with the Fire Department at X5641 that we have left.
1230 Back out at WB-2 after lunch. Compliance have requested we perform some soil transfer from #7545 (15 cuyd) to #7546 (2 cuyd). There is a ≃ 20,000 lb (10 tons / cuyds) limit on these roll off boxes. Our first two WB-2 containers weighed about 17,000 lbs per Steve Maestas, so we will have to get #7545 down in weight. Assuming about 3-5 cuyds (6,000-10,000 lbs).
1245 Mickey & Brian run to get a front end loader. T. Kordy & A. Montes on-site to help untape #7545 and re-secure the liner to #7546.
1315 We have taped up the roll offs. Tim and Al park upwind of heavy equipment activities to support supervision and write out labels for Wednesday's 200 Area Sewage lagoon sampling.
1330 Mickey is digging from #7545 with backhoe bucket and transferring to Brians front end loader. Brian then dumps soil from front end loader into #7546. Both are being careful not to spill any soil.
1430 Mickey and Brian done for the day. Estimate we have transferred about 4 cubic yards from #7545 (now 11 cuyds) to #7546 (now 6 cuyds).
1435 Tim, Al, & myself taping PVC covers onto the liners in the roll off boxes to cover the soil. Fill out logbooks.
1455 Tim & Al depart.
1510 Secure site. Depart.

SUMMARY

- Performed confirmatory sampling on the WB-2 Firing Range berm. Collected 10 samples (WB-2-B1 through WB-2-B10) and QA/QC duplicate & matrix spike. Also collected a rinsate from the sampling equipment.
- Transferred 4 cuyds soil from roll off #7545 (now 11 cuyds) to #7546 (now 6 cuyds).

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Read and Understood By

Signed — Date — Signed — Date

2/7/17 — 03/06/18

(WED 2/8/17)

0800 G. Giles meets M. Plemmons & B. Heim at STGT Firing Range. Technicians are tied up with 200 Area lagoon sampling today with Tom McCrory.
0810 Brian needs to run back to his house. Mickey and I continue with berm excavation activities.

WEATHER: 46°F, forcast high 70°F, clear skies, no clouds, no breeze in the morning.
PERSONNEL: G. GILES Navarro M. PLEMMONS Jacobs

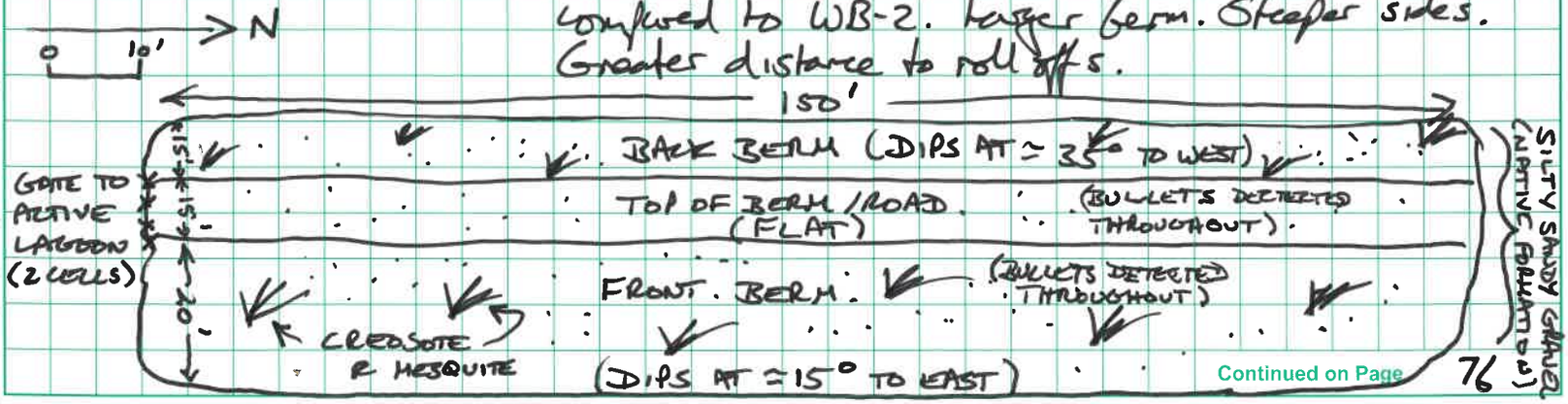
OBJECTIVE: Excavate STGT Firing Range berm. Start by clearing berm of brush and then perform excavation.

0830 Tailgate Safety Briefing. See form for details.
0840 Scan berm with metal detector to confirm distribution of bullets. Numerous bullets on front and top of berm.
0845 Mickey commences clearing sporadic creosote & mesquite bushes from the front of the berm. We need to remove these to gain access to the berm.

General Plan

Front Berm 20' wide
Berm length 150' long
Berm Top 15' wide
Back Berm 15' wide

① Scrape/dig out vegetation and station this vegetation north of the Firing Range Floor.
② Scrape away the front berm face and deposit soil in roll off boxes. We currently have 3 on-site.
③ Weld plate to excavator bucket and drag soil from top of back berm (west side) up onto berm west. Dispose of this soil in roll offs.
④ Clear lower side of back berm on west side with excavator. More time will be involved here compared to WB-2. Larger berm. Steeper sides. Greater distance to roll offs.



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Read and Understood By

Signed — Date 2/8/17
Signed — Date 03/06/18

0920 Mickey has finished clearing away brush.
0940 We have inserted the 10 mil (?) black plastic liner in the first of the roll off boxes.
0945 Mickey starts scraping away the front berm by pulling down from the top (combing down from road on west side back to the base of the berm on the east side). Brian Arrives back on-site.
0950 Brian spotting Mickey. Brian on the top of the berm with a hard hat and reflective vest.
1030 We have completed removal of the top layer of the front berm. This lift was approximately 4" in thickness.
1040 Scan the front of the STBT Firing Range berm with the metal detector. Use stakes to flag areas (strips) where bullet density is increased. There seems to be three strips across the berm with higher density where targets may have existed. Secure site, depart for lunch.
1200 Mickey & Brian back on site to start on second lift averaging 8" in thickness.
1245 We have filled the first roll off #7537. We have about 10 cuyds or 10 tons in this dumpster.
1255 We have inserted a liner in the second roll off box #7538.
1310 Start transferring dirt/soil (gravelly sandy silt) into the second roll off #7538
1400 We have completed the second lift of 8" and have removed approx 12" (1 ft) total from the front of the berm. Appears relatively clean with only 1-2 bullets every several feet.
1430 Roll off #7537 - Gravelly sandy silt w/ bullets - 10 cuyds.
Roll off #7538 - Gravelly sandy silt w/ bullets - 4 cuyds.
1500 G. Gile completes logbooks, stickers on roll offs, detach tape from sides for PVC liner. Fold liners over soil & secure with Calfico tape. Secure site, all depart.

SUMMARY
- Commenced excavation of STBT Firing Range berm. Worked on the front (east) side 150 ft x 20 ft. Comprised gravelly sandy silt w/ bullets.
- Removed approximately 12" (1 ft) of soil from berm front.
- Filled dumpster/roll off #7537 w/ 10 cuyds soil.
- Partially filled roll off #7538 w/ 4 cuyds soil
- Steve Maestas ordered 2 more roll offs for STBT (total 5 now).

Continued on Page —

Read and Understood By

Signed — Date — Signed — Date

2/8/17 — 03/06/18

0800 G. Giles, M. Plemmons, & B. Heim out at STGT Firing Range. Mickey & Brian have been working on Test Stand 304 test article preparation this week. This is their first opportunity to support the STGT Firing Range. Coordinated w/ Pete Muñoz.

WEATHER: Cool ≈ 34°F, forcast high 58°F, recent heavy rains have created a muddy working environment, clear skies, 20% cloud cover, no significant breeze in the morning.

PERSONNEL: G. GILES Navarro
M. PLEMMONS, B. HEIM Talbots

0820 Tailgate Safety Briefing. See form for details. Covered care around heavy equipment, PPE - reflective vests in addition to Level D. No dust generation today so we should not need to utilize dust masks. Hard hats when proximal <50' from front end loader.

0830 Scan berm front with metal detector. Flag area of concern. We have a 100' long area in the central berm that we will scrape another 6" lift from. Also a pile of rocks that Mickey moved to the south side of the berm front that contains bullet fragments. We will move this also.

0845 G. Giles runs back to B. 637 for some calpico tape to use on dumpsters / liners.

0905 G. Giles back. No calpico left (:(), but I have several other types of tape including electric tape.

0915 Mickey has completed 1' lift and moved all soil to roll off #7538. We are at 85% of the acceptable limit of about 20,000 lbs.

0920 Re-scan entire berm front w/ metal detector. Looks very good. Identify one area of ≈ 40 sq ft that we will scrape off. Also strip of soil at extreme top of front berm face. We will use this dirt to fill roll off #7538.

0945 We have completed removal of an additional 1 ft over the 40 sq ft area and strip at the top of the front berm. Roll off #7538 now full with approx. 10 cuyds of dirt/soil. Soil is a gravelly sandy silt.

1000 Insert liner in roll off on extreme east end of north firing range area. We have 4 roll offs in line on this side of pad. All empty

Continued on Page 78

Read and Understood By

Signed	Date	Signed	Date
[signature]	2/15/17	Michael Nannup	03/06/18

1015 Liner is taped into roll off # 7539. This roll off has a folding top, so easy to cover. Shorter roll off at 16' x 6' x 8' (1 foot taller than other roll offs

1020 Mickey starts clearing vegetation from upper back berm (west side). He recommends clearing the road on top of the berm last so that we have a good foundation for the front end loader while clearing the east (front) or west (back) sides of the berm.

1045 We have removed about half of the creosote bushes from the west side of the berm. Break for lunch. Secure site, all depart.

1230 All back on site. Mickey and Brian ready to scrape west side of berm. Perform initial metal detector scan. Lots of bullets on top of berm, but much less significant on back slope. One or two bullets every 5 or 6 feet.

1245 Mickey commences on back berm excavation. G. Giles fills out log book for #7538. Our new roll off box is #7539 on the extreme northeast corner of the STGT Firing Range floor.

1330 Labels are on the new roll off box. Mickey is stripping the upper 6' of dirt from the top of the back berm with a small metal plate welded to the "Stinger" of the backhoe. Seems to be working well.

1415 We have removed a 4"-6" lift from the upper part of the back berm (west side) along a distance of ≈ 110 feet. Continue removing soil from top of berm also.

1445 We are done w/ excavation for the day. Roll off #7539 has ≈ 5 cubic yards (≈ 5 tons) in it. Fill out log book and add to sealable bucket with log books.

1450 Close lid on roll off #7539. Tape up liner in roll off #7538: plastic will not stretch all the way across. An 18" gap is left in the middle (spine down the central roll off) where soil exposed. We can have technicians add plastic cover

1500 Secure site. All depart

SUMMARY

- Continued excavation of STGT Firing Range Berm. Front (east) side complete - removed 2 x partial 6" lifts in selected areas.
- Removed vegetation from top of back (west side). Removed 1 x 6" lift of soil.
- Added 6 cuyds of soil to #7538. Rolloff now has 10 cuyds and is full.
- Added 5 cuyds of soil to #7539. Rolloff partially full

Continued on Page —

Read and Understood By

Signed — Date 2/15/17 — Signed — Date 03/06/18

PROJECT STGT FIRING RANGE (BERM EXCAVATION) (THU 2/23/17)

Continued from Page —

0800 G. Giles meets M. Plemmons at STGT Berm. A. Montes and T. Kordy are also on-site preparing for STGT Sewage lagoon berm sampling. T. McCrory has run back to office for a dig permit. They need our help digging 10 small holes to 1' depth for lagoon berm samples. The soil is "too hard" to hand dig.

WEATHER: 48°F, forecast high 66°F clear skies, no clouds, breeze from the southwest at 5 mph.

PERSONNEL: G. Giles (Firing Range)
T. Kordy
A. Montes
T. McCrory
(lagoon berm)] Navarro
M. Plemmons - Jacobs

0815 Tailgate safety briefing. See form for details. Topics covered: heavy equipment operation, winds, use of Supplemental PPE IF required.

0825 G. Giles & M. Plemmons scanning upper back side of STGT berm with the metal detector. Flag limited areas where we still have a few bullets remaining. Overall - very good. We have flagged 6 spots where Mickey will drag the stinger over. Dirt/soil will be transferred to roll off box #7539.

0835 T. McCrory back on site w/ required dig permit to install 10 holes to 1' depth. Mickey takes front end loader/backhoe over to the STGT lagoon to install these holes w/ T. McCrory, T. Kordy & A. Montes.

0900 M. Plemmons has completed the 10 holes. Work with Mickey to open up roll off #7539 and tape liner back up on sides.

0915 Mickey is scraping 6" lifts of soil with the stinger from the top part of the back berm where we had flagged based on metal detector scanning. Scraping soil into piles on the top of the berm. We will scrape this all up with the blade off the top of the berm when we are done. Winds picking up out of the west 15-25 mph!

0930 G. Giles (with permission of Technicians) lining roll off box #7563 with PVC 10 mil (?) black plastic liner.

Continued on Page 80

Read and Understood By

J. Giles 2/23/17 — Signed / Date

Michael Plemmons 03/06/18 — Signed / Date

1015 Break for lunch. M. Plemmons has to depart to support alternate project.

1200 M. Plemmons & G. Giles back on-site at the STGT Firing Range. Mickey is completing scraping of upper back berm on the west side and trimming the top of the berm. We are placing all of the excavated soil in roll off # 7583. Winds have picked up to 40-45 mph, very strong.

1315 Scan STGT berm top & back berm with metal detector. It is so windy that I can barely hear the metal detector signal.

1325 Danny Hinojos on-site. He and Mickey say it is too windy to continue. We will reconvene at 0700 hrs on Monday morning 2/27/17.

1330 Mickey & Danny depart. I close up roll offs as best possible. Roll off # 7539 now has 10 cuyds (5 cuyds added today) and roll off # 7583 has 8 cuyds in it. Fill out start date for accumulation on # 7583 of 2/23/17. Fill out log books, secure logbook bucket, depart site.

1350 G. Giles back @ B. 101 parking lot.

SUMMARY

- Continued with STGT Firing Range back berm excavation & transfer of soil to roll offs.
- Focused on scanning & removal of dirt from top of back berm and on top of berm.
- Removed 13 cuyds today. 5 cuyds added to roll off # 7539 to fill it to capacity (10 cuyds). 8 cuyds added to roll off # 7583.
- Secured site. All depart.

Monday 2/27/17 : M. Plemmons will be ready to go at 0700 hrs to finish the berm excavations

Continued on Page

Read and Understood By

Signed — Date 2/23/17 — Signed — Date 03/06/18

0655 G. Giles out at STGT berm. Performing an initial metal detector survey of the berm top & top of the back berm (west side). Top needs a 6" scrape / lift. Back berm is good (2 bullet detections across entire berm from top to 8' down.

0710 Mickey Plemmons arrives with a second (larger) front end loader w/ bucket on the back. Brian is not at work today, but Mickey will work soil with both front end loaders (loading dirt into other & pushing dirt into buckets between loaders.

WEATHER: Cool ≈ 40°F, forecast high 68°F, clear skies (<5% clouds), slight breeze from the South (2-3 mph). Weather forecast indicates windy conditions in the afternoon, so we will need to get going this morning.

PERSONNEL: G. Giles - Navarro, M. PLEMMONS - Jacobs

0715 Tailgate safety briefing. See form for details. Topics include reflective vests, potential for dust masks in the afternoon.

0730 I. McCrory, T. Rondy, & A. Montes pull up at the adjacent STGT Sewage lagoon to complete berm sampling.

0740 M. Plemmons starts on top of berm. G. Giles sawing the PVC liners in the roll offs. We will complete the fill of roll off # 7563, and start on roll off # 7564. We have ≈ 2 cubic yards space left in # 7563 and # 7564 is empty.

0830 Mickey has removed a 6" lift off the berm top. Scan with the Metal detector. SOBMS excellent. Flag two zones, one at extreme north end and one at extreme south end of berm top. We need to get good 6" lifts from these two areas. We have filled roll off # 7563 and moved over to roll off # 7564.

0905 Mickey is done with the 6" lift on the south end of the STGT Firing Range berm right up to the separator gate with the sewage lagoon - all good.

0925 We have completed the north side of the berm. All finished on top.

0930 T. McCrory, T. Rondy, A. Montes done with STGT Lagoon sampling - depart.

0935 M. Plemmons starts "grubbing" (removing creosote) from bottom west berm.

Continued on Page 82

Read and Understood By

Signed 2/27/17 Date

Signed 03/06/18 Date

PROJECT STGT FIRING RANGE (BERM EXCAVATION) (MDW 2/27/17)

Notebook No. FRB # 1

Continued from Page 81

1010 We have removed all of the major vegetation from the bottom side of the back berm (west side). This was mainly creosote & mesquite bushes. Ready to excavate after a scan.

1015 Adding liner to final roll off box (6 total). Decided to do this before lunch and before the winds pick up.

1035 Secure site. Depart for lunch.

1200 G. Giles back on-site @ STGT Firing Range after lunch. Scan lower half ≈ 10' of berm on west side (back berm). A few sporadic ammunition fragments mixed in with surface gravels. We will perform a 6" lift of the lower back berm to complete this work.

1210 Mickey Plemmons on-site. Immediately starts to perform 6" lift on the back berm. Pulling down soil from unexcavated horizon to base of berm and then scooping it up with the bucket. Continue Filling # 7564. We will then move to the final roll off box # 7565.

1315 Switch over to roll off # 7565.

1330 We have finished a 6" lift off the lower back (west) berm. Scan berm with metal detector. Look to be in good shape. We will take a little extra lift of the extreme north and south sides of the berm where a lift was not performed. Also, one small pile of dirt not picked up by Mickey. This contains a few bullets so Mickey will pick it up. We still have some room in roll off # 7565.

1415 We have finished scraping off lifts from the STGT Firing Range Berm.

1425 Close top on the last roll off # 7565. Fill out log books at the 90 day area. We filled six roll offs at STGT with an estimated 10 cubic yards in each, so a total of 60 cuyds from the STGT Berm.

1430 Secure site. All depart. High winds at 25-30 mph.

SUMMARY

- Completed STGT Firing Range berm excavation activities. We focused on the berm top, and the lower half of the back berm on the west side.
- Added 2 cuyds soil to roll off # 7563. Total 10 cuyds
- Filled roll off # 7564 with 10 cuyds soil.
- Filled roll off # 7565 with 10 cuyds soil.
- Secured lids on 2 of 5 roll offs on site.
- The remaining 3 need to have PVC secured on top.

Continued on Page —

Read and Understood By

Signed — Date 2/27/17 — Signed — Date 03/06/18

0700 G. Giles @ B.101 picking up field equipment - measuring tape, metal detector, field logbook. T. Kondy & A. Montes @ B.637 preparing sampling jars for soil (4 oz) and rinsate sample bottle (500 ml HNO_3 preservative).

0715 Back to B.101 to prepare Task Memo for next weeks bulk survey & recovery on the periphery of the fallout grid. I prepared a Task Memo for this berm sampling yesterday.

WEATHER: 45°F, forecast high 63°F, Sunny (0% cloud cover), no breeze in the morning.

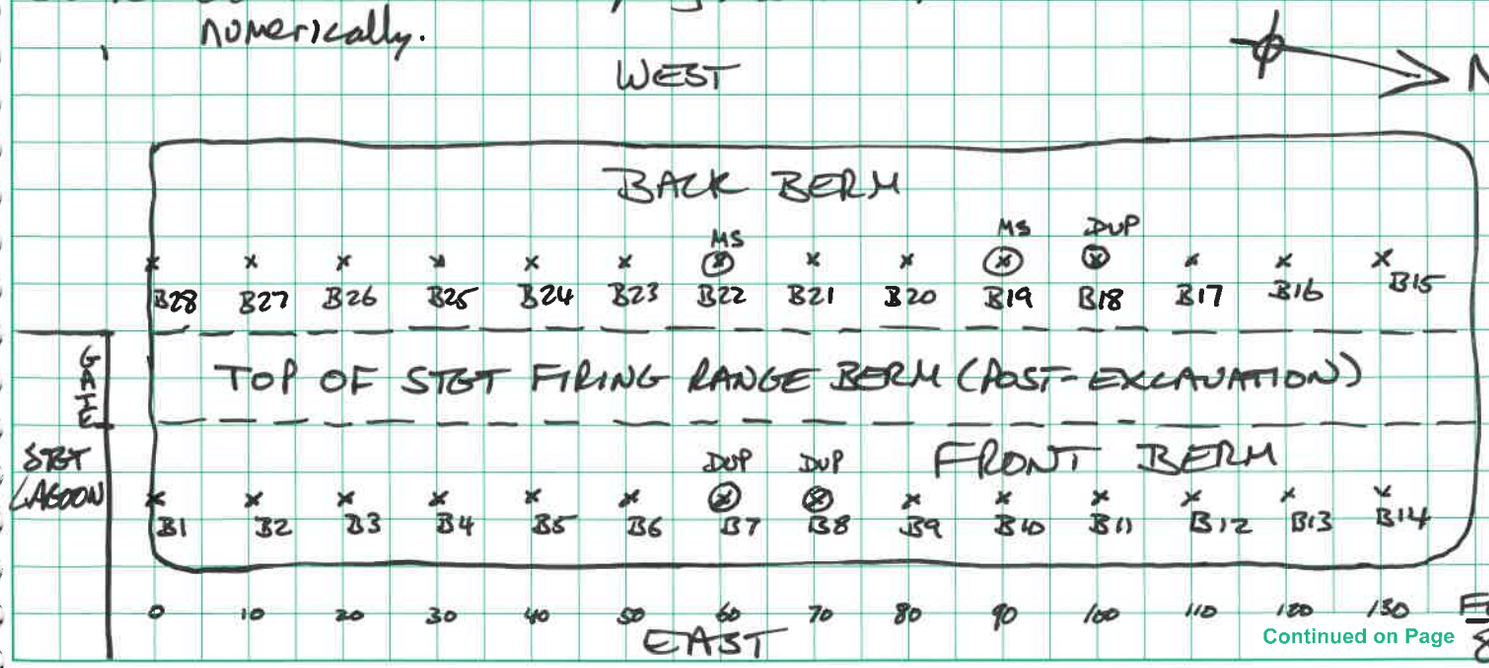
PERSONNEL: G. GILES, T. KONDY, A. MONTES] Navarro.

0730 Check in w T. Wiebe, R. Spencer, C. Delferraro concerning task memo protocol.

0745 Back over to B.637. Technicians are collecting the rinsate sample. Collect Rinsate sample 1703010745 for metals by 6010C.

0800 Depart for STGT Firing Range berm. Perform tailgate safety briefing. See form for details. Topics discussed → PPE (we will use a 3M dust mask if the wind picks up) and cave sampling on the steep side of the berm (back side on west).

0840 Commence berm sampling. We will start at STGT-B1 and continue numerically.



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Read and Understood By

Signed — Date 3/1/17 — Signed Michael Thorup — Date 03/06/18

PROJECT STGT FIRING RANGE (BERM CONFIRMATORY SAMPLING) (WED 3/1/17)

Notebook No. FRB # 1

Continued from Page 83

0840	Sample	STGT - B1	1703010840	metals by 6010C.
0842	"	STGT - B2	1703010842	" "
0844	"	STGT - B3	1703010844	" "
0846	"	STGT - B4	1703010846	" "
0848	"	STGT - B5	1703010848	" "
0850	"	STGT - B6	1703010850	" "
0852	"	STGT - B7	1703010852	" "
0854	"	STGT - B7 (DUP)	1703010854	" "
0900	"	STGT - B8	1703010900	" "
0902	"	STGT - B8 (DUP)	1703010902	" "
0904	"	STGT - B9	1703010904	" "
0906	"	STGT - B10	1703010906	" "
0908	"	STGT - B11	1703010908	" "
0910	"	STGT - B12	1703010910	" "
0912	"	STGT - B13	1703010912	" "
0914	"	STGT - B14	1703010914	" "
0944	"	STGT - B 15	1703010944	" "
0946	"	STGT - B16	1703010946	" "
0948	"	STGT - B17	1703010948	" "
0950	"	STGT - B18	1703010950	" "
0952	"	STGT - B18 (DUP)	1703010952	" "
0954	"	STGT - B19	1703010954	" "
0956	"	STGT - B19 (MS)	1703010956	" "
0958	"	STGT - B20	1703010958	" "
1000	"	STGT - B21	1703011000	" "
1002	"	STGT - B22	1703011002	" "
1004	"	STGT - B22 (MS)	1703011004	" "
1006	"	STGT - B23	1703011006	" "
1008	"	STGT - B24	1703011008	" "
1010	"	STGT - B25	1703011010	" "
1012	"	STGT - B26	1703011012	" "
1014	"	STGT - B27	1703011014	" "
1016	"	STGT - B28	1703011016	" "

1030 Secure site. All depart for R.637/638. Store soil samples in cooler/refrigerator.

SUMMARY

- Performed STGT Firing Range berm confirmatory sampling - 28 sampling locations
- Store all soil samples in refrigerator in preparation for shipping.

Continued on Page —

Read and Understood By:

Signed — Date 3/1/17

Signed — Date 03/06/18

GEOLOGISTS LB STOP

Tuesday, March 14, 2017 Weather: Clear, 72°F

1000 M. Narup, Navarro, gathered all GPS equipment needed to take locations for WB-2 and STGT Firing range locations with survey grade TSC3 Trimble GPS devices.

1030 Arrive at WB-2, Geoff has maked out all berm sample locations with stakes, orange flagging, and lables, check the label on the stakes to confirm they are correct sample location to collect points.

1045 Collect points at sample locations WB-2-B1 through WB-2-B10. confirm locations on mini-map and depart back to office.

1130 Picked up some batteries for radio, was at 10% at WB-2, depart to collect the rest of the berm sample locations at STGT

1143 Collected points at sample locations STGT B1 through B28. Confirm locations on mini-map and depart back to 100 Area office

1240 Download the points from the Trimble TSC3 into a shapefile and sent it to Stephanie

Summary: Confirmed berm sample locations using the survey grade Trimble TSC3, at WB-2 and STGT

03/14/17

Continued on Page —

Read and Understood By

Michael Narup Signed 03/14/17 Date

Signed 3/15/17 Date

0700 Personnel: Phillip Bolen
Kyle Williams
Tim Handy
Al Montes

Date: 9-12-2019

SCMI

Temp: 70°F Forcast mid 80s Partly Cloudy

0715 Safety Meeting Uneven surfaces, Snakes

Objectives: Begin discreet soil sampling at 200 Area Firing Range.

0720 Collected equipment / equipment blank.

0925 It is believed that some grid stakes have been washed out. Will need to reconfirm with Nick Balog who will be available Monday AM (9-16-19).

1030 Done attempting to locate "inissing?" grid stakes. Off site, back to the office.

P. Bolen
9-12-2019

Continued on Page

Read and Understood By

P. Bolen — Signed
9-12-19 — Date
Kyle Williams — Signed
9-12-19 — Date

Personel: Phillip Boken, Nicki Balog Date: 9-16-2019 SCMI

Temp/Weather: 73° Humid ~~poor~~ 9-16-19 Partly cloudy slight Breeze

1000: Depart to STGT Firing Range

1015: Met Nicki at STGT begin survey (Check spot stakes)

1109: Staked NE Corner of Grid 30 White/Pink Flag
Staked NE Corner of Grid 24 "
Staked NW Corner of Grid 22 "

1120 Staked SW Corner of Grid, 62 "
Staked SE Corner of Grid 65 "

1133 Staked SE Corner of Grid 61 "
Staked NE Corner of Grid 38 "

1135 Break for Lunch will Resume at Area 200 Firing Range at 1245-100

1240 Hiking into 300 Area F.R. (Roads Washed Out) Southern end

1317 Grids not lining up correctly! PB 9-16-19 PB 9-16-19

1341 Tentatively Marked: 41SW, 42SW, 43SW, 43SE, ~~Illegible~~ 39SE, 28SE, 15SE, 7SW, 6SW
Need to verify layout Moving on to WB-2 Firing Range

1400 Arrived at WB-2 Firing Range
9-16-19

1415 Tentatively Marked: 31NE, 32NE, 47SE, 57SE
9-16-19

1433 Grids not lining up correctly! Wrapping up, will send map points to Nicki to geolocate ~~from~~ points onto maps to verify grid locations on maps.
PB 9-16-19

1441 Back at the office will consult with Kyle.

Continued on Page

Read and Understood By

J. Boken 9-16-19 — Signed / Date

Signed 9-17-19 — Signed / Date

0700: K. Williams coordinates w/ T. Kondy + M. Avo to meet at STGT Firing Range.

0740: All arrive at STGT. Tailgate H+S, uneven walking surfaces & gaiters. Setting up to collect samples. Phillip Bolen on site 0840

Time	Grid	Quad.	Sample No.	Analysis	Jo6
0755	38	3	1909170755	6010 Metals	SCMI
0805	6	1	1909170805	(no preservative)	
0810	12	4	1909170810		
0813	18	2	1909170815		
0820	19	4	— 0820		
0825	20	2	— 0830		
0835	21	3	— 0835		
0840	61	4	— 0840		
~~0846~~	5	1	— ~~0846~~ KW 0850		
0855	11	1	— 0855		

KW - wrong location

0930: Nick Balog checked staked locations and determined that the grid centers are staked instead of grid corners. Therefore the 10 samples collected were from the wrong locations. Will dispose of collected samples and begin sampling the correct locations. Will return collected samples to original locations.

Grid	Quad.	Sample No.	Analysis	Preservative	Job #
38	3 + KW 1		6010 metals	ice	SCMI
KW ~~5~~ 6	1				
KW ~~12~~ 11	~~1~~ KW 1				
KW ~~18~~ 17	~~2~~ KW 1				
19	4				
20	2				
21	3				
6	1				
12	4				
18	2				

(10 Primary)

Continued on Page

1125: Tech wrapped up and off to lunch. Done for the day.

Read and Understood By

T. Balog — Signed — 9-17-19 — Date

T. Kondy — Signed — 9-18-19 — Date

0700 Meet up with Jim Kondy & Marcus Avalos
0705 Techs off to gas up truck.
0710 Phillip Bolen of STGT site
0725 Techs on site rigging up. Tail Gate Safety Brief
0734 Field Blank - - - - - - - -> Grid 1 Quad 2 Sample# 190918 0735

Grid #:	Quad:	Sample#:	Analysis:	Preservative:	Job #:
			6010 Metals	Ice	SCMT
1	2	190918 0745	"	"	"
1	2 (Duplicate)	190918 0746	"	"	"
7	4	190918 0800	"	"	"
13	3	190918 0805	"	"	"
2	3	190918 0815	"	"	"
8	1	190918 0870	"	"	"
14	2	190918 0830	"	"	"
14	2 (Duplicate)	190918 0831	"	"	"
3	3	190918 0835	"	"	"
9	3	190918	"	"	"
15	4 (Matrix)	190918 0844 PB 9/19	"	"	"
15	4	190918 0845 PB 9/19	"	"	"
15	4 (Field Blank)	190918 0847	"	"	"
4	2	190918 0850	"	"	"
10	4	190918 0855	"	"	"
16	1	190918 0900	"	"	"

915 Range Floor Complete (10 min break for water & shade) PB 9/19

Grid #	Quad #:	Sample #	Analysis:	Preservative:	Job #:
			6010 Metals	Ice	SCMT
37	1	190918 0930	"	"	"
36	2	190918 0935	"	"	"
35	3	190918 0945	"	"	"
35	3 (Duplicate)	190918 0946	"	"	"
34	2	190918 0950	"	"	"
33	1 (Matrix)	190918 1001	"	"	"
33	1	190918 1000	"	"	"
33	1 (Field Blank)	190918 1002	"	"	"
32	3	190918 1010	"	"	"
31	3	190918 1020	"	"	"
25	3	190918 1030	"	"	"

Continued on Page 91 PB 9/19

Read and Understood By

P. Bolen — Signed — 9-18-19 Date

[signature] — Signed — 9-18-19 Date

1026 Continued Soil Sampling 9-18-19

Grid #	Quad #:	Sample #:	Analysis:	Preservative:	Tab #
26	4	1909181035	6010 Metals	Ice	SCMS
27	1	1909181045	"	"	"
27	1 (Duplicate)	1909181046	"	"	"
28	1	1909181055	"	"	"

1105 Wrapping up, Picking up done sampling for the day.

1107 Techs off site enroute to Building 537 to store samples & decon.

Summary for the day: Soil sampling of STGT Firing range and surrounding fallout area. 32 total samples (3 Field Blanks, 3 Duplicates, 2 Matrix spikes, 24 discreet). Firing range floor complete in Northernmost lagoon. Most of Northern fallout zone.

Goal for tomorrow: Continue sampling Firing range (STGT) area. Attempt to complete the remaining areas available. Grab sample 9-3 which was missed.

23 Primary,
4 Duplicates,
2 Field Blanks,
2 Matrix Spike.

R. Baker 9-18-19

Continued on Page

Read and Understood By

R. Baker 9-18-19
Signed Date

Signed Date 9-18-19

1245: Williams, Kondy, Garcia, Torres meet at STGT to resume sampling.

Williams locating sampling locs. Kondy/Garcia collecting samples. Torres logging samples, labelling, int. COCs.

Grid	Quad	Sample No.	Analysis	Pres.	Lab
22	1	190924 1305	6010 Metals	Ice	SLMT
23	4	— 1315	"	"	"
24	2	— 1322	"	"	"
29	4	— 1327	"	"	"
30	4	— 1332	"	"	"
	1 → FB	— 1333	"	"	"
43	2	— 1340	"	"	"
	1 → MS	— 1341	"	"	"
42	4	— 1346	"	"	"
41	1	— 1351	"	"	"
40	1	— 1355	"	"	"
50	1 Dup	— 1356	"	"	"
39	1	— 1405	"	"	"
44	4	— 1415	"	"	"
45	4	— 1421	"	"	"
46	1	— 1430	"	"	"
47	4	— 1435	"	"	"
48	1	— 1440	"	"	"
	1 → FB	— 1441	"	"	"
53	3	— 1445	"	"	"
52	3	— 1450	"	"	"
	3 → Dup.	— 1451	"	"	"

1500: Shift end, stop for the day.

Summary: Collected 17 primary, 2 FB, 2 Dup, 1 M.S.
STGT Totals: 50 primary, 4 FB, 6 Dup, 3 M.S.
Resume soil sampling on Thursday 9-26-19.

Continued on Page

Read and Understood By

Signed — Date 9-24-19 — Signed — Date 9-26-19

PROJECT STGT Firing Range Sampling 9-26-19

Notebook No. FR Book #1

Continued from Page _____

Weather: Clear, Calm, 64° Objectives: Try to finish out STGT sampling today

0750 Philip Bolen on site. Techs gathering gear, should be along shortly. Getting ovens

0815 Techs: Tim Kondy & Marcos Avalos (#Al) (#Montez) on site

0820 Tailgate safety briefing. Loose soil, slips, snakes

0825 Rig up & begin sampling

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Job #:
58	3	190926 0840	6010 Metals	Ice	SCMT
57	1	190926 0847	"	"	"
56	4	190926 0852	"	"	"
55	4	190926 0858	"	"	"
54	3	190926 0904	"	"	"
49	3	190926 0911	"	"	"
50	3	190926 0918	"	"	"
51	1	190926 0924	"	"	"
65	1	190926 0944	"	"	"
65 MS.	1	190926 0945	"	"	"
64	2	190926 0951	"	"	"
64 Duplicate	2	190926 0952	"	"	"
64 Field Blank	2	190926 0953	"	"	"
63	3	190926 1000	"	"	"
67	1	190926 1007	"	"	"

1030 STGT sampling finished for the day. Rigging down, picking up. Techs off to store samples and decon equipment and dispose of waste. Sampling will resume after safety stand-down ~1230 at 200 Area Firing range.

1032 Philip Bolen off site. (#M)

Today: 12 Primary samples Totals: 62 Primary, 5 Field Blanks, 7 Duplicates, 4 Matrix Spikes

1 Duplicate

1 Field Blank

1 Matrix Spike

T. Bolen 9-26-19

Continued on Page

Read and Understood By

T. Bolen 9-26-19 Signed Date

Signed 10-1-19 Date

0800: Begin sampling of 200 FR Area. Weather: Sunny, warm & breezy ~90°
~~9-27-19~~ mb
9-26-19

0835 Tim Kondi, Al Montez, Phillip Bolen on site

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Lab #:
3	3	190926 1342	6010 Metals	Ice	SCMT
4	3	190926 1346	"	"	"
5	4	190926 1350	"	"	"
6	1	190926 1356	"	"	"
9	2	190926 1402	"	"	"
10	3	190926 1410	"	"	"
11	1	190926 1415	"	"	"
17	1	190926 1420	"	"	"
18	3	190926 1425	"	"	"
19	4	190926 1435	"	"	"
19	4 (Duplicate)	190926 1436	"	"	"
19	4 (Field Blank)	190926 1437	"	"	"
					PB ✓

1450 Techs had to go, rigged down packed up, off site.

1500 Marked off last grid completed, flagged off some of next rows for tomorrow.

1520 Phillip Bolen packed up, off site.

Summary for the day: Finished out STGT FR before lunch. After lunch started 200 Area FR. Worked up from Arroyo to Grid #20, stopped for the day

Todays (200 FR) samples:
Primary Samples: 10
Duplicate Samples: 1
Field Blank: 1

200 FR Total Samples:
Primary Samples 10
Duplicate Samples 1
Field Blanks 1
Matrix Spike 0

Goal for tomorrow: Aim to finish off sampling of 200 Area FR. If time pack samples for shipping.

Continued on Page

Read and Understood By

T. Bolen — Signed — 9-26-19 — Date

Signed — 10-1-19 — Date

Weather: Clear, calm, cool ~60° Phillip Boken, Tim Handy, Tony Torrez 9-27-19

Objectives: Collect samples for 200 Area FR, continued (soil samples)

0749 Phillip Boken on site. Techs finishing up getting gear, should be along shortly.

Tailgate safety briefing: Hiway hazards, steep slopes.

Rig up begin soil sampling for the day.

Grid #:	Quad #:	Sample #:	Analysis:	#8 Preservative: Preservative	Job #:
31 30	2 3	190927 0805	6010 Metals	Ice	SCMT
31	2	190927 0812	"	"	"
32	3	190927 0818	"	"	"
33	4	190927 0823	"	"	"
34	1	190927 0830	"	"	"
35	3	190927 0838	"	"	"
36	2	190927 0846	"	"	"
37	2	190927 0855	"	"	"
26	2	190927 0915	"	"	"
21	1	190927 0922	"	"	"
21 Dup	1	190927 0923	"	"	"
21 F.B.	1	190927 0925	"	"	"
21 M.S.	1	190927 0924	"	"	"
22	1	190927 0932	"	"	"
23	3	190927 0938	"	"	"
1	3	190927 0945	"	"	"
2	1	190927 0951	"	"	"
24	4	190927 1000	"	"	"
25	2	190927 1006	"	"	"
26	3	190927 1015	"	"	"
27	4	190927 1024	"	"	"
27 Dup.	4	190927 1025	"	"	"
27 F.B.	4	190927 1026	"	"	"

1030 Techs packing up off site. Training class.

1045 Phillip Boken marking end point. Flagging location for next sampling day.

1100 Phillip Boken off site.

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Read and Understood By

P. Boken 9-27-19
Signed Date

Signed 10-1-19
Signed Date

Summary for the day: Sampled ~3/4 of 200 Area F.R. total now. Techs had to leave at 1030 for class and lunch. No sampling scheduled for the afternoon. Samples collected will be packed for shipping this afternoon.

Objective for not scheduled day: ~15 more grids left to sample in the 200 Area F.R. Will finish these thus finishing sampling for this area.

Todays Collected Samples (200 Area F.R.): 18 Primary Samples
2 Duplicate Samples
2 Field Blank Samples
1 Matrix Spike Sample

Total Collected Samples for 200 Area F.R.: 28 Primary Samples
3 Duplicate Samples
3 Field Blank Samples
1 Matrix Spike Sample

9-27-19 T. Bath

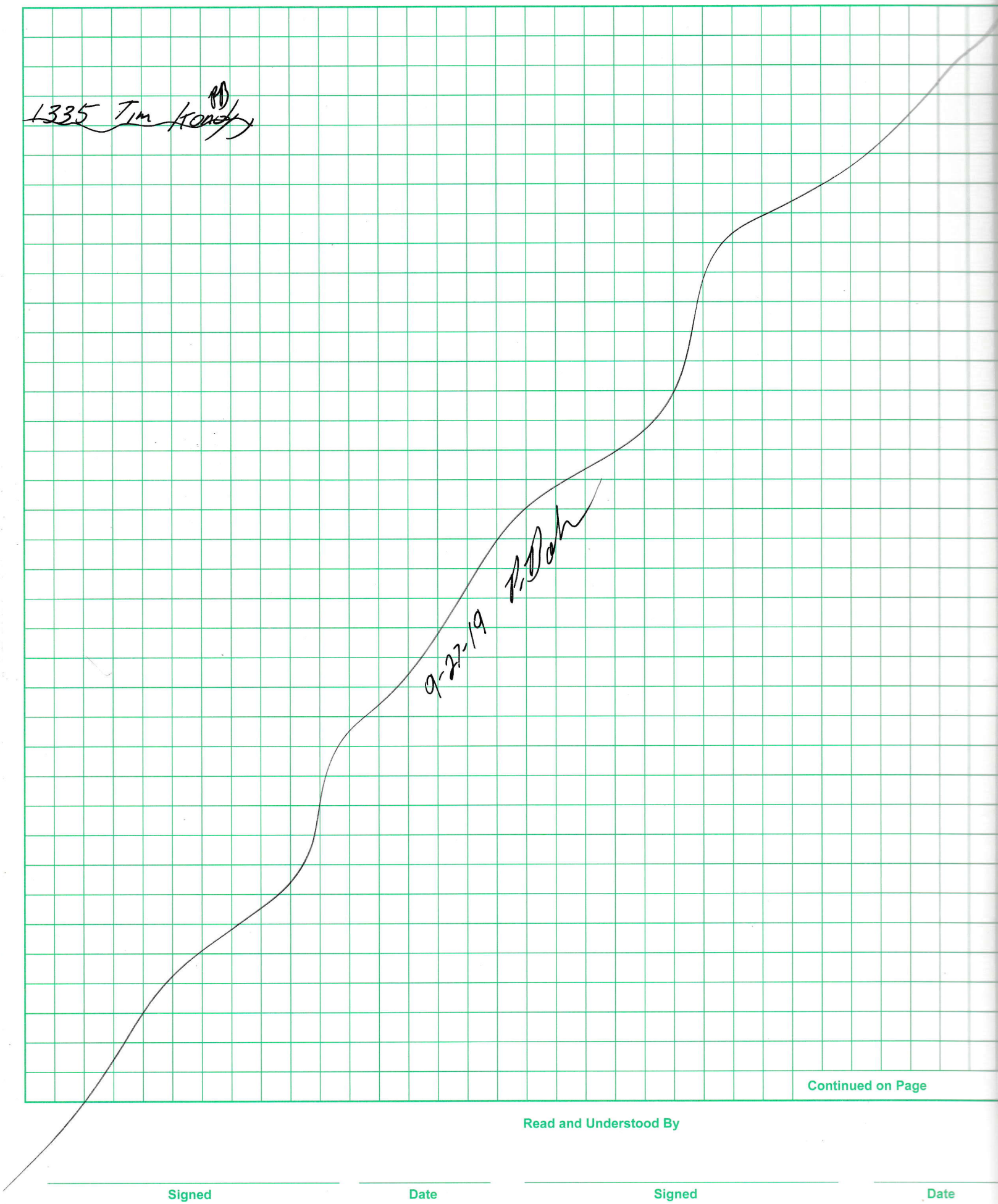
Continued on Page

Read and Understood By

T. Bath 9-27-19
Signed Date

[signature] 10-1-19
Signed Date

1335 Tim Kordy PJ



Continued on Page

Read and Understood By

Signed _____ Date _____ Signed _____ Date _____

Weather: Slightly cloudy, calm ~68° Phillip Boken, Mike Kondy, Marcus Anders
Chance of storms in afternoon 9-30-19
Objectives for today: Finish sampling of 200 Area Firing Range soils.

0748 Phillip Boken on site.
0805 Techs on site forgot notebook back to Area 631
0823 Techs back rigging up setting up.

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Job #:
41	3	1909300840	6010 Metals	Ice	SCMI
42	4	1909300855	"	"	"
43	1	1909300906	"	"	"
44	1	1909300918	"	"	"
40	2	1909300932	"	"	"
39	1	1909300949	"	"	"
38	1	1909301013	"	"	"
28	3	1909301024	"	"	"
29	2	1909301040	"	"	"
29 Matrix Spike	2	1909301041	"	"	"
16	3	1909301054	"	"	"
16 Duplicate	3	1909301056 55 PD 12-1-19	"	"	"
16 Field Blank	3	1909301057 56 FB 12-1-19	"	"	"

1057 Breaking for lunch, techs packing up, heading out.
1103 Phillip Boken off site.
1305 Resume Final Sampling.

Grid #:	Quad #:	Sample #:	Analysis:	Preservative:	Job #:
15	2	1909301315	6010 Metals	Ice	SCMI
7	1	1909301325	"	"	"
6	4	1909301333	"	"	"
14	1	1909301340	"	"	"
13	3	1909301347	"	"	"
12	2	1909301355	"	"	"

FB ~~1305~~

1405 Area 200 FR Soil Sampling complete.

Continued ~~from~~ on page 2

Read and Understood By

T. Boken 9-30-19 Signed Date

[signature] 10-1-19 Signed Date

1415 Techs rigged down pickup. OEE to Area 637 to decon and store samples
1417 Phillip Boken off site.

Summary for the day: Completed soil sampling of Area 200 Firing Range.

Todays (200 FR) samples:

Primary Samples: 16
Duplicate Samples: 1
Field Blanks: 1
Matrix Spikes: 1

Total (200 FR) samples:

Primary Samples: 44
Duplicate Samples: 4
Field Blanks: 4
Matrix Spikes: 2

Objectives For tomorrow: Begin sampling of WB-2 Firing Range

9-30-19 P. Boken

Continued from page

Read and Understood By

P. Boken — 9-30-19 — 10-1-19

Signed — Date — Signed — Date

~~Weather~~ 10-1-19 Weather: Mostly Cloudy 68° Calm, 20% Chance rain. 10-1-19

Phillip Boles, Tim Handy, Marcus Avalos

Objectives: Begin sampling of LWB-2 Firing Range.

745 Phillip Boles & Techs on site
750 Tail ~~Gate~~ Safety Meeting.

Square:	Quad:	Sample #:	Analysis:	Preservative:	Job #:
			6010 Metals	Ice	SCMI
38	3	191001 0834	"	"	"
39	2	191001 0840	"	"	"
40	4	191001 0847	"	"	"
41	4	191001 0902	"	"	"
42	4	191001 0911	"	"	"
43	4	191001 0919	"	"	"
44	4	191001 0930	"	"	"
45	2	191001 0944	"	"	"
45 Duplicate	2 10-1-19	191001 0945	"	"	"
45 ~~Matrix Spike~~	2 Field Blank	191001 0946	"	"	"
46	2	191001 1010	"	"	"
47	3	191001 1017	"	"	"
37	3	191001 1024	"	"	"
32	3	191001 1032	"	"	"
31	1	191001 1039	"	"	"
36	3	191001 1044	"	"	"
35	3	191001 1050	"	"	"

1100 Techs off to lunch, used/lost of 4oz bottles. Will bring out 8oz. jars to continue sampling after lunch. Packing up.

1105 Phillip Boles & Techs off site. Will return 1230-1245 to resume soil sampling.

10-1-19 P. Boles

Continued ~~from~~ on page 4

Read and Understood By

P. Boles 10-1-19
Signed Date

Signed Date

PB 10-3-19

PROJECT ~~200 Area Firing Range~~ WB-2 Firing Range

Notebook No. FR Book 2

Continued from page 3

1310 Onsite w/ Techs. Rigging up
1319 Beginning sampling for afternoon.

Grid #:	Quad #:	Sample #:	Preservative: Ice	Analysis: 6010 Metals	Job #: SCMT
34	2	191001/1323	"	"	"
33	4	191001/1330	"	"	"
57	2	191001/1338	"	"	"
57 Duplicate	2	191001/1339	"	"	"
57 Field Blank	2	191001/1340	"	"	"
56	1 10-1-19 PB	191001/1347 10-1-19	" 10-1-19 PB	" 10-1-19 PB	" 10-1-19 PB
~~56 Matrix Spike~~	~~1 PB~~	~~191001/1353 PB~~	~~" PB~~	~~" PB~~	~~" PB~~
55	3	191001/1353	"	"	"
55 Matrix Spike	3	191001/1354	"	"	"
54	2	191001/1400	"	"	"
53	1	191001/1410	"	"	"
66	3	191001/1415	"	"	"
65	2	191001/1435	"	"	"

1437 Finished sampling for the day. Techs rigging down headed to decon @ 637 and store samples.
1445 Phillip Baker and Techs off site for the day.

Summary: Began sampling of WB-2 Firing Range. ~1/3 completed.

Objectives for tomorrow: Continue with WB-2 Firing Range Soil sampling.

Todays WB-2 FR Samples:

Primary Samples:	24
Duplicates:	2
Field Blanks:	2
Matrix Spikes:	1

Total WB-2 FR Samples:

Primary Samples:	24
Duplicates:	2
Field Blanks:	2
Matrix Spikes:	1

P. Baker 10-1-19

Continued from page

Read and Understood By

P. Baker — Signed — 10-1-19 Date

Signed — 10-1-19 Date

PB 10-3-19

PROJECT ~~700 Area Firing Range~~ WB-2 Firing Range

Notebook No. FR Book 2 5

Continued from page

Weather: Partly Cloudy 68° Calm Chance of storms in the afternoon.

10-2-19

Phillip Bolen, Tim Handy, Marcus Avalos

0750 All above onsite Tailgate Safety briefing & Rigging Up

Sad #:	Quad #:	Sample #:	Preservative:	Analysis:	Job #:
64	2	191002 0810	Ice	6010 Metals	SCMT
63	2	191002 0815	"	"	"
62	1	191002 0823	"	"	"
61	4	191002 0832	"	"	"
61 Duplicate	4	191002 0833	"	"	"
61 Field Blank	4	191002 0834	"	"	"
60	3	191002 0842	"	"	"
59	2	191002 0850	"	"	"
58	4	191002 0900	"	"	"
72	2	191002 0920	"	"	"
71	3	191002 0924	"	"	"
70	4	191002 0930	"	"	"
69	4	191002 0936	"	"	"
68	4	191002 0945	"	"	"
67	1	191002 0951	"	"	"
30	1	191002 1020	"	"	"
30 Duplicate	1	191002 1021	"	"	"
30 Field Blank	1	191002 1022	"	"	"
29	4	191002 1026	"	"	"
28	3	191002 1034	"	"	"
24 Matrix Spike	3	191002 1035	"	"	"
27	3	191002 1043	"	"	"
26	1	191002 1050	"	"	"

1055 Breaking for lunch. Techs picking up, ~~rigging~~ PB 10-2-19 rigging down.

1100 Techs off site. Phillip Bolen flagging last location & next row

1110 Phillip Bolen off WB2 FR site for lunch.

10-2-19 P. Bolen

Continued ~~from~~ on page 6

Read and Understood By

P. Bolen — Signed — 10-2-19 — Date

[signature] — Signed — 10-2-19 — Date

PB-10-3-19

PROJECT ~~200 Area Firing Range~~ WB-2 Firing Range

Notebook No. FR Book #2

Continued from page 5

1300 Phillip Bolen on WB-2 site.
1309 Techs on site, rigging up setting up.

Square #:	Grid #:	Sample #:	Preservative:	Analysis:	Jar #:
25	1	191002-1315	Ice	6010 Metals	500
24	1	191002-1321	"	"	"
23	3	191002-1327	"	"	"
22	4	191002-1335	"	"	"
21	3	191002-1345	"	"	"
20	3	191002-1400	"	"	"
20 Duplicate	3	191002-1401	"	"	"
20 Field Blank	3	191002-1402	"	"	"

1400 Finished with soil sampling for the day. Techs rigging down & packing up.

1410 Phillip Bolen & Techs off WB-2 FR site. Heading to Area 637 to prep and pack samples for shipment.

Summary for the day: Continued soil sampling at WB-2 Area Firing Range

Objectives for Tomorrow: Finish up with soil sampling at WB-2 Area Firing Range

Todays WB-2 FR Samples: 24 Primary Samples
3 Duplicates
3 Field Blanks
1 Matrix Spike

Total WB-2 FR Samples: 48 Primary Samples
5 Duplicates
5 Field Blanks
2 Matrix Spikes

10-2-19 P. Bolen

Continued from page

Read and Understood By

P. Bolen — Signed — 10-2-19 Date

Signed — 10-2-19 Date

10-3-19

Weather: Cloudy, Calm possible showers later. ~67°

10-3-19 PB (Auditor) ~~(Auditor)~~

Tim Kandy Marcus Avalos Techs. Phillip Boleu site Supervisor. Roy Spencer

~~0805~~ 10-3-19 0900 All on site. Rigging up, held Tailgate safety briefing.

Square #:	Grid #:	Sample #:	Preservatives:	Analysis:	Job #:
			Ice	6010 Metals	SCMT
19	3	19100308O2	"	"	"
18	2	19100308O8	"	"	"
17	2	19100308I4	"	"	"
16	4	19100308I2	"	"	"
15	3	19100308I0	"	"	"
14	2	19100308I6	"	"	"
13	3	19100308I8	"	"	"
13 Matrix Spike	3	19100308I9	"	"	"
12	4	19100309O4	"	"	"
11	3	19100309I4	"	"	"
10	3	19100309I7	"	"	"
10 Duplicate	3	19100309I8	"	"	"
10 Field Blank	3	19100309I9	"	"	"
9	1	19100309I8	"	"	"
8	3	19100309I7	"	"	"
7	3	19100310O0	"	"	"
6	3	19100310I0	"	"	"
5	3	19100310I6	"	"	"
4	4	19100310I5	"	"	"
3	4	19100310I53	"	"	"
3 Matrix Spike	4	19100310I54	"	"	"

1105 Breaking for lunch. Will return after lunch to finish last 2 off site.

P. Boleu 10-3-19

Continued ~~from~~ on page 7

Read and Understood By

P. Boleu — Signed — 10-3-19 — Date

Signed — 10-8-19 — Date

Phillip Boles, Techs: Tim Handy & Marcus Avalos

1305 Onsite to take last 2 soil samples. Reed Elliot joining us for pictures. Take photographs. Rigged up tools, last 2 samples & pictures.

Square #:	Quad #:	Sample #:	Preservative:	Analysis:	Jar:
2	3	191003 1325	Ice	6010 Metals	SOIL
1	2	191003 1335	"	"	"
1 Duplicate	2	191003 1336	"	"	"
1 Field Blank	2	191003 1337	"	"	"

1340 Phillip Boles, Tim Handy, Marcus Avalos picking up, rigging down.
1345 Phillip Boles, Tim Handy, Marcus Avalos, Reed Elliot left WB-2 FR site.

Summary: Completed soil sampling of WB-2 Area Firing Range.

Todays WB-2 FR Samples: 19 Primary Samples
2 Duplicate Samples
2 Field Blank Samples
2 Matrix Spikes

Total WB-2 FR Samples: 67 Primary Samples
7 Duplicates
7 Field Blanks
4 Matrix Spikes

P. Boles 10-3-19

Continued from page

Read and Understood By

P. Boles — Signed — 10-3-19 — Date
T. Handy — Signed — 10-8-19 — Date

Weather: 37° Cold, Clear & Sunny. Should warm up later. 11-13-2019

Objective: Ammo recovery at STGT south lagoon berm. Don't anticipate many recoveries. Not many hits when checked earlier.

0753 P. Bolen on site. Setting up, waiting up TSB.

0800 Techs on site. Tim Kandy, Tony Tocci.

Gave them tasks memo & stickers, ~~dispatch~~ 11-13 disposal books, stickers. Went to get buckets for recovered ammo.

0810 Made a couple passes near NE end of south STGT lagoon berm. No hits don't think we're going to be finding many bullets at ~~range~~ 11-13 or fragments?

0845 Found 2 scraps so far. Scanning top side of berm from north to south.

0930 Walked berm top south to end of southmost lagoon. Only 3 fragments recovered so far.

1000 1 more bullet recovered along top road between berms (northmost).

1030 1 more fragment recovered at top of berm edge NE edge (northmost).

1055 Recovered 3 more fragments so 8 total recovered. Recovered near gate at top of berm road NE corner.

1115 No more detector hits since last @ 1055. Packing up techs heading off site to decon and head to lunch.

1120 Philip Bolen off site to lunch.

1240 P. Bolen, T. Kandy, T. Tocci back on site will start by ~~sweep~~ 11-13 surveying 66, 71, 76 grids in northmost lagoon that has yet to be surveyed.

1400 4 more scraps collected so far 66, 71, 76 completed. Moving on to 67, 72, 77

1510 2 more scraps recovered. First sweep of west side of 67, 72, 77 complete.

1515 Techs packing up heading off site. 15 bullets/fragments recovered total for the day.

1520 P. Bolen packed up heading off site.

Summary for the Day: Surveyed with metal detector grids 48 & 53 along berm top NE of STGT lagoons. Completed cells 66, 71, 76 inside lagoon. Made first sweep of cells 67, 72, 77.

Fragments/Bullets Recovered: 15

Continued from page ~

Read and Understood By

T. Bolen	11-13-19		4/13/2020
Signed	Date	Signed	Date

PROJECT STGT Firing Range

Notebook No. FR Book #2

Continued from page

Weather: 39° Clear & Cold. Suppose to warm up later however. 11-14-2019

0715 P. Baker on site. Techs: Tim Handy, Tony Torrez
Objective: Continue bullet recovery at STGT Firing Range - Southern Lanes.

0720 Techs on site. Conducted TSB. Begin surveying for the day.

0900 67,72,77 grids surveyed. 5 Fragments/bullets recovered so far today. Now going to survey grids 68,73,78 for ammo scrap.

1040 Almost completed grids 68,73,78. Found 4 more scraps so far.

1110 Collect 10 Fragments/bullets so far for the day. Almost through grids 68,73, 78

1115 Breaking for lunch. Packing up. Will return after lunch & Safety Meeting. Techs at site. P. Baker packing up.

1120 P. Baker heading off site for lunch / safety meeting as well.

1330 P. Baker, T. Handy, T. Torrez back on site to resume bullet recovery survey.

1420 ~~Almost completed~~ 11-14 68,73,78 completed. Almost completed 69,74,79
No new scraps or bullets recovered from 68,73, or 78. No fragments or bullets found so far on grids 69,74 & 79. Found a few Aluminum cans but that's been it.

1505 Techs packing up and heading off site. Grids 69,74 & 79 completed. No new scrap or bullets identified or recovered.

1540 P. Baker packing up and preparing to head off site for the day. Conclusion of survey for the week - will resume monday with Grids # 70,75,80

Summary for the day: Completed survey of grid #s.
67,72,77,68,73,78,69,74,79,
10 new bullets/fragments collected today

Total collected: 25

No fragments/bullets found in grids #. 69,74 & 79. Will resume monday with Grids # 70,75,80.

T. Baker 11-14-19

Read and Understood By

T. Baker 11-14-19 — Signed / Date

Signed 4/13/2020 — Date

Weather: Clear, Cool 44°. Should warm up to mid 70s. 11-18-19

Objective: Continue if Try to finish bullet recovery today. (STBT & WB-2)

0715 P. Baker onsite. Techs on site Techs: Tim Handy Tony Torres

0720 TSB, Rigging up to begin recovery.

0815 70,75,80 almost completed. 1 Bullet recovered @ 70. Fake bits of wire, cans seem more common in the eastern rows.

0930 70,75,80 Completed. 19,20,21 grids #s almost complete. No fragments or bullets recovered.

1000 Grids 19,20,21 completed. Several cans discovered, no bullets or fragments at ammo recovered. Stacking grids #59,60,61.

1055 About half way through grids #59,60,61 no bullets or fragments recovered. Couple pieces of bark wire 1 pull tab found.

1105 Packing up/picking up for lunch. Techs off site. Will come after lunch and complete grid #s 59,60,61. Then move over to WB-2 firing range for rest of afternoon.

1110 P. Baker off site, Headed to office.

1240 P. Baker back at STBT. Reed Elliot should be along soon to take some official pictures of the survey and recovery process.

1245 Techs on site. Preparing to finish out STBT bullet recovery. Reed Elliot on site.

1320 Completed 59,60,61 survey of STBT site for bullet/fragments complete.

1330 Heading over to WB-2 firing range for bullet recovery.

1330 P. Baker at WB-2 gate waiting on techs.

1335 Techs on site cleared to enter WB-2. Heading to survey site

11-19

1340 Received call that security needs to use firing range. Will have to try to complete WB-2 bullet/fragment recovery tomorrow. Vacating firing range. Headed back to the office.

Summary for the day: Completed survey of STBT site for recoverable bullets. Found 1 bullet in grid #70.

Total for day: 1

total collected from STBT site: 26

Hope to start→finish bullet recovery tomorrow. Start soil sampling of STBT southern lagoons later tomorrow as well if possible.

Continued from page

Read and Understood By

K. Baker	11-18-19		4/13/2020
Signed	Date	Signed	Date

12

PROJECT Firing Ranges

Notebook No. FR Book #2

Continued from page _____

Weather: Clear / Cool / 65° Chance of showers increasing later in the day. Breezy. 11-19-2019

1230 P. Bolen on site @ STGT lagoons. Setting up will start with square #70.

1245 Techs on site Techs: Tim Handy, Al Montez Conducted TSB.

Analysis: #19119125~~4~~/115, 6010 Metals, Ice HNO_3, 125 ml poly, SCMT

Square #:	Dead #:	Sample #:	Preservative:	Analysis:	Job #:
70	3	191191257	Ice	6010 Metals	SCMT
~~63~~ 69	~~3~~ 4	191191301	"	"	"
68	3	191191306	"	"	"
67	2	191191311	"	"	"
66	4	191191316	"	"	"
71	2	191191323	"	"	"
72	4	191191330	"	"	"
72 Duplicate	4	191191331	"	"	"
73	3	191191334	"	"	"
73 Matrix Spike	3	191191335	"	"	"
74	1	191191339	"	"	"
75	3	191191342	"	"	"
9	3	191191349	"	"	"
59	1	191191355	"	"	"
59 Field Blank	1	191191356	"	"	"
60	4	191191401	"	"	"
61	4	191191405	"	"	"
80	1	191191407	"	"	"
79	2	191191410	"	"	"
78	3	191191414	"	"	"
77	3	191191418	"	"	"
76	3	191191422	"	"	"

1430 Soil sampling of STGT Firing Range completed. P. Bolen, T. Handy, A. Montez packing up. Techs headed to 637 to stage samples and decon.

Summary for day: Finished soil sampling of STGT Firing range. All soil samples complete.

Samples Collected Today: Primary: 19
Duplicates: 1
Matrix Spike: 1
Field Blanks: 1

Total Samples Collected (STGT): Primary: 80
Duplicates: 8
Matrix Spike: 5
Field Blanks: 6

Continued from page

Read and Understood By

P. Bolen — Signed — 11-19-19 — Date

Signed — 4/13/2020 — Date

Weather: Cloudy, Cool 53° Rain the night before. Might rain more later today. 11-20-2019

0720 P. Balen, T. Conley, Al Montez on site @ WB-2 Firing range to complete bullet recovery. Reed Elliot joining us later for official photographs.

0725 Rigging up conducted Tailgate Safety Briefing - Going to begin recovery

0800 Started ~ 30 bullets just exposed on the surface so far. Going to continue recovering the ones that are visible then after it appears those are collected going to move on to using metal detector over the area.

0900 ~30+ more recovered on the surface. (visible to the eye). Taking 10 min break to warm up tired eyes.

1100 Counted how many bullets/fragments collected so far.: 140+84=224 collected so far. Security arrived to the range for an hour or two. Packing up. Techs off site. P. Balen packing up.

1105 P. Balen off site. Will try to resume collection after lunch. (So far, surface picked visible ammunition of ~4'x8' truck)

1240 P. Balen on site at WB-2 gate.

1245 Techs on site. Were given cleared to enter. Going to resume ~~sampling~~ survey.

1345 Frank Gallegos on site Truck 1903 was ready headed back to swap trucks.

1355 P. Balen back on site in 1903. Reed Elliot on site for official pictures.

1400 R. Elliot taking procedural photos. Continue bullet recovery.

1415 R. Elliot off site. Continuing with bullet location & recovery.

1500 Finished with bullet recovery for the day. Counting # recovered this afternoon. 114 more recovered this afternoon. ~1/2 of intended survey area covered. Will continue

1505 Techs packing up to head off site to dispose of todays recovered ammunition.

1510 Techs & P. Balen off site for the day.

Total bullets/ammo scrap recovered: 338

Summary for the day: Collected visible ammo scrap on the surface. Then began survey with metal detector. Covered ~1/3-1/2 of range floor in front of old WB-2 firing range berm. Collected 338 bullets/ammo scrap. Goal for tomorrow: Aim to finish final bullet/ammo recovery of WB-2 firing range.

Read and Understood By

T. Balen — Signed — 11-20-19 — Date

J. Williams — Signed — 4/13/2020 — Date

Weather: Mostly Cloud 54°, Possible Rain later. 11-21-2019

~~#8~~ #20 P. Baker & Tim Kemp, Al Montez on site.

Objectives: Continue bullet recovery.

0725 Rigging up conduct TSB continue with bullet recovery.

0750 Taking 10 min break. Quite a few bullets recovered, seems there are still quite a few in the ground at the foot of the berm. Techs off site. T. Kemp needed to use restroom.

0905 Techs back side side. Going to continue bullet recovery.

0935 Batteries ran out on metal detector. P. Baker to the office to get more

0945 P. Baker back on site with new batteries. ~~to~~ Changing batteries and resuming bullet recovery.

1100 Stopping for the morning. Counting bullets recovered for the day so far. 192 bullets/ammo scrap recovered so far today.

1105 Picking up rigging down till later. Techs off site to dispose of bullets collected so far and then off to lunch.

1110 P. Baker off site. Called us out, & secured gate.

Summary for the day: Almost completed 1st pass of floor area along the base of WB-2's old firing range berm. Still recording alot of hits even after first pass.

Total Bullets/scrap recovered for the day: 192

Total bullets/scrap recovered so far: 530

Goals for the future: Talk with Kyle Williams & or Troy Weaver about the possibility of just removing the rest of the old WB2 berm and scraping the berm floor adjacent. Still appears that there are a lot of bullets & scrap still to be recovered. In lieu of that will continue next week with ammo/scrap recovery.

P. Baker 11-21-19

Continued from page

Read and Understood By

P. Baker — 11-21-19
Signed — Date

Signed — 4/13/2020
Signed — Date

Weather: Cold mostly sunny 47° 12-12-2019

Objective for the day: Soil Removal of ammo fragments at WB2 Firing range. Try to limit as much as possible soil removal. Using metal detector to confirm scrap removal.

0845 Phillip Bolen on site. Facilities should be along shortly.

0915 Danny Hinojos & Mitch on site with Backhoe. Beginning grubbing.

0930 Tim Kontz & Al Mantez on site with 4 big super sacks. Unloaded first supersack.

0945 T. Kontz & A. Mantez off site. Beginning soil removal. Going 4-6 inches deep only. Scraping & scooping from south end in front to start.

1030 Filled 3 supersacks so far. Danny Hinojos off site to grab 2 more along with pallet. Having to go deeper to 6in. still getting some detections

1045 Danny Hinojos back at WB2 Firing range site. Set up 4th supersack and pallet to fill. May need the 5th also we shall see. Need to get with Brian Barcick for documentation. (will try at lunch).

1100 Danny Hinojos & M getting ready to head off site for lunch. Will complete soil removal after lunch.

1245 Back on site with Danny Hinojos & Mitch resuming soil removal. Need to make sure wrapped up for the day at ~~12~~ 1415 so we have time to clean Backhoe. 4 supersacks filled up so far.

1300 Soil recovery complete. Backhoe off site to clean pad at 637. Brian Barcick on site to look over activities. P. Bolen & B. Barcick sealed and tied off supersacks.

1345 Danny Hinojos & Mitch back on site to load supersacks for transport to CSU location for storage.

4 Logbooks. Contains #8717 ~1yd³
#9357 ~1yd³
#8716 ~1yd³
Need logbook from B. → #9358 ~1yd³
Barcick.

1410 Supersacks loaded onto flatbed transporting to CSU site. (4 sacks total)

1425 Supersacks unloaded at CSU site. D. Hinojos, M. , P. Bolen off site. Soil recovery is complete.

(Brian H 496-3748)

Continued from page

Read and Understood By

P. Bolen — Signed
12-12-19 — Date
Signed
4/13/2020 — Date

16

Notebook No. FR Book #2

PROJECT Firing Ranges

Continued from page

1-15-20

1253 Leather Clouds, Mild, nice day out!
P. Boden, Kyle Williams, Dave Burkett on site for bio survey of LB-2 Firing range.
1320 Survey of LB-2 complete. Off site to 200 Area.
1333 On site at 200 Area Firing range. Conducting bio survey.
*Note: Site photos needed for All Firing ranges?
1402 Finished at Area 200 Firing range. Headed off site.
1415 On site at STBT firing range site. Conducting bio-survey at the area.
1433 Finished at STBT area P. Boden, K. Williams, D. Burkett headed off site. Done for the day.

P. Boden 1-15-20

Continued from page

Read and Understood By

P. Boden
Signed

1-15-20
Date

Signed

4/13/2020
Date

PROJECT Firing Ranges

Notebook No. FR Book #2 17

Continued from page —

12:00- K. Williams contacts Alex Tupolus (WSTF photographer) to coordinate photos at each FR. Will take 4 at each, in the 4 cardinal directions from the center of each shown.

12:30- WB-2 photos.

12:35- Completed WB-2

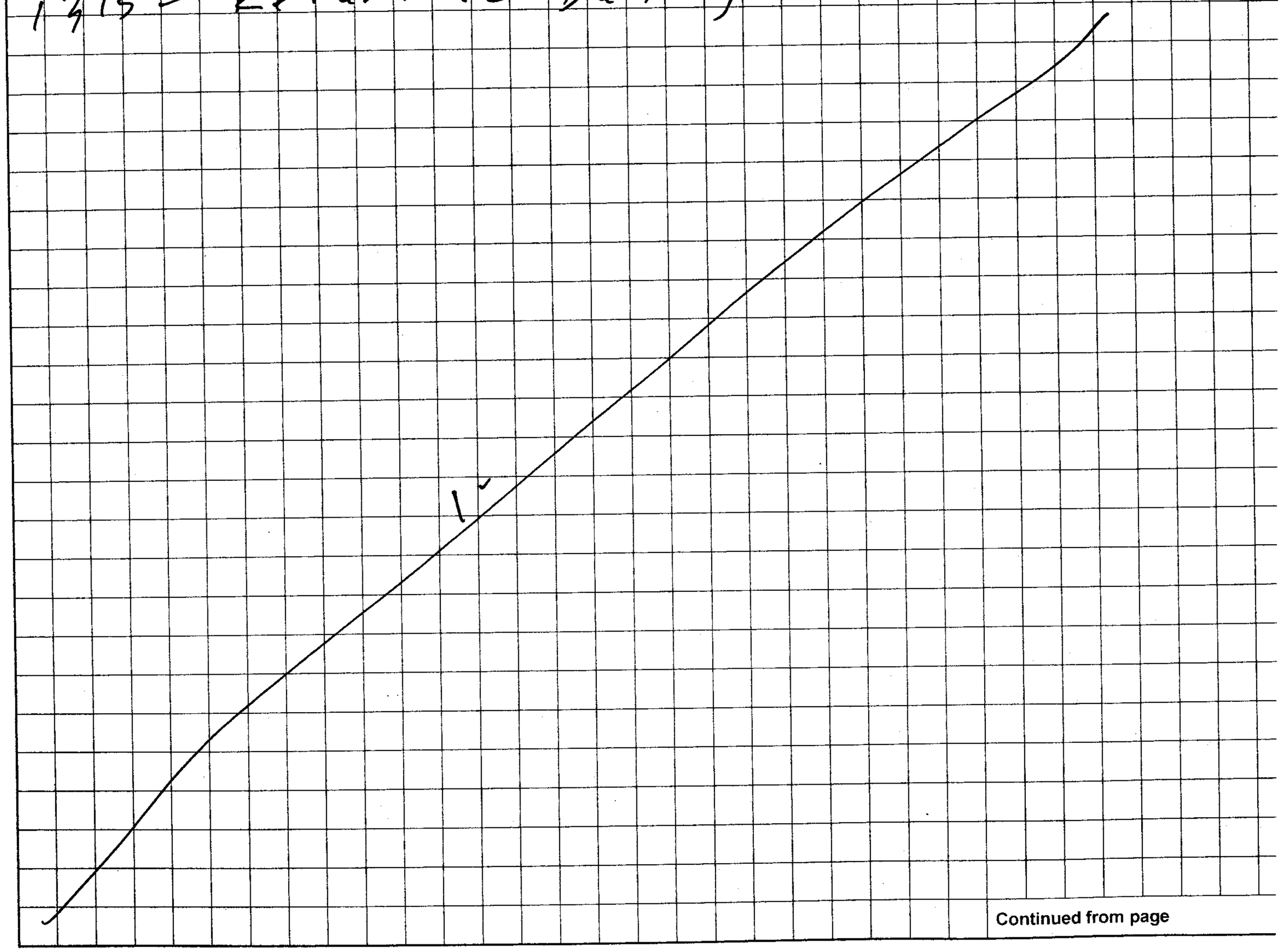
1245- 200 Area photos.

1250- completed 200 Area.

1255- STGT photos

1300- Completed STGT.

1315- Return to Building 601



Continued from page

Read and Understood By

K. Williams — 1-22-20

Signed — Date

P. Baker — 1-30-20

Signed — Date

18

PROJECT Firing Ranges

Notebook No. PR Book #2

Continued from page

Weather: Sunny, light clouds 58° 1-30-2020

Book 1-30

1350 Philip Boden on site at STGT Firing Range looking for disturbed
1315 rock pile that might have been scraped to use for road fill?

1330 Not really sure where it may have ended up. Looking around for it. Might need someone to show me where it is.

1338 Found it I believe big gravel and cobble used to level fill washout on Tacnab road. Going to check it over with Metal Detector to look for any anomalies.

1350 So far a couple of detector hits but all are trash and a bolt. Will finish out sweep of the road section.

1410 Sweep of filled washout section complete. Located 11 pieces of assorted junk such as bolts, wire, fencing brackets?, but no ammo scrap or casings.

1418 Found another spot further down where fill was used again. Going to scan this spot as well.

1436 Found 14 more pieces of fencing brackets?, bolts, can, wire. No ammo scrap or cartridges found. Almost finished with sweep of second fill section in road.

1441 Finished at second fill site. Going to head down road to make sure that was all the fill locations.

1445 Found a third site. Going to check and scan this filled section as well.

1455 Located another 12 pieces of assorted junk again, but no ammo scrap or cartridges.

1457 Going to head back in for the day. 3rd spot check completed.

P. Boden
1-30-2020

Continued from page

Read and Understood By

W. Boden — Signed
1-30-2020 — Date
Signed
4/23/2020 — Date

TECHNICIANS LB START

Notebook No. FRSS Book 1 # 1

PROJECT Firing Range Sampling WB-2

Continued from Page N/A

R. Burrows & F. Gallegos present. Collecting a composite of soil from each Cell, Decon equipment between Cell samples. Weather is cloudy & calm. *NOTE: we will be using 000 Numbers & Carboy G-5 in use.

Cell-#	Analysis	Preservative	Lot #	Lab	P-Prepared U-Unprepared
7 # 150827 0827	~~Metals 6010C~~ XRF	NONE	N/A	WSTF	U
150827 0829	"	"	"	"	P
#19-150827 0857	XRF	NONE	"	"	U
150827 0901	"		"	"	P
150827 0859	TOTAL metals by 6010C	"	"	HALL	U
# 20 - Cell			N/A		
150827 0935	XRF	NONE	"	WSTF	U
150827 0937	"	"	"	"	P
Cell # 8					
150827 0955	XRF	NONE	N/A	WSTF	U
150827 0959	"	"	"	"	P
150827 0957	Total Metals by 6010C	"	"	HALL	U
Cell # 9					
150827 1025	XRF	NONE	N/A	WSTF	U
150827 ~~1029~~ 1027	"	"	"	"	P
150827 ~~1029~~ 1029	Total Metals by 6010C	"	"	HALL	U
Cell # ~~21~~ 10 PSE 9.22.15		NONE			
150827 1333	XRF	"	N/A	WSTF	U
150827 1337	"	"	"	"	P
150827 1335	Total Metals by 6010C	"	"	HALL	U
Cell # 22					
150827 1301	XRF	NONE	N/A	WSTF	U
150827 1303	"	"	"	"	P
150827 1305	Total Metals by 6010C	"	"	HALL	U
Cell # ~~10~~ 21 PSE 9.22.15					
150827 1047	XRF	NONE	N/A	WSTF	U
150827 1049	"	"	"	"	P
150827 1047	Total Metals by 6010C	"	"	HALL	U
Cell # 23					
150827 1405	XRF	NONE	N/A	WSTF	U
150827 1409	"	"	"	"	P
150827 1407	Total Metals by 6010C	"	"	HALL	U

Continued on Page 2

Read and Understood By

Robert Burrows — Signed — 8-27-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

R. Burrows & E Gallegos present. Collecting a composite of soil from each cell. Decon equipment between cells sampling cells. Weather is clear & Calm. Will be using odd numbers for sampling ID. Carboy G-5 in use.

Cell # 11	**Preservative**	**Lot #**	**Lab**	**P- Prepared U- Unprepared**
150831 0815	XRF	N/A	WSTF	U
—— 0817	"	"	"	P
—— 0819	Total Metals by 6010C	"	Hall	U
Cell # 12				
150831 0841	XRF	N/A	WSTF	U
—— 0845	"	"	"	P
—— 0843	Total Metals by 6010C	"	Hall	U
Cell # 24				
150831 0857	XRF	N/A	WSTF	U
—— 0901	"	"	"	P
—— 0859	Total Metals by 6010C	"	Hall	U
Cell # 25				
150831 0921	XRF	N/A	WSTF	U
—— 0925	"	"	"	P
—— 0923	Total Metals by 6010C	"	Hall	U
Cell # 13				
150831 0945	XRF	N/A	WSTF	U
—— 0949	"	"	"	P
—— 0947	Total Metals by 6010C	"	Hall	U
Cell # 1				
150831 1011	XRF	N/A	WSTF	U
—— 1015	"	"	"	P
—— 1013	Total Metals by 6010C	"	Hall	U
Cell # 2				
150831 1033	XRF	N/A	WSTF	U
—— 1035	"	"	"	P
	~~Total Metals by 6010C~~ RB	~~"~~ RB	~~Hall~~ RB	~~U~~ RB
Cell # 14				
150831 1305	XRF	N/A	WSTF	U
—— 1309	"	"	"	P
—— 1307	Total Metals by 6010C	"	Hall	U

Continued on Page 3

Read and Understood By

Robert Burrows — Signed — 8-31-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

	Preservative	Lot #	Lab	P-prepared U-unprepared
Cell # 26				
150831 1331	XRF	N/A	WSTF	U
——— 1335	"	"	"	P
——— 1333	Total Metals by 6010C	"	Hall	U
Cell # 27				
150831 ~~1409~~ 1351	XRF	N/A	WSTF	U
——— ~~1413~~ 1355	"	"	"	P
——— ~~1411~~ 1353	Total Metal by 6010C	"	Hall	U
Cell # 15				
150831 1409	XRF	N/A	WSTF	U
——— 1413	"	"	"	P
——— 1411	Total Metals by 6010C	"	Hall	U
~~Cell # 9~~				

Continued on Page 4

Read and Understood By

Robert Bueno — Signed — 8-31-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Burrows & F. Gallegos present. Weather is Clear & Calm. Collecting a composite of soil from each cell. We Decon Equipment between cell after sampling. We will be using odd numbers for Sampling I.D. Carboy G-5 in use for Decon.

	Preservative	Lot #	Lab	p-prepared u-unprepared
Cell # 3				
150901 0735	XRF	N/A	WSTF	u
—— 0739	"	"	"	p
—— 0737	Total Metals by 6010C	"	Hall	u
Cell # 4				
150901 0751	XRF	N/A	WSTF	u
—— 0755	"	"	"	p
—— 0753	Total Metals by 6010C	"	HALL	u
Cell # 16				
150901 0809	XRF	N/A	WSTF	u
—— 0813	"	"	"	p
—— 0811	Total Metals by 6010C	"	HALL	u
Cell # 28				
150901 0831	XRF	N/A	WSTF	u
—— 0835	"	"	"	p
—— 0833	Total Metals by 6010C	"	Hall	u
Cell # 29				
150901 0847	XRF	N/A	WSTF	u
—— 0851	"	"	"	p
—— 0849	Total Metals by 6010C	"	HALL	u
Cell # 17				
150901 0915	XRF	N/A	WSTF	u
—— 0919	"	"	"	p
—— 0917	Total Metals by 6010C	"	Hall	u
Cell # 5				
150901 0931	XRF	N/A	WSTF	u
—— 0935	"	"	"	p
—— 0933	Total Metals by 6010C	"	HALL	u
Cell # 6				
150901 0951	XRF	N/A	WSTF	u
—— 0953	"	"	"	p

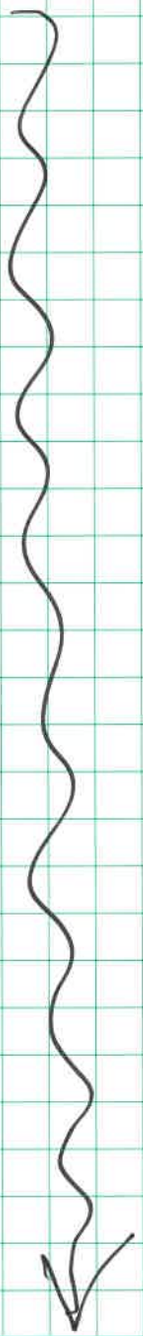
Continued on Page 5

Read and Understood By

Robert Burrows — Signed — 09-01-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

Cell # 18	Preservative	Lot #	Lab	P- prepared U- unprepared
150901/1007	XRF	N/A	WSTF	U
—— 1011	"	"	"	P
—— 1009	Total Metals by 6010C	"	Hall	U
Cell # 30				
150901/1025	XRF	N/A	WSTF	U
—— 1029	"	"	"	P
—— 1027	Total Metals by 6010C	"	Hall	U



Continued on Page ——

Read and Understood By

Robert Burrows — Signed — 09-01-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

PROJECT Firing Range Sampling 200 Area

Notebook No. FRSS Book #1

Continued from Page N/A

R. Burrows & Frank Gallegos present. Weather is Cloudy & Calm. Collecting a composite of soil from each cell. We will Decon Equipment between cell after sampling. We will be using odd numbers for Sampling ID. Carboy G-5 in use for Decon.

Cell #1	Preservative	Lot#	Lab	P-prepared U-unprepared
150904 0815	XRF	N/A	WSTF	U
—— 0819	"	"	"	P
—— 0817	Total Metals by 6010C	"	HALL	U
Cell #2				
150904 0835	XRF	N/A	WSTF	U
—— 0839	"	"	"	P
—— 0837	Total Metal by 6010C	"	HALL	U

Continued on Page N/A

Read and Understood By

Robert Burrows — Signed — 9-4-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Burrows & F. Gallegos present. Weather is windy & warm & cloudy. Collecting a composite of soil from each cell. We will Decon Equipment between cell after sampling. We will be using odd numbers for Sampling I.D. Carboy C-5 in use for Decon. Continue on 9-15-15.

	Preservative	Lot #	Lab	P- prepared U- unprepared
Cell # 6				
150914 1441	XRF	N/A	WSTF	U
——— 1445	"	"	"	P
——— 1443	Total metals by 6010C	"	Hall	U
Cell # 5				
150914 1518	XRF	N/A	WSTF	U
——— 1519	"	"	"	P
——— 1517	Total metals by 6010C	"	Hall	U
Cell # 11				
150915 0819	XRF	N/A	WSTF	U
——— 0821	"	"	"	P
Cell # 12				
150915 0841	XRF	N/A	WSTF	U
——— 0845	"	"	"	P
——— 0843	Total metals by 6010C	"	HALL	U
Cell # 18				
150915 0903	XRF	N/A	WSTF	U
——— 0907	"	"	"	P
——— 0905	Total metals by 6010C	"	HALL	U
Cell # 19				
150915 0945	XRF	N/A	WSTF	U
——— 0949	"	"	"	P
——— 0947	TOTAL metals by 6010C	"	HALL	U
Cell # 20				
150915 1043	XRF	N/A	WSTF	U
——— 1047	"	"	"	P
——— 1045	Total Metals by 6010C	"	Hall	U
Cell # 21				
150915 1107	XRF	N/A	WSTF	U
——— 1111	"	"	"	P
——— 1109	Total metals by 6010C	"	Hall	U

These 2 sampling events are from 9.14.2015 — Pamela Egan 9.22.15

Continued on Page 8

Read and Understood By

Robert Burrows — Signed — 9-15-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

PROJECT Firing Range Sampling STGT

Notebook No. FRSS Book 1#

Continued from Page 7

	Preservative	Lot #	Lab	P- prepared U- UN prepared
Cell # 17				
150915 1343	XRF	N/A	WSTF	U
—— 1347	"	"	"	P
—— 1345	Total metals by 6010C	"	Hall	U
Cell # 16				
150915 1405	XRF	N/A	WSTF	U
—— 1409	"	"	"	P
—— 1409	Total metals by 6010C	"	Hall	U
Cell # 10				
150915 1433	XRF	N/A	WSTF	U
—— 1437	"	"	"	P
—— 1435	Total metals by 6010C	"	Hall	U

Continued on Page —

Read and Understood By

Robert Burrows — Signed — 9-15-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Barrows & E. Gallegos present. Weather is Breezy & Warm & cloudy, Collecting a composite of soil from each cell. We will Decon Equipment between cell after Sampling. We will be using odd numbers for Sampling ID, Carboy G-J in use for Decon.

	Preservative	Lot #	Lab	P- prepared U- unprepared
Cell # 4				
150916 0915	XRF	N/A	WSTF	U
—— 0917	"	"	"	P
—— 0917	Total Metals by 6010C	"	Halls	U
Cell # 3				
150916 0933	XRF	N/A	WSTF	U
—— 0937	"	"	"	P
—— 0935	Total Metals by 6010C	"	Hall	U
Cell # 9				
150916 0953	XRF	N/A	WSTF	U
—— 0957	"	"	"	P
—— 0955	Total Metals by 6010C	"	Hall	U
Cell 15 #				
150916 1013	XRF	N/A	WSTF	U
—— 1017	"	"	"	P
—— 1015	Total Metals by 6010C	"	Hall	U
Cell # 14				
150916 1033	XRF	N/A	WSTF	U
—— 1037	"	"	"	P
—— 1035	Total Metals by 6010C	"	Hall	U
Cell # 8				
150916 1339	XRF	N/A	WSTF	U
—— 1343	"	"	"	P
—— 1341	Total Metals by 6010C	"	Hall	U
Cell # 2				
150916 1357	XRF	N/A	WSTF	U
—— ~~1401~~ 1359	"	"	"	P
—— ~~1403~~	~~Total Metals by 6010C~~ RB	— RB	~~Hall~~ RB	~~—~~ RB
Cell # 1				
150916 1421	XRF	N/A	WSTF	U
—— 1425	"	"	"	P
—— 1423	Total Metals by 6010C	"	HALL	U

Continued on Page 10

Read and Understood By

Robert Barrows — Signed — 9-16-15 Date

Pamela Egan — Signed — 9.22.15 Date

Cell # 7	Preservative	Lot #	Lab	P- prepared U- unprepared
150916 1443	XRF	N/A	WSTF	U
— 1445	"	"	"	P
~~Cell # 13~~				
RB	XRF	N/A	~~WSTF~~	U
	"	"	"	P
	Total Metals by 6010C	"	Hall	

Continued on Page 11

Read and Understood By

Robert Burrows — Signed — 9-16-15 Date

Pamela Egan — Signed — 9.22.15 Date

R. Burrows & F. Gallegos present, weather is clear & Breezy & warm. Collecting a composite of soil from each cell, we will Decon Equipment between cells After sampling. We will be using odd numbers for Sampling I.D. Carboy G-5 in use for Decon.

Cell #13	Preservative	Lot #	Lab	P-prepared U-unprepared
150917 0819	XRF	N/A	WSTF	U
[redacted] 0823	"	"	"	P
[redacted] 0821	Total Metals by GOLDC	"	HALL	U

Continued on Page —

Read and Understood By

Robert Burrows — Signed — 9-17-15 — Date

Pamela Egan — Signed — 9.22.15 — Date

K. Burrows & M Gaeta present. Collecting a composite of soil from each cell. We will Decon Equipment between Cell samples. Weather is Clear and breezy. Carboy 6-4 in use.

Sample #	Analysis	Rinsate Preservative	Container	Lot #	Lab
161115 0910	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	H&LL

Cell # / Sample #	Analysis	Sample Preservative	Container	Lot #	Lab
161115 0921 (#72)	Total Metals 6010C	ICE	(1) Clear 4oz jar	01250015	H&LL
(#71) 161115 0948	" "	" "	(1) "	" "	" "
(#70) 161115 0959	" "	" "	(1) "	" "	" "
(#69) 161115 1006	" "	" "	(1) "	" "	" "
(#68) 161115 1013	" "	" "	(1) "	" "	" "
(#67) 161115 1020	" "	" "	(1) "	" "	" "
(#66) 161115 1028	" "	" "	(1) "	" "	" "
(#65) 161115 1034	" "	" "	(1) "	" "	" "
(#64) 161115 1041	" "	" "	(1) "	" "	" "
(#63) 161115 1048	" "	" "	(1) "	" "	" "
(Dup) 161115 1049	" "	" "			
(#62) 161115 1056	" "	" "	(1) "	" "	" "
(#61) 161115 1328	" "	" "	(1) "	" "	" "
(#60) 161115 1335	" "	" "	(1) "	" "	" "
(#59) 161115 1343	" "	" "	(1) "	" "	" "

Continued on Page 13

Read and Understood By

Robert Burrows
Signed

11-16-16
Date

Signed

11/17/16
Date

PROJECT Firing Range WB-2

Notebook No. FRSS Book 1# 13

Continued from Page 12

Samples					
Cell#/Sample#	Analysis	Preservative	Container	Lot#	Lab
(58) 161115 1352	Total Metals 6010C 6020A	ICE	(1) Clear 4oz jar	01250015	HALL
(57) 161115 1407	" "	" "	" "	" "	" "
(56) 161115 1412	" "	" "	" "	" "	" "
(55) 161115 1416	" "	" "	" "	" "	" "
(54) 161115 1421	" "	" "	" "	" "	" "
(53) 161115 1427	" "	" "	" "	" "	" "
#Dup) 161115 1428					
(47) 161115 1438	" "	" "	" "	" "	" "
#MS) 161115 1439					
(46) 161116 00756	" "	" "	" "	" "	" "
(45) 161116 00802	" "	" "	" "	" "	" "
(44) 161116 00808	" "	" "	" "	" "	" "
(43) 161116 00814	" "	" "	" "	" "	" "
(42) 161116 00823	" "	" "	" "	" "	" "
(41) 161116 00832	" "	" "	" "	" "	" "
(40) 161116 00841	" "	" "	" "	" "	" "
(39) 161116 00854	" "	" "	" "	" "	" "
(38) 161116 00905	" "	" "	" "	" "	" "
(37) 161116 00913	" "	" "	" "	" "	" "
(Dup) 161116 00914					

Continued on Page 14

Read and Understood By

Robert Burnett — Signed — 11-16-16 — Date

Jeff [illegible] — Signed — 11/17/16 — Date

PROJECT Firing Range WB-2

Notebook No. FRSS Book 1 #

Continued from Page 13

Samples

Cell#/Sample#	Analysis	Preservative	Container	Lot#	Lab
(32) 161116 0921	Total Metals 6010C 6020A	ICE	(1) Clear 4oz Jar	01250045	Hall
(35) 161116 0928	" "	" "	(1) " "	" "	" "
(34) 161116 0937	" "	" "	(1) " "	" "	" "
(33) 161116 0947	" "	" "	(1) " "	" "	" "
(32) 161116 0954	" "	" "	(1) " "	" "	" "
(Dup) 161116 0955					
(31) 161116 1002	" "	" "	(1) " "	" "	" "
(MS) 161116 1003					

* R. Burrows & M. Gordon Resumed Sampling 11-16-16 IDW - 5 gal.

Rinsate

Sample#	Analysis	Preservative	Containers	Lot#	Lab
161116 0747	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	Hall

Continued on Page —

Read and Understood By

Robert Burrows — Signed — 11-16-16 Date

Signed — 11/17/16 Date

R. Burrows & Giles, Jeff present, Weather is cloudy & Cool. Collecting a composite of Soil from each cell in fallout areas, We will Decon Equipment prior to Samples. Carboy G-4 in use. Washed equipment with Alconox.

Sample #	Analysis	Rinsate Preservative	Container	Lot #	Lab
170103090 4	Total Metals 6010C	HNO3 / ICE	(1) 500 ml poly	N/A	Hall

(Cell #) / Sample #	Analysis	Sample Preservative	Container	Lot #	Lab
(3#) 170103092 5	Total Metals 6010C	ICE	(1) Clear 4oz jar	0125 0015	HALL
(4#) 170103093 8	"	"	(1) "	"	"
(5#) 170103095 2	"	"	(1) "	"	"
(6#) 170103101 7	"	"	(1) "	"	"
(7#) 170103104 4	"	"	(1) "	"	"
(8#) 170103130 5	"	"	(1) "	"	"
(9#) 170103131 7	"	"	(1) "	"	"
(10#) 170103132 8	"	"	(1) "	"	"
(11#) 170103134 1	"	"	(1) "	"	"
(12#) 170103140 5	"	"	(1) "	"	"
Dup) 170103140 7	"	"	(1) "	"	"
(13#) 170103142 3	"	"	(1) "	"	"
(14#) 170103144 0	"	"	(1) "	"	"

Continued on Page N/A

Read and Understood By

Robert Burrows — Signed — 1-3-17 Date

Signed — 1/6/17 Date

R. Burrows & G. Giles present. Weather is cloudy and cold. Collecting a composite of soil from each Cell in fallout areas, we will decon Equipment prior to Sampling. Carboy G-4 in use.

Sample #	Analysis	Rinsate Preservative	Container	Lot #	Lab
170104 0759	Total Metal 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

(Cell #)/Sample #	Analysis	Samples Preservative	Container	Lot #	Lab
(15#) 170104 0811	Total Metals 6010C	ICE	(1) 4oz clear Jar	01250015	HALL
(16#) 170104 0831	"	"	(1) "	"	"
(17#) 170104 0853	"	"	(1) "	"	"
(18#) 170104 0904	"	"	(1) "	"	"
(19#) 170104 0918	"	"	(1) "	"	"
(20#) 170104 0928	"	"	(1) "	"	"
(21#) 170104 0940	"	"	(1) "	"	"
(22#) 170104 0953	"	"	(1) "	"	"
(Dup) 170104 0954	"	"	(1) "	"	"
(23#) 170104 1008	"	"	(1) "	"	"
(MS) 170104 1009	"	"	(1) "	"	"
(24#) 170104 1022	"	"	(1) "	"	"
(25#) 170104 1301	"	"	(1) "	"	"
(26#) 170104 1313	"	"	(1) "	"	"
(27#) 170104 1327	"	"	(1) "	"	"

Continued on Page 17

Read and Understood By

Robert Burrows — Signed
1-4-17 — Date
Signed
1/6/17 — Date

Samples

(Cell #) / Sample #	Analysis	Preservative	Container	Lot #	Lab
(28#) 170104/343	Total Metals 6010C	ICE	(1) 4oz clear JAR	0125 0015	HALL
(29#) 170104 1401	" "	" "	(1) " "	" "	" "

Rinsate

Sample #	Analysis	Preservative	Container	Lot #	Lab
170105 0736	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

Samples

(Cell #) / Sample #	Analysis	Preservative	Container	Lot #	Lab
(30#) 170105 0801	Total Metals 6010C	ICE	(1) 4oz clear JAR	0125 0015	HALL
(31#) 170105 0810	" "	" "	(1) " "	" "	" "
(32#) 170105 0821	" "	" "	(1) " "	" "	" "
(Dup) 170105 0822	" "	" "	(1) " "	" "	" "
(33#) 170105 0834	" "	" "	(1) " "	" "	" "
(34#) 170105 0845	" "	" "	(1) " "	" "	" "
(35#) 170105 0858	" "	" "	(1) " "	" "	" "
(36#) 170105 0908	" "	" "	(1) " "	" "	" "
(37#) 170105 0919	" "	" "	(1) " "	" "	" "
(38#) 170105 0936	" "	" "	(1) " "	" "	" "
(39#) 170105 0955	" "	" "	(1) " "	" "	" "
(40#) 170105 1010	" "	" "	(1) " "	" "	" "
(41#) 170105 1340	" "	" "	(1) " "	" "	" "

Continued on Page 18

Read and Understood By

Robert Burrows — Signed — 1-5-17 — Date

Signed — 1/6/17 — Date

Samples

(cell #)/Sample #	Analysis	Preservative	Container	Lot #	Lab
(42#) 170105 1353	Total Metals 6010C	ICE	(1) 4oz clear JAR	0125 0015	Hall
(Dup) 170105 1354	" "	" "	(1) " "	" "	" "
(43#) 170105 1409	" "	" "	(1) " "	" "	" "
(MS) 170105 1410	" "	" "	(1) " "	" "	" "
(44#) 170105 1426	" "	" "	(1) " "	" "	" "

Continued on Page N/A

Read and Understood By

Robert Burnard — Signed — 1-5-17 — Date

Signed — 1/6/17 — Date

R. Burrows & G. Giles present. Weather is cloudy and cold. Collecting a composite of soil from each Cell in fallout area. We will decon Equipment prior to Sampling Carboy - G-5 in use.

RINSATE

Sample #	Analysis	Preservative	Container	Lot #	Lab
170117 0834	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

SAMPLES

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
(22#) 170117 0908	Total Metals 6010C	ICE	(1) 4oz clear Jar	082216BNS	HALL
(23#) 170117 0921	"	"	(1) "	"	"
(24#) 170117 0937	"	"	(1) "	"	"
(25#) 170117 0949	"	"	(1) "	"	"
(26#) 170117 1002	"	"	(1) "	"	"
(27#) 170117 1040	"	"	(1) "	"	"
(28#) 170117 1057	"	"	(1) "	"	"
(29#) 170117 1310	"	"	(1) "	"	"
(30#) 170117 1322	"	"	(1) "	"	"
(31#) 170117 1342	"	"	(1) "	"	"
(32#) 170117 1400	"	"	(1) "	"	"

RINSATE

Sample #	Analysis	Preservative	Container	Lot #	Lab
170118 0805	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	N/A	HALL

Continued on Page 20

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Robert Burrows — Signed — 1-18-17 Date

Signed — 2/9/17 Date

R. Burrows & G. Giles continue on 1-18-17

Samples

Cell #/Sample #	Analysis	Preservative	Container	Lot #	Lab
(33#) 170118 0819	Total Metals 6010C	ICE	(1) 4oz Clear Jar	082216IBWS	HALL
(Dup) 170118 0820	" "	" "	(1) " "	" "	" "
(34#) 170118 0837	" "	" "	(1) " "	" "	" "
(35#) 170118 0937	" "	" "	(1) " "	" "	" "
(36#) 170118 0953	" "	" "	(1) " "	" "	" "
(37#) 170118 1008	" "	" "	(1) " "	" "	" "
(38#) 170118 1028	" "	" "	(1) " "	" "	" "
(39#) 170118 1330	" "	" "	(1) " "	" "	" "
(40#) 170118 1349	" "	" "	(1) " "	" "	" "
(41#) 170118 1407	" "	" "	(1) " "	" "	" "
(Dup) 170118 1408	" "	" "	(1) " "	" "	" "
(42#) 170118 1428	" "	" "	(1) " "	" "	" "
(MS) 170118 1429	" "	" "	(1) " "	" "	" "

R. Burrows & G. Giles continue Sampling 1-19-17

Rinsate

Sample #	Analysis	Preservative	Container	Lot #	Lab
170119 0800	Total Metals 6010C	HNO3 / ICE	(1) 500 ml poly	N/A	HALL

Samples

Cell #/Sample #	Analysis	Preservative	Container	Lot #	Lab
(43#) 170119 0827	Total Metals 6010C	ICE	(1) 4oz Clear Jar	082216IBWS	HALL

Continued on Page 21

Read and Understood By

Robert Burrows — Signed — 1-19-17 — Date

[signature] — Signed — 2/9/17 — Date

Samples

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
(44#) 1701190849	Total Metals 6010C	ICE	(1) 4oz clear JAR	0822161BNS	HALL
(45#) 1701190903	"	"	(1) "	"	"
(46#) 1701190921	"	"	(1) "	"	"
(47#) 1701190940	"	"	(1) "	"	"
(48#) 1701190957	"	"	(1) "	"	"
(49#) 1701191019	"	"	(1) "	"	"
(50#) 1701191035	"	"	(1) "	"	"
(51#) 1701191335	"	"	(1) "	"	"
(Dup) 1701191336	"	"	(1) "	"	"
(52#) 1701191350	"	"	(1) "	"	"
(53#) 1701191415	"	"	(1) "	"	"
(54#) 1701191428	"	"	(1) "	"	"
(55#) 1701191441	"	"	(1) "	"	"

R. Burrows & G. Giles continue to Sample 1-2017

Rinsate

Sample #	Analysis	Preservative	Container	Lot #	Lab
1701200730	Total Metals 6010C	HNO3/ICE	(1) 500 ml poly	n/a	HALL

Samples

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
(56#) 1701200745	Total Metals 6010C	ICE	(1) 4oz clear JAR	0822161BNS	HALL

Continued on Page 22

Read and Understood By

Robert Burrows — Signed — 1-2017 — Date

Signed — 2/9/17 — Date

22

PROJECT Firing Range SIGT Fallout Soil Sampling

Notebook No. FRSS Book #1

Continued from Page 21

Cell # / Sample #	Analysis	Preservative	Container	Lot #	Lab
		Samples			
(57#) 170120 0758	Total Metals 6010C	ICE	(1) 4oz JAR Clear	0822616BNS	Hall
(58#) 170120 0817	" "	" "	(1) " "	" "	" "
(59#) 170120 0827	" "	" "	(1) " "	" "	" "
(60#) 170120 0836	" "	" "	(1) " "	" "	" "
(61#) 170120 0849	" "	" "	(1) " "	" "	" "
(62#) 170120 0925	" "	" "	(1) " "	" "	" "
(63#) 170120 0939	" "	" "	(1) " "	" "	" "
(Dup) 170120 0940	" "	" "	(1) " "	" "	" "
(64#) 170120 0958	" "	" "	(1) " "	" "	" "
(MS) 170120 0959	" "	" "	(1) " "	" "	" "
(65#) 170120 1019	" "	" "	(1) " "	" "	" "

(EB)

Continued on Page n/a

Read and Understood By

Robert Burns — Signed — 1-20-17 — Date

Signed — 2/9/17 — Date

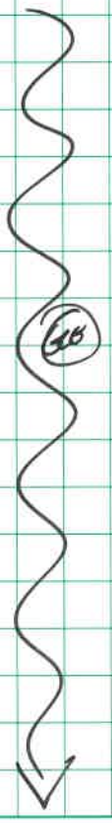
T Kenney + A Montes present. Weather is cool and windy.

Samples Rinsate

	Sample#	Analysis	Preserv	Cont	Lot#	Lab
(Rinsate)	1702070900	Total Metals 6010C	Ice, HNO_3	(1) 500 ml poly		#42C

Soil

(B1)	1702070950	Total Metals 6010C	Ice	(1) 4 oz Jar	012600 IB	#42C
(B2)	0951	"	"	"	"	"
(B3)	0952	"	"	"	"	"
(B4)	0954	"	"	"	"	"
(B5)	0956	"	"	"	"	"
(B6)	0957	"	"	"	"	"
(B7)	0958	"	"	"	"	"
(B8)	0959	"	"	"	"	"
(B9)	1000	"	"	"	"	"
(B10)	1001	"	"	"	"	"
(B3)	0953	(Dupl)	"	"	"	"
(B4)	0955	(MS)	"	"	"	"



Continued on Page —

Read and Understood By

T Kenney — Signed — 2-7-17 Date

Signed — 2/9/17 Date

24

PROJECT Firing Range STGT

TECHNICIANS LB STOP

Notebook No. FRSS # 1

Continued from Page —

T. Konoy + A Montes present. Weather is cool and cloudy.

Rinsate

Soil

Sample #	Analysis	Preserv	Cont.	Lot #	Lab
1703010745	Total Metals 6010C	Ice, HNO_3	(1) 500 ml poly	062016-244W	HALL
B1) 1703010840	"	Ice	(1) 4 oz JAR	012600138	"
B2) 0842	"	"	"	"	"
B3) 0844	"	"	"	"	"
B4) 0846	"	"	"	"	"
B5) 0848	"	"	"	"	"
B6) 0850	"	"	"	"	"
B7) 0852	"	"	"	"	"
B7) 0854	" (Dupl)	"	"	"	"
B8) 0900	"	"	"	"	"
B8) 0902	" (Dupl)	"	"	"	"
B9) 0904	"	"	"	"	"
B10) 0906	"	"	"	"	"
B11) 0908	"	"	"	"	"
B12) 0910	"	"	"	"	"
B13) 0912	"	"	"	"	"
B14) 0914	"	"	"	"	"
B15) 0944	"	"	"	"	"
B16) 0946	"	"	"	"	"
B17) 0948	"	"	"	"	"
B18) 0950	"	"	"	"	"
B18) 0952	" (Dupl)	"	"	"	"
B19) 0954	"	"	"	"	"
B19) 0956	" (MS)	"	"	"	"
B20) 0958	"	"	"	"	"
B21) 1000	"	"	"	"	"
B22) 1002	"	"	"	"	"
B22) 1004	" (MS)	"	"	"	"
B23) 1006	"	"	"	"	"
B24) 1008	"	"	"	"	"
B25) 1010	"	"	"	"	"
B26) 1012	"	"	"	"	"
B27) 1014	"	"	"	"	"
B28) 1016	"	"	"	"	"

Continued on Page —

Read and Understood By

T. Konoy
Signed

3-1-2017
Date

Signed

3/1/17
Date

Tim Kondy + ~~Marcos Avalos~~ ~~Al Montes~~ present. Weather is warm and clear. Rinsate taken from a deconed Auger, Samples taken From a deconed Auger.

Rinsate

Sample #	Analysis	Preserv	cont.	Lab
190917 0645	Total Metals 6010c	Ice, HNO3	(1) 125 ml poly	ALS

Soil

5.3) 190917 0755	"	Ice	(1) 4 oz JAR	"
6.1) 190917 0805	"	"	"	"
12.4) — 0810	"	"	"	"
18.2) — 0815	"	"	"	"
19.4) — 0820	"	"	"	"
20.2) — 0830	"	"	"	"
21.3) — 0835	"	"	"	"
6.1) — 0840	"	"	"	"
5.1) — 0850	"	"	"	"
11.1) — 0855	"	"	"	"
—	"	"	"	"

83) 190917 0940	Total Metals	Ice	(1) 4 oz JAR	ALS
~~FR~~ 5.1 — 0945	"	"	"	"
~~FR~~ 11.5 — 0950	"	"	"	"
~~FR~~ 17.1 — 0955	"	"	"	"
19.4) — 1000	"	"	"	"
20.2) — 1010	"	"	"	"
21.3) — 1015	"	"	"	"
6.1) — 1100	"	"	"	"
12.4) — 1105	"	"	"	"
18.2) — 1110	"	"	"	"

Rinsate

190918 0645	"	Ice, HNO3	(1) 125 ml poly	"

Continued on Page

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T. Kondy — Signed — 9-18-19 — Date

P. Bak — Signed — 11-19-19 — Date

Soil STGT

#	Sample	Analysis	Preserv	Cont
(1.2)	190918 0735 (FB)	Total Metals	Ice	(1) 4 oz HDPE
(1.2)	— 0745	"	"	"
(1.)	— 0746 (Dupl)	"	"	"
(7.4)	— 0800	"	"	"
(13.3)	— 0805	"	"	"
(2.3)	— 0815	"	"	"
(8.1)	— 0820	"	"	"
(14.2)	— 0830	"	"	"
(14.2)	— 0831 (Dupl)	"	"	"
(3.3)	— 0835	"	"	"
(15.4)	— 0845	"	"	"
(15.4)	— 0846 (MS)	"	"	"
(15.4)	— 0847 (FB)	"	"	"
(4.2)	— 0850	"	"	"
(10.4)	— 0855	"	"	"
(16.1)	— 0900	"	"	"
(37.1)	— 0930	"	"	"
(36.2)	— 0935	"	"	"
(35.3)	— 0945 (Dupl)	"	"	"
(35.3)	— 0946 (Dupl)	"	"	"
(34.2)	— 0950	"	"	"
(33.1)	— 1000	"	"	"
(33.1)	— 1001 (MS)	"	"	"
(33.1)	— 1002 (FB)	"	"	"
(32.3)	— 1010	"	"	"
(31.3)	— 1020	"	"	"
(25.3)	— 1030	"	"	"
(26.4)	— 1035	"	"	"
(27.1)	— 1045	"	"	"
(27.1)	— 1046 (Dupl)	"	"	"
(28.1)	— 1055	"	"	"

Continued on Page

Read and Understood By

Signed — Date 9-18-19 — Signed — Date 11-19-

Tim Kondy, MATT GARCIA, Kyle WILLIAMS, & Tony TOFFER. THE WEATHER IS OVERCAST & COOL. SAMPLES COLLECTED WITH A DECONED AUGER

RINSATE

SAMPLE #	ANALYSIS	PRESERV	LOT#	CONT	LAB
190924 1245	TOTAL METALS 6010C	ICE/HNO3		(1) 125ml poly	ALS

SOIL SAMPLES

SAMPLE#	ANALYSIS	PRESERV	LOT#	CONT	LAB
190924 1305 (22.1)	TOTAL METALS	ICE	0722A-15R	(1) 4oz JAR	ALS
190924 1315 (23.4)	"	"	"	"	"
1322 (24.2)	"	"	"	"	"
1327 (29.4)	"	"	"	"	"
1332 (30.4)	"	"	"	"	"
1333 (30.4) (FB)	"	"	"	"	"
1340 (43.2)	"	"	"	"	"
1341 (43.2) (MS)	"	"	"	"	"
1346 (42.4)	"	"	"	"	"
1351 (41.1)	"	"	"	"	"
1355 (40.1) ~~(Dup)~~	"	"	"	"	"
1356 (40.1) (Dup)	"	"	"	"	"
1405 (39.1)	"	"	"	"	"
1415 (44.4)	"	"	"	"	"
1421 (45.4)	"	"	"	"	"
1430 (46.1)	"	"	"	"	"
1435 (47.4)	"	"	"	"	"
1440 (48.1)	"	"	"	"	"
1441 (48.1) (FB)	"	"	"	"	"
1445 (53.3)	"	"	"	"	"
1450 (52.3)	"	"	"	"	"
1451 (52.3) ~~(MS) (Dup)~~ (Dup)	"	"	"	"	"

Continued on Page

Read and Understood By

Signed — Date: 9-24-19

Signed — Date: 9-24-19

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PROJECT FR - 9TGT

Notebook No. FR 9S #1
Continued from Page

T. Kondy A Montes present... Weather is Hot and Sunn
Samples collected with a decond Auger.

RinSate

Sample #	Analytes	Preserv	Cont.	Lab
190926 0700	Total Metals	Ice, HNO_3	(1) 125-mlp-cly	ACE

Soil Samples

			Total Metals	Ice	(1) 4 oz JAR	A
(58.3)	190926	0840	"	"	"	"
(52.1)	—	0847	"	"	"	
(56.4)	—	0852	"	"	"	
(55.4)	—	0858	"	"	"	
(54.3)	—	0904	"	"	"	
(49.3)	—	0911	"	"	"	
(50.3)	—	0918	"	"	"	
(51.1)	—	0924	"	"	"	
(65-1)	—	0944	"	"	"	
(65-1)	—	0945	(MS) "	"	"	
(64.2)	—	0951	"	"	"	
(64.2)	—	0952	(Dup) "	"	"	
(64.2)	—	0953	(FB) "	"	"	
(63.3)	—	1000	"	"	"	
(62.1)	—	1007	"	"	"	

Continued on Page

Read and Understood By

T. Kondy — Signed
9-26-2019 — Date
P. Bahn — Signed
11-14 — D

T. Kondy + A. Montes present. Weather is clear, sunny, hot and breezy. Samples taken with a decon'd Auger.

Sample #			Analysis	Preserv	Cont.	Lab
	19092613 00		Rinsate Total Metals	Ice, HNO_3	(1) 125 ml poly	ALS
			Soil			
(3)	19092613 42		Total Metals	Ice	(1) 4 oz JAR	ALS
(3)	— 1346		"	"	"	"
(4)	— 1350		"	"	"	"
(1)	— 1356		"	"	"	"
(2)	— 1402		"	"	"	"
(0.3)	— 1410		"	"	"	"
(1.1)	— 1415		"	"	"	"
(7.1)	— 1420		"	"	"	"
(8.3)	— 1425		"	"	"	"
(9.4)	— 1435		"	"	"	"
(9.4)	— 1436	(Dup)	"	"	"	"
(9.4)	— 1437	(FB)	"	"	"	"

9-27-19 T. KONDY + T. TORRES PRESENT

			Analysis	Preserv	Cont.	Lab
	19092708 30		Rinsate Total Metals	Ice, HNO_3	(1) 125 ml poly	ALS
			Soil			
(3)	19092708 05		"	Ice	(1) 4 oz JAR	ALS
(1.2)	— 0812		"	"	"	"
(2.3)	— 0818		"	"	"	"
(3.4)	— 0823		"	"	"	"
(4.1)	— 0830		"	"	"	"
(5.3)	— 0838		"	"	"	"
(6.2)	— 0846		"	"	"	"
(7.2)	— 0855		"	"	"	"
(0.2)	— 0915		"	"	"	"
(1.1)	— 0922		"	"	"	"
"	— 0923	Dup	"	"	"	"
"	— 0924	(MS)	"	"	"	"
"	— 0925	(FB)	"	"	"	"

Continued on Page

Read and Understood By

T. Kondy — Signed

9-27-19 — Date

T. Bahr — Signed

11-19-19 — Date

FR-200 Soil

Sample #		Analysis	Preserv	COA
(22.1)	1909270932	Total Metals	Ice	(1) 4 oz JAR
(23.3)	— 0938	"	"	"
(1.3)	— 0945	"	"	"
(2.1)	— 0951	"	"	"
(24.4)	— 1000	"	"	"
(25.2)	— 1006	"	"	"
(26.3)	— 1015	"	"	"
(27.4)	— 1024	"	"	"
"	— 1025 (Dup)			
"	— 1026 (FB)			

9-30-19 Tr. Kondy + M. Aquas present

		Rinsate		
	1909300700	Total Metals	Ice, HNO3	(1) 125 ml poly

		Soil		
(41.3)	1909300840	Total Metals	Ice	(1) 4 oz JAR
(42.4)	— 0855	"	"	"
(43.1)	— 0906	"	"	"
(44.1)	— 0918	"	"	"
(40.2)	— 0932	"	"	"
(39.1)	— 0949	"	"	"
(38.1)	— 1013	"	"	"
(28.3)	— 1024	"	"	"
(29.2)	— 1040	"	"	"
"	— 1041 (MS)	"	"	"
16.3	— 1054	"	"	"
"	— ~~1056 (Dup)~~ 55 (Dup) 10-1-19	"	"	"
"	← ~~1057 (FB)~~ 56 (FB)	"	"	"
15.2	— 1315	"	"	"
7.1	— 1325	"	"	"
6.4	— 1333	"	"	"
14.1	— 1340	"	"	"
13.3	— 1347	"	"	"
12.2	— 1355	"	"	"

Continued on Page

Read and Understood By

T. Kondy — Signed — 9-30-2019 — Date

R. Bahr — Signed — 10-1-19 — Date

T. Kondy + M. Wales present. Weather is cool and cloudy. Samples taken with a decanal dipper

Rinsate

Sample #	Analysis	Preserv	cont.	Lab
191001 0730	Total Metals	HCl, HNO_3	(1) 125 ml poly	ALS

Soil FR-WB2

	Sample #		Total Metals	HCl	(1) 4oz JAR	ALS
(24)	191001		"	"	"	"
(38.3)	191001	0836	"	"	"	"
(39.2)	—	0840	"	"	"	"
(40.4)	—	0847	"	"	"	"
(41.4)	—	0902	"	"	"	"
(42.4)	—	0911	"	"	"	"
(43.4)	—	0919	"	"	"	"
(44.4)	—	0930	"	"	"	"
(45.2)	—	0944	"	"	"	"
(44)	—	0945	(Dup) "	"	"	"
(11)	—	0946	(FB) "	"	"	"
(46.2)	—	1010	"	"	"	"
(47.3)	—	1017	"	"	"	"
(37.3)	—	1024	"	"	"	"
(32.3)	—	1032	"	"	"	"
(31.1)	—	1039	"	"	"	"
(36.3)	—	1044	"	"	"	31
(35.3)	—	1050	"	"	"	"
(34.2)	—	1323	"	"	(1) 8 oz JAR	"
(33.4)	—	1330	"	"	"	"
(57.2)	—	1338	"	"	"	"
(11)	—	1339	(Dup) "	"	"	"
(11)	—	1346	(FB) "	"	"	"
(56.1)	—	1347	"	"	"	"
(55.3)	—	1353	"	"	"	"
(11)	—	1354	(MS) "	"	"	"
(54.2)	—	1400	"	"	"	"

Continued on Page

Read and Understood By

T. Kondy — Signed — 10-1-19 — Date

F. Bahr — Signed — 11-19-19 — Date

Sample #	Analysis	Preserv	cont	Lo
		Soil		
(53.1) 191001 1410	Total Metals	Ice	(1) 8 oz JAR	A
(66.3) — 1415	"	"	"	
(65.2) — 1435	"	"	"	
		Rinsate	10-2-19	
191002 0700	Total Metals	Ice, HNO3	(1) 125 ml poly	
		Soil		
(64.2) 191002 0810	Total Metals	Ice	(1) 8 oz JAR	
(63.2) — 0815	"	"	"	
(62.1) — 0823	"	"	"	
(61.4) — 0832	"	"	"	
(") — 0833 (Dupl)	"	"	"	
(") — 0834 (FB)	"	"	"	
(60.3) — 0842	"	"	"	
(59.2) — 0850	"	"	"	
(58.4) — 0900	"	"	"	
(72.2) — 0920	"	"	"	
(71.3) — 0924	"	"	"	
(70.4) — 0930	"	"	"	
(69.4) — 0936	"	"	"	
(68.4) — 0945	"	"	"	
(67.1) — 0951	"	"	"	
(30.1) — 1020	"	"	"	
(") — 1021 (Dupl)	"	"	"	
(") — 1022 (FB)	"	"	"	
(29.4) — 1026	"	"	"	
(28.3) — 1034	"	"	"	
(") — 1035 (MS)	"	"	"	
(27.3) — 1043	"	"	"	
(26.1) — 1050	"	"	"	
(25.1) — 1315	"	"	"	
(24.1) — 1321	"	"	"	
(23.3) — 1327	"	"	"	
(22.4) — 1335	"	"	"	

Continued on Page

Read and Understood By

T. Kowalski — Signed — 10-2-19 — Date

R. Bahr — Signed — 11-19-1 — Date

Soil

Sample #		Analysis	Preserv	cont	Lab
(13)	191002 1345	Total Metals	Ice	(1) 8 oz JAR	ALS
(0.3)	— 1400	"	"	"	"
"	— 1401 (Dup)	"	"	"	"
"	— 1402 (FB)	"	"	"	"

10-3-19 RM State

	191003 0700	"	Ice, HNO3	(1) 125 ml poly	ALS

Soil

19.3	191003 0802	"	Ice	(1) 8 oz JAR	ALS
18.2	— 0808	"	"	"	"
17.2	— 0814	"	"	"	"
16.4	— 0822	"	"	"	"
15.3	— 0830	"	"	"	"
14.2	— 0836	"	"	"	"
13.3	— 0848	"	"	"	"
(11)	— 0849 (MS)	"	"	"	"
12.4	— 0904	"	"	"	"
11.3	— 0914	"	"	"	"
10.3	— 0927	"	"	"	"
(11)	— 0928 (Dup)	"	"	"	"
(11)	— 0929 (FB)	"	"	"	"
9.1	— 0938	"	"	"	"
8.3	— 0947	"	"	"	"
7.3	— 1000	"	"	"	"
6.3	— 1030	"	"	"	"
5.3	— 1036	"	"	"	"
4.4	— 1045	"	"	"	"
3.4	— 1053	"	"	"	"
(1)	— 1054 (MS)	"	"	"	"
2.3	— 1325	"	"	"	"
1.2	— 1339	"	"	"	"
(1)	— 1336 (Dup)	"	"	"	"
(1)	— 1337 (FB)	"	"	"	"

Continued on Page

Read and Understood By

Signed — Date 10-3-19

Signed — Date 11-19-19

Tim Kopp + AC Monts present. Weather is cool (40's) cloudy and a slight breeze. Samples collected with a decon'ed Auger.

Rinsate

Sample #			Analysis	Preserv	cont.	Lab
191119	1115		Total Metals	ice, HNO3	(1) 125 ml poly	ALS

Soil Samples

70.3	191119	1257	"	ice	(1) 4 oz JAR	"
69.4	—	1301	"	"	"	"
68.3	—	1306	"	"	"	"
67.2	—	1311	"	"	"	"
66.4	—	1316	"	"	"	"
71.2	—	1323	"	"	"	"
72.4	—	1330	"	"	"	"
72.4	—	1331 (Dup)	"	"	"	"
73.3	—	1334	"	"	"	"
73.3	—	1335 (MS)	"	"	"	"
74.1	—	1339	"	"	"	"
75.3	—	1342	"	"	"	"
9.3	—	1349	"	"	"	"
59.1	—	1355	"	"	"	"
59.1	—	1356 (FD)	"	"	"	"
60.4	—	1401	"	"	"	"
61.4	—	1405	"	"	"	"
80.1	—	1407	"	"	"	"
79.2	—	1410	"	"	"	"
78.3	—	1414	"	"	"	"
77.3	—	1418	"	"	"	"
76.3	—	1422	"	"	"	"

Continued on Page

Read and Understood By

T. Kopp — Signed — 11-19-19 — Date

L. Bach — Signed — 11-19-19 — Date

Appendix B
Hazardous Waste Manifests

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688308 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	13,962 ~~25,455~~	~~LBK~~	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7535, ~~#7536~~ Profile 070249410-1 (ZXRoll-offs CM)
ACT 2048

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarisgard
Signature:
Month: 02 Day: 06 Year: 2017

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature:
Month: 2 Day: 6 Year: 17

Transporter 2 Printed/Typed Name: Luis Gurule
Signature: Luis Gurule
Month: 2 Day: 7 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H132			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Thomas Mann
Signature:
Month: 02 Day: 09 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Truck Trailer
T-891 T-1057

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688309 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III, ERG #171	1	CM	11993	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7536, Profile 070249410-1 (1XRoll-offs CM)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month: 02 Day: 06 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Bowr
Signature:
Month: 2 Day: 06 Year: 17

Transporter 2 Printed/Typed Name: Robert Hurd
Signature:
Month: 2 Day: 10 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Melissa Moon
Signature:
Month: 02 Day: 14 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688313 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	16565	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7545, Profile 070249410-1 (1XRoll-off CM)
Bin # 303-22

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature: [signature]
Month: 02 Day: 09 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.: Oct 9 17

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature: [signature]
Month: 2 Day: 9 Year: 17

Transporter 2 Printed/Typed Name: Kevin Cable
Signature: [signature]
Month: 2 Day: 10 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H089			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: William Mosley
Signature: [signature]
Month: 02 Day: 13 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

ype. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NM8800019434	1	575-524-5911	014688314 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name
Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number
NMR000021162

7. Transporter 2 Company Name
Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number
CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number
NVT330010000

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	10197	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7546, Profile 070249410-1 (1XRoll-off CM)

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skousen
Signature: [signature]
Month: 02 Day: 09 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☒ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature: [signature]
Month: 2 Day: 9 Year: 17

Transporter 2 Printed/Typed Name: Chris Edmonds
Signature: [signature]
Month: 2 Day: 13 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Andrea Zavala
Signature: [signature]
Month: 2 Day: 17 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688317 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP) — U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA) — U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	12,746	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7563, Profile 070249410-1 (1XRoll-off CM)

Bond # 0009-20

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard — Signature: [signature] — Month: 03 Day: 07 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brun — Signature: [signature] — Month: 03 Day: 7 Year: 17

Transporter 2 Printed/Typed Name: Jared Kinsey — Signature: [signature] — Month: 03 Day: 09 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Tabitha Mann — Signature: [signature] — Month: 03 Day: 10 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688310 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP) — U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA) — U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	14315	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7537, Profile 070249410-1 (1XRoll-off CM)
Bin # ACT 4028

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard — Signature: [signature] — Month: 02 Day: 13 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown — Signature: [signature] — Month: 2 Day: 17 Year: 17

Transporter 2 Printed/Typed Name: Robert Hund — Signature: [signature] — Month: 2 Day: 24 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Thomas Mann — Signature: [signature] — Month: 02 Day: 28 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

#16

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688311 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name
Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number
NMR000021162

7. Transporter 2 Company Name
Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number
CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number
NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	14016	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7538, Profile 070249410-1 (1XRoll-off CM)

Bendt AFI 4029

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month 03 Day 08 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature:
Month 3 Day 8 Year 17

Transporter 2 Printed/Typed Name: Jared Kinsey
Signature:
Month 3 Day 13 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Tabitha Mell
Signature:
Month 03 Day 23 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688312 JJK

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	12038	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7539, Profile 070249410-1 (1XRoll-off CM)

Bond # ACT5118-01

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month 03 Day 07 Year 17

INTL
16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael BROWN
Signature:
Month 3 Day 7 Year 17
Transporter 2 Printed/Typed Name: Justin Curry
Signature:
Month 3 Day 10 Year 17

DESIGNATED FACILITY
18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H039 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Robin Mann
Signature:
Month 03 Day 13 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Truck T-89 / Trailer T-1057

Please print or type. (Form designed for use on elite (12-pitch) typewriter)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM8800019434	1	575-524-5911	014688318 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name
Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number
NMR000021162

7. Transporter 2 Company Name
Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number
CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number
NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	15059 ~~12744~~	K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7564 Profile 070249410-1 (1XRoll-off CM)

BIN # 9927-20

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarsgard
Signature:
Month 03 Day 08 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Brown
Signature:
Month 3 Day 8 Year 17

Transporter 2 Printed/Typed Name: Robert Hurd
Signature:
Month 3 Day 8 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Robert Mann
Signature:
Month 03 Day 20 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NM8800019434
2. Page 1 of: 1
3. Emergency Response Phone: 575-524-5911
4. Manifest Tracking Number: 014688319 JJK

GENERATOR

5. Generator's Name and Mailing Address
NASA White Sands Test Facility Attn: S. Acosta
P.O. Box 20
Las Cruces, NM 88004
Generator's Phone: 575-524-5763

Generator's Site Address (if different than mailing address)
NASA White Sands Test Facility
12600 NASA Road
Las Cruces, NM 88012

6. Transporter 1 Company Name: Advanced Chemical Transport, Inc. (CHP)
U.S. EPA ID Number: NMR000021162

7. Transporter 2 Company Name: Advanced Chemical Transport, Inc. (CA)
U.S. EPA ID Number: CAR000070540

8. Designated Facility Name and Site Address
US Ecology Nevada Inc.
P.O. Box 578 Highway 95, 11 Miles S of Beatty
Beatty, NV 89003
Facility's Phone: 775-553-2203
U.S. EPA ID Number: NVT330010000

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, Hazardous Waste, Solid, n.o.s., (contains D008), 9, PG III ERG #171	1	CM	11,649 ~~12480~~	SM K	D008
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b.1 #7565 Profile 070249410-1 (1XRoll-off CM)
ACT 518-02

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amanda Skarstgard
Signature:
Month 03 Day 07 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: FEDERICO DOMINGUEZ
Signature:
Month 3 Day 7 Year 17

Transporter 2 Printed/Typed Name: Ray Ortega
Signature:
Month 3 Day 7 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H039			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in item 18a

Printed/Typed Name:
Signature:
Month 03 Day 17 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Appendix C
Photographic Documentation
Impact Berm Excavation

Figure C.1 **STGT Transfer of Berm Soil – view to the north**

This photograph shows the transfer of STGT impact berm soil to roll off containers located on firing range floor.

Figure C.2 **Excavation of STGT From Front Berm- view to the south**

This photograph shows excavation of STGT impact berm soil from front berm (left - east side) and berm crest.

Figure C.3 **Excavation of STGT From Back Berm – view to the southwest**

This photograph shows excavation of STGT impact berm soil from back berm (right - west side).

Figure C.4 **Ammunition Example**

This photograph shows an example of ammunition recovered from the range floor using a metal detector. Distorted bullets, bullet jackets, and shell casing are visible.

Figure C.5 STGT Impact Berm Following Removal of Soil Lifts – view to the north

This photograph shows the STGT impact berm following removal of soil lifts. Front berm (right - east side), berm crest, and back berm (left - west side) are visible.

Figure C.6 **STGT Range Floor and Impact Berm– view to the west**

This photograph shows the STGT range floor and impact berm showing front end loaders and covered roll off containers.

Figure C.7 **WB-2 Soil Transfer – view to the east**

This photograph shows transfer of soil from the front of the WB-2 impact berm (west side) to a roll off container

Figure C.8 **WB-2 Excavated Soil – view to the east**

This photograph excavated soil (well sorted sand) from the central part of the WB-2 impact berm.

Figure C.9 **Excavation of WB-2 Impact Berm – view to the northeast**

This photograph shows excavation of WB-2 impact berm soil from the front berm (west side) in lifts.

Figure C.10 WB-2 Impact Berm Following Excavation Activities – view to the north

This photograph shows WB-2 impact berm following excavation activities. Stakes represent confirmation sample locations on front and back of berm.