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14. ABSTRACT

This Final Investigation Report describes the activities performed to complete the Scope of Work (SOW) for the Investigation at the Compliance Restoration Site CC-RVAAP-80 and Other Environmental Services at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio.

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FINAL INVESTIGATION REPORT FOR THE COMPLIANCE RESTORATION SITE CC-RVAAP-80 GROUP 2 PROPELLANT CAN TOPS AND OTHER ENVIRONMENTAL SERVICES

Ravenna Army Ammunition Plant (RVAAP)
Ravenna, Ohio

Contract No. W912QR-10-P-0058

Submitted to

U.S. Army Corps of Engineers, Louisville
600 Dr. Martin Luther King, Jr. Place
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Investigation Report

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RVAAP Facility Manager	2	2
USACE Program Manager - Louisville	2	2

NGB – National Guard Bureau

OHARNG – Ohio Army National Guard - Camp Ravenna

Ohio EPA-NEDO-DERR – Ohio Environmental Protection Agency NE District-DERR

PIKA – PIKA International Inc.

REIMS – Ravenna Environmental Information Management System

RVAAP – Ravenna Army Ammunition Plant

USACE – United States Army Corps of Engineers – Louisville District

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LIST OF ACRONYMS

AOC	Area of Concern
APP	Accident Prevention Plan
BRACD	United States Base Realignment and Closure Division
CELRL	USACE - Louisville District, Louisville, Kentucky
CR	Compliance Restoration
DOD	Department of Defense
EZ	Exclusion Zone
FM	Facility Manager
FWCUGs	Facility Wide Cleanup Goals
GOCO	Government Owned, Contractor Operated
GPS	Global Positioning System
GPR	Ground Penetrating Radar
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous Toxic and Radioactive Waste
IAW	In Accordance With
IDW	Investigation Derived Waste
IRP	Installation Restoration Program
LL	Load Line
m	meter
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MI	Multi-Increment
mm	millimeter

MSD	Minimum Separation Distance
NGB	National Guard Bureau
Ohio EPA	Ohio Environmental Protection Agency
OHARNG	Ohio Army National Guard
OSHA	Occupational Safety and Health Administration
PAM	Pamphlet
PIKA	PIKA International, Inc.
PjM	Project Manager
QC	Quality Control
RRD	Range Related Debris
RSL	Regional Screening Level
RVAAP	Ravenna Army Ammunition Plant
SOW	Scope of Work
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USP&FO	United States Property and Fiscal Officer
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
UXOT III	Unexploded Ordnance Technician III/Team Leader
VOC	Volatile Organic Compound
WP	Work Plan

1.0 INTRODUCTION

This report describes the activities performed to complete the Scope of Work (SOW) for the Compliance Restoration (CR) Site CC-RVAAP-80 and Other Environmental Services at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio. Authorization for performance is contained in contract W912QR-10-P-0058 issued to PIKA International, Inc. (PIKA) by U.S. Army Corps of Engineers - Louisville District (CELRL), Louisville, Kentucky. A copy of the SOW is presented in Appendix A.

The Report describes the procedures, operational sequence, and resources PIKA used for the following tasks:

- Perform a geophysical delineation of the buried or near surface materials (propellant can tops, etc.) in the designated Group 2 areas;
- Collect surface soil samples based on the results of the geophysical delineation;
- Analyze soil samples for the common propellants used by the Department of Defense (DoD) including Nitrocellulose, Nitroglycerine, Nitroguanidine, and Perchlorate, with one (1) of the samples also analyzed for the RVAAP full suite (i.e., Explosives, Propellants, TAL Metals, VOCs, SVOCs, Pesticides, PCBs and Mercury) and Cyanide;
- Dispose of all Investigation Derived Waste (IDW); and
- Pump and remove accumulated water from the excavation at RVAAP Load Line (LL) 2 Building DB-802 in accordance with Ohio Environmental Protection Agency (Ohio EPA) requirements for ground application.

1.1 Objective

The objective of this project was to conduct an initial investigation of the Group 2 Propellant Can Tops areas. The following tasks were achieved during the investigation:

- Delineate the boundaries of the propellant can top areas;

- Confirm the presence or absence of releases of propellants and/or other munitions constituents (MC) to the surface soils at this area of concern (AOC); and
- Remove accumulated water from the excavation at LL2 Building DB-802 to facilitate completion of scheduled site restoration operations by others under a separate United States Base Realignment and Closure Division (BRACD) contract.

1.2 RVAAP Location

When the RVAAP Installation Restoration Program (IRP) began in 1989, the RVAAP was identified as a 21,419 acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a two year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres has been transferred to the National Guard Bureau (NGB) and subsequently licensed to the OHARNG for use as a military training site known as Camp Ravenna. The current RVAAP consists of 1,280 acres scattered throughout Camp Ravenna. The Camp Ravenna perimeter fence encloses both installations.

Camp Ravenna is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east northeast of the city of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the city of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna/RVAAP is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry Roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

When RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a government-owned contractor operated (GOCO) industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP, references to the RVAAP in this document are considered to be inclusive of the historical extent of RVAAP, unless otherwise specifically stated. A regional map indicating the General Location and Orientation of the RVAAP is presented in Appendix B as Figure 1. A facility map of the RVAAP is presented in Appendix B as Figure 2.

1.3 RVAAP History

Production at the facility began in December 1941 with the primary missions of depot storage and ammunition loading. The installation was divided into two separate units, the Portage Ordnance Depot and the Ravenna Ordnance Plant. The Portage Ordnance Depot's primary mission was depot storage of munitions and components, while the Ravenna Ordnance Plant's mission was to load and pack major caliber artillery ammunition and to assemble munitions initiating components that included fuzes, boosters, and percussion elements. In August 1943, the installation was redesignated the Ravenna Ordnance Center and again, in November 1945, as the Ravenna Arsenal.

The plant was placed in standby status in 1950 and operations were limited to renovation, demilitarization, and normal maintenance of equipment, along with storage of ammunition and components. The plant was reactivated during the Korean Conflict to load and pack major caliber shells and components. All production ended in August 1957, and in October 1957 the installation was again placed in a standby condition. In October 1960, the ammonium nitrate line was renovated for demilitarization operations which involved melting explosives out of bomb casings for subsequent recycling. These operations commenced in January 1961. In July 1961, the plant was again deactivated. In November 1961, the installation was divided into the Ravenna Ordnance Plant and an industrial section, with the entire installation designated as the RVAAP. In May 1968, RVAAP began loading, assembling, and packing munitions on three (3) LLs and two (2) component lines in support of the Southeast Asia Conflict. These facilities were deactivated in

August 1972. The demilitarization of the M71A1 90 millimeter (MM) projectile extended from June 1973 until March 1974. Demilitarization of various other munitions was conducted from October 1982 through 1992.

Until 1993, RVAAP maintained the capability to load, assemble, and pack military ammunition. As part of the RVAAP mission, the inactive facilities were maintained in a standby status by keeping equipment in a condition to permit resumption of production within prescribed limitations. In September 1993, RVAAP was placed in inactive caretaker status and subsequently changed to modified caretaker status. The LLs and associated real estate were determined to be excess to the U.S. Army.

1.4 RVAAP – CC-RVAAP-80: Group 2 Propellant Can Tops

CC-RVAAP-80 consists of the Group 2 Propellant Can Tops area. Propellant can lids or tops were identified on the ground surface/near surface at the southern end of the former Group 2 Ammunition Storage Area. These materials are typically classified as Range-Related Debris (RRD) (similar to munitions packaging materials). This site was never used or classified as an operational range. It is believed that the discarded propellant can tops might qualify as inert scrap metal.

The propellant can tops located at the south end of Group 2 were initially identified by OHARNG trainees in the winter of 2008. The propellant can tops were observed in the vegetated area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines (see Appendix B, Figure 3). This area consists of approximately 539,572 square feet (12.4 acres).

The CELRL performed an emergency survey with a metal detector over a portion of the southern area ground surface. Results of the survey revealed multiple magnetic anomalies in the surface and near surface soils. On-site Unexploded Ordnance (UXO) personnel visually identified the surface anomalies as propellant can tops. During the emergency survey, it was also noted that the ground surface had been disturbed and contained hummocks (mounds) ranging in height from one (1) foot to two (2) feet throughout the survey area.

As such, the propellant can tops or RRD are of environmental concern for the subject area. A geophysical survey was necessary to identify the anomalies and anomalous areas within the subject area, and to characterize the subject area boundary(ies). The limited soil investigation within the identified anomalous areas was warranted to assess possible releases of propellants or MC to the surface soils in the vicinity of the can tops. The site is a low probability site in regard to encountering munitions and explosives of concern (MEC). Therefore, only UXO construction support was required for this project.

1.5 RVAAP- 09: Load Line 2

Former excavation activities conducted at LL2 (RVAAP-09) have resulted in the accumulation of water within the Building DB-802 footprint. To facilitate restoration activities at this location, the accumulated water needed to be removed from the excavation to assist in the restoration of the site. A map showing the location of Building DB-802 within LL2 is presented in Appendix B, Figure 4.

NOTE: As per the requirements of the SOW, the water removal services were to coincide with the BRACD contractor's schedule. To that end, the water removal services were conducted by PIKA from May 3, 2010, through May 18, 2010, to facilitate the June 2010 restoration activities at LL2 by the BRACD contractor. All water removal services were conducted in accordance with Ohio EPA requirements. A copy of the Ohio EPA e-mail correspondence relative to approval for discharging the surface water to ground surface is provided in Appendix F.

2.0 COMPLIANCE RESTORATION SITE CC-RVAAP-80 SITE INVESTIGATION ACTIVITIES

The following documents were prepared and approved prior to starting the Compliance Restoration Site CC-RVAAP-80 (Group 2 Propellant Can Tops) site investigation operations:

- February 25, 2011, "Final Project Work Plan for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services"
- December 17, 2010, "Final Project Management Plan for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services"
- February 2011, "Final Accident Prevention Plan for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services"
- February 2011, "Final Site Safety and Health Plan for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services"
- February 2011, "Final Sampling and Analysis Plan for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services"
- February 2011, "Final Quality Assurance Project Plan for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services"

The sequence of operations for the Group 2 Propellant Can Tops site investigation as approved in the work plan (WP) was:

- Mobilization and site preparation – Conducted 4 through 6 April 2011;

- Surface sweep – Conducted 7 – 14 April 2011;
- Mark wetland boundaries – Conducted 21 April 2011
- Vegetation Removal – Conducted 26 April through 5 May 2011;
- Geophysical Delineation of Group 2 Propellant Can Tops area – Conducted 9 through 11 May 2011;
- Multi-Increment (MI) surface soil sampling within areas identified as containing propellant can tops – Conducted 26 May 2011;
- Disposal of IDW – Conducted 26 May 2011;
- Survey boundaries of MI sample areas – Conducted 31 May 2011;
- Demobilization – Conducted 31 May 2011, and
- Data Validation – Conducted 28 June through 5 July 2011

Details pertaining to each of the Group 2 Propellant Can Tops site investigation operations are provided in the subsections that follow. Photographic documentation of the Group 2 Propellant Can Tops site investigation operations are provided in the Weekly Reports that are contained in Appendix C.

2.1 Mobilization and Site Preparation

2.1.1 Mobilization of Manpower

PIKA scheduled the arrival of the work force in a manner designed to facilitate immediate productivity. All PIKA personnel mobilized to the site met requirements for Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training and medical surveillance requirements as specified in the Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP). Site personnel were trained to perform the specific tasks to

which they were assigned. At no time were site personnel tasked with performing an operation or duty for which they did not have appropriate training and experience.

2.1.2 Preliminary Activities

During the initial mobilization, PIKA site management personnel engaged in the following preliminary activities:

- Coordinated with the RVAAP Facility Manager (FM) and Camp Ravenna Range Control to finalize access and communications requirements for operations within the Group 2 area;
- Contacted and coordinated with local vendors for accommodations as well as vendors/suppliers for routine purchases to ensure smooth project start up; and
- Inspected the work area to identify possible environmental constraints, terrain limitations, and other interferences.

2.1.3 Equipment

All equipment was inspected as it arrived to ensure proper working order. All instruments and equipment that required routine maintenance and/or calibration were checked initially upon arrival and then checked again prior to use each day. As part of the initial equipment set-up and testing, PIKA also installed and tested its communication equipment to include the following:

- Cellular Phone Service to maintain communication with RVAAP security personnel.
- Hand-held portable radios used to maintain communications between the Project Manager (PjM) and the UXO Technician III (UXOT III)/Team Leader.
- Cellular telephones equipped with Direct Connect Service (very high frequency band) to be used as back up communications between the PjM and the UXOT III/Team Leader.

- Prior to initiating site activities, PIKA coordinated communication with Camp Ravenna Range Control, including information relative to planned road blocks, as needed.

2.1.4 Site-Specific Training

As part of the mobilization process, PIKA performed site-specific training for all on-site personnel assigned to this project. The purpose of this training was to ensure that all on-site personnel fully understood the operational procedures and methods to be used by PIKA at RVAAP and the Camp Ravenna Group 2 site. Individual assigned responsibilities and safety and environmental concerns associated with site operations were also covered in the training. The Senior UXO Supervisor (SUXOS)/UXO Safety Officer (UXOSO) conducted the training sessions which included the topics identified below.

- Field equipment operation, including the safety and health precautions, field inspection, and maintenance procedures that were to be used.
- Interpretation of relevant sections of the Final WP and APP/SSHP as they related to the tasks that were being performed.
- Personnel awareness of potential site and operational hazards associated with site-specific tasks and operations.
- Public relations to ensure that personnel do not make any public statements to the media without prior coordination and approval from the RVAAP FM.
- Environmental concerns and sensitivity including the location of wetlands.
- Additional OSHA or CELRL required training per the approved APP.
- Identification features, hazards, and disposal methods of MEC/UXO that may be encountered.

2.1.5 Permitting

No permits were identified to be required for the execution of work under this scope of work.

2.1.6 Tenant Relocation

PIKA worked with the RVAAP FM in conjunction with the Camp Ravenna Range Control in order to minimize any effects caused by the performance of any/all of the operational tasks conducted during the Group 2 Propellant Can Tops site investigation. However, upon arrival to the site for conducting the surface sweep operations, it was noted that OHARNG training operations were being conducted within the northwest area of the site adjacent to Building AA-150. As such, tenant relocation was required prior to initiating site operations.

2.1.7 Site Control

The site was a low probability site in regard to encountering MEC and only UXO "construction support" was required for the project. As such, in accordance with (IAW) Engineering Pamphlet 75-1-2, *Munitions and Explosives of Concern (MEC) Support During Hazards, Toxic, and Radioactive Waste (HTRW) and Construction Activities, a* Minimum Separation Distance (MSD) was not required; however, as a precaution, PIKA instituted a 200-foot diameter exclusion zone (EZ) during the investigation operations for site control and site security purposes. This consisted of establishing barriers including warning cones and yellow tape to control the points of site access along strategic points of the Group 2 access roads. All personnel non-essential to the field activities complied with the limits of EZ.

2.2 Surface Sweep

Prior to initiating the brush clearing and geophysical delineation operations, the PIKA on site UXO technicians conducted an instrument-assisted surface sweep of the entire Group 2 Propellant Can Tops site. The surface sweep was conducted using Schonstedt GA-52Cx metal detectors and a XLT-E Series Whites metal detector to locate and mark any MEC items that could have been present at the site. No MEC items were found. The surface sweep activities were conducted 7 through 14 April

2011. Photo documentation of the surface sweep activities are provided in the weekly reports contained in Appendix C.

2.3 Marking Wetlands

Prior to initiating the vegetation removal and site investigation operations, PIKA located and marked the existing wetlands at the site to ensure protection throughout the site investigation operations. The boundaries of the wetlands were located by a licensed surveyor on 21 April 2011 using survey data provided by Ms. Katie Tait, Camp Ravenna Environmental Specialist. A map showing the location of the wetlands within the Group 2 Propellant Can Tops site is presented in Appendix B as Figure 5. Photo documentation of the surveying operations are provided in the weekly reports contained in Appendix C.

2.4 Vegetation Removal

PIKA conducted vegetation removal operations at the Group 2 Propellant Can Top Area to facilitate the site investigation operations. The vegetation removal operations were conducted from 26 April through 6 May 2011 and included the removal of ground level vegetation and small trees. Vegetation removal was conducted using a tractor mounted brush cutter with the deck locked in position at six (6)-inches above ground level. Prior to and during vegetation removal, UXO Technicians visually searched the area where the vegetation was removed to ensure the area was free of surface MEC/UXO items or other items that may have presented a physical hazard. No MEC/UXO items were encountered during the brush clearing operations. Photo documentation of the vegetation removal operations is provided in the weekly reports contained in Appendix C.

2.5 Geophysical Delineation of Group 2 Propellant Can Tops Site

PIKA subcontracted GeoSearches, Inc., located in Chagrin Falls, Ohio to conduct the geophysical survey of the Group 2 Propellant Can Top Area. The objective of the survey was to delineate the boundaries of the propellant can top areas within the

site. The geophysical survey of the Group 2 Propellant Can Top Area was conducted 9 through 13 May 2011.

The geophysical survey was conducted using Electromagnetics (EM61-MK2). Prior to initiating the geophysical activities, 100-foot by 100-foot grids were surveyed and marked across the site to facilitate the investigation. During the geophysical survey, detected anomalies were surveyed utilizing the Global Positioning System (GPS)-integrated EM61 for generating data maps and then marked in the field using colored pin flags to aid in selection of the surface soil samples. At the completion of the geophysical survey operations, a total of five (5) distinct high anomaly density areas (i.e., anomaly clusters) were delineated at the site. Each of these areas was located roughly within the center portion of the site, stretching south to north. Individual anomalies were also detected across the site, but primarily in the southeastern and northwestern regions of the site. Figure 6 in Appendix B shows the location and layout of the anomalies and anomaly clusters delineated within Group 2.

A number of propellant can tops and/or cans were visible on the surface within each of the delineated cluster areas, most notably within cluster areas 1, 3, and 5. A few of the individual anomalies detected outside the cluster areas were also visible on the surface but only within the southeast portion of the site and one near the center of the site along the rail bed. These visible individual detections were identified as propellant cans and/or tops. None of the individual anomalies detected within the northwest region of the site were visible. A photo log showing the propellant can tops and cans within each cluster area as well as the individual propellant cans and tops that were visible on the surface is presented in Appendix H.

Upon delineating the boundaries of the propellant can tops cluster areas, Ground Penetrating Radar (GPR) was used to determine the approximate depth of the anomalies within each cluster area in order to determine if there was any evidence of potential excavation and/or dumping operations. Results of the GPR data indicate that all of the anomalies within the five (5) cluster areas exist at the surface or within near surface soils at no more than nine (9)-inches in depth. Additionally,

based upon the GPR data results there were no signs of disturbance within the subsurface lithology (i.e., signs of excavation and dumping).

Details pertaining to all of the geophysical survey operations are provided in the GeoSearches survey report provided in Appendix D. Photo documentation of the geophysical delineation activities are provided in the weekly reports contained in Appendix C.

2.6 Multi-Increment Surface Soil Sampling

Based upon results of the geophysical survey, MI surface soil samples were collected within the boundaries of selected anomaly cluster areas in order to assess possible releases of propellant MC to the surface soils from the propellant can tops and cans. As per the SOW, a total of three (3) biased MI surface soil samples were collected and analyzed for the common propellants used by DoD, including Nitrocellulose, Nitroglycerine, Nitroguanidine and Perchlorate. Additionally, one of the samples was analyzed for the RVAAP full suite. A PIKA UXO team consisting of two UXO Technicians provided construction oversight services during all sampling operations IAW Engineering Pamphlet 75-1-2, *Munitions and Explosives of Concern (MEC) Support During Hazards, Toxic, and Radioactive Waste (HTRW) and Construction Activities*.

Prior to collecting the samples, a site walk was conducted on 25 May 2011 with representatives from the Ohio EPA to evaluate each of the anomaly cluster areas for selecting the three (3) MI sample areas. Based upon site observations including size of the area and amount of visible propellant cans and tops within each area, anomaly cluster areas 1, 3 and 5 were selected for sampling and are identified as MI sample Area 3, MI sample Area 2, and MI sample Area 1, respectively. The locations along with the corresponding MI sample identifications for each of the identified sample areas are provided in Appendix B, Figure 7. The surface soil sampling operations were conducted on 26 May 2011. Photo documentation of the MI surface soil sampling activities is provided in the weekly reports contained in Appendix C.

For each sampling location, a minimum of 30 random aliquots were collected from zero (0) to one (1) foot below ground surface (bgs) using a ¾ inch diameter dedicated stainless steel step probe, placed in a plastic lined container, and mixed in the field. The aliquot locations were selected by the sample technician walking over the entire area and randomly selecting aliquot locations, which were marked with flagging. All the aliquots collected from each MI sample area were placed in a labeled container for transport to the laboratory. At the laboratory, the samples were dried, sieved, and finely ground for specific constituent analysis. All three (3) of the MI samples were analyzed for Nitrocellulose, Nitroglycerine, Nitroquanidine and Perchlorate. Additionally, one of the samples was also analyzed for the RVAAP full suite. Sample PCTss-002M-001-SO within MI sample Area 2 was selected for the RVAAP full suite due to the large amount of propellant can tops and propellant cans present relative to Areas 1 and 3. IAW the SAP, the MI sampling method was not utilized for the volatile organic compound (VOC) component of this RVAAP full suite sample. Instead, one discrete sample was collected from within the MI sample Area 2. The location of the discrete sample was biased toward the area most likely to contain volatile compounds. No soil staining or other obvious signs of potential VOC contamination was observed within MI sample Area 2 so the discrete sample was biased toward the section of MI sample Area 2 which contained the heaviest concentration of propellant can top debris items. The soil portion for the discrete sample for the VOC analyte was placed directly in the sample container and was not composited or further processed in the field or laboratory.

The boundaries of each of the MI sample areas were surveyed on 31 May 2011 to document the layout and location within Group 2 for future use as needed. The total area for each of the MI sample areas is as follows:

MI sample area 1 equals 198 square meters;
MI sample area 2 equals 553 square meters; and
MI sample area 3 equals 330 square meters.

A map showing the surveyed limits of the MI sample boundaries is provided in Appendix B, Figure 8. A copy of laboratory sample results for all the samples,

including QC samples (i.e., duplicate, equipment rinsate, and MS/MSD), is provided in Appendix E.

2.7 Summary of Surface Soil Sample Results

A tabulated summary of all the sample results are provided in Tables 1 and 2, Appendix E. All the sample results have been compared to the established Facility Wide Cleanup Goals (FWCUGs) for National Guard Trainee, Regional Screening Level (RSL), and the established Surface Soil Background Criteria. A narrative summary of the results is provided below:

1. None of the samples (including the RVAAP full suite sample) reported detectable concentrations of the chemicals of concern above the established FWCUGs.
2. The RVAAP full suite sample (MI sample Area 2, Sample PCTss-002M-0001) did show detectable concentrations for five (5) metal analytes (arsenic, lead, mercury, vanadium, zinc) that are slightly above the RSL and/or RVAAP-specific Surface Soil Background Criteria.
3. Both perchlorate and propellants were reported at MI Sample Area 1 (sample PCTss-001M-0001-SO); including the associated duplicate sample, and also at MI Sample Area 3 (sample PCTss-003M-0001-SO), however each result was flagged as estimated because the target analytes were detected at concentrations below the reporting limit.

2.8 Disposal of IDW

The MI surface soil samples were collected using pre-decontaminated, dedicated, ¾-inch stainless steel step probes. Additionally, all the soils generated from the 30 aliquots at each of the MI samples were sent to the laboratory. Subsequent to lab analyses, excess soils were disposed of by the laboratory. As such, no IDW was generated that required disposal by PIKA.

2.9 Data Validation

The analytical methods employed during the implementation of the Group 2 site investigation operations are defined in the Facility-Wide Sampling and Analysis Plan and Facility-Wide Quality Assurance Project Plan for the RVAAP. A listing of all the analytical methods used for this project are provided in Appendix G. All of the Group 2 sample analyses were performed by Test America in Sacramento, CA. Laboratory results included documentation verifying compliance with sample log-in procedures, analytical holding times, and quality control procedures for analyses. The laboratory also provided information about the percent of recovery attained in laboratory spike samples, calibration curves (initial and continuing) dilutions, and detection limits. The laboratory flagged data if results warranted.

All sample results were systematically verified and validated by Purves Environmental in Hudson, OH in accordance with the United States Environmental Protection Agency (USEPA) Test Methods for evaluating Solid Waste SW-846, National Functional Guidelines for Data Validation, and The US Army Corps Louisville Chemistry Guideline, Version 5.0. The validation process was conducted to ensure that the precision and accuracy of the analytical data were adequate for their intended use. The validation process minimizes the potential of using false results in the decision-making process and ensures that detected and non-detected compounds were accurately identified.

Data validation determined that all samples were properly analyzed, diluted as needed, quantitated and that no problems were encountered with the system performance of any of the instruments. As such, data validation determined that all data are 100 percent complete and usable. A copy of the data validation report is provided in Appendix G.

2.10 Demobilization

Upon completion of the tasks covered under this SOW, PIKA demobilized from the site on 31 May 2011. The demobilization activities consisted of the following steps:

1. Remove/demobilize all PIKA equipment.
2. Demobilize any other remaining equipment and supplies.
3. Demobilize personnel.

3.0 CONCLUSIONS

The objectives of this project were to:

- Delineate the boundaries of the propellant can top areas;
- Confirm the presence or absence of releases of propellants and/or other MC to the surface soils at the Group 2 Propellant Can Tops site; and
- Remove accumulated water from the excavation at Building DB-802 (LL2) to facilitate completion of scheduled site restoration operations by others.

The defined objectives were achieved through completion of the SOW as summarized below:

1. The water removal services were conducted by PIKA from May 3, 2010, through May 18, 2010, to facilitate the June 2010 restoration activities at LL2 by the BRACD contractor. All water removal services were conducted in accordance with Ohio EPA requirements. A copy of the Ohio EPA e-mail correspondence relative to approval for discharging the surface water to the ground surface is provided in Appendix F.
2. Based upon geophysical survey a total of five (5) distinct high anomaly cluster areas were delineated within the Group 2 Propellant Can Tops site. Individual anomalies were also detected across the site outside of the delineated cluster areas, primarily within the southeastern and northwestern regions of the site as shown on Figure 6, Appendix B. Based upon visual observations within the delineated cluster areas it is evident that the detected anomalies are comprised almost exclusively of propellant can tops and/or propellant cans. Additionally, of the individual anomalies detected that were visible on the surface, each was identified as a propellant can and/or top. It is unlikely that the remaining shallow subsurface anomalies detected within the northwestern and southeastern portions of the site are MEC or munitions debris (MD) given the fact that none of these type items were encountered either during the precautionary surface sweep operations conducted prior to the brush clearing operation, or during the course of any of the subsequent site investigation operations. However, further investigation (i.e., geophysical

and/or anomaly digs with UXO support) of at least a percentage of the subsurface individual anomalies may be warranted for verification.

3. Results of the GPR data within the five (5) cluster areas indicate that all of the anomalies exist at the surface or within near surface soils at no more than nine (9)-inches in depth and that there were no signs of disturbance within the subsurface lithology (i.e., no signs of excavation and burial).
4. Based upon visual observation of the five (5) delineated cluster areas, one MI surface soil sample was collected from each of the three cluster areas identified as having the most propellant cans and tops present in order to confirm the presence or absence of releases of propellants and/or other MC to the surface soils. The sample results indicate that none of the samples reported detectable concentrations of the chemicals of concern above the established FWCUGs. The RVAAP full suite sample (MI sample Area 2, Sample PCTss-002M-0001) did show detectable concentrations for five (5) metal analytes (arsenic, lead, mercury, vanadium, zinc) that are slightly above the RSL and/or RVAAP-specific Surface Soil Background Criteria. Both perchlorate and propellants were reported at MI Sample Area 1 (sample PCTss-001M-0001-SO); including the associated duplicate sample, and also at MI Sample Area 3 (sample PCTss-003M-0001-SO), however each result was flagged as estimated, i.e., below the reporting limit. None of the samples reported detectable concentrations of the chemicals of concern above the established FWCUGs.
5. From the results and based upon site observations, it is likely that the two (2) cluster areas that were not sampled during this investigation (i.e., cluster areas 1 and 4 as depicted on Figure 6 in Appendix B) would show similar sample results. Collecting surface soil sampling within the individual anomaly areas located in the northwestern and southeastern portions of the site would likely be contingent upon results of any further investigation operations conducted in these areas.

Appendix A

Scope of Work

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SCOPE OF WORK

FOR

COMPLIANCE RESTORATION SITE CC-RVAAP-80

AND OTHER ENVIRONMENTAL SERVICES

RAVENNA ARMY AMMUNITION PLANT

RAVENNA, OHIO

22 MARCH 2010

The Louisville District, U.S. Army Corps of Engineers (USACE) is requesting environmental services as described in this Scope of Work (SOW) at the former Ravenna Army Ammunition Plant (RVAAP).

Compliance Restoration (CR) site CC-RVAAP-80 (Group 2 Propellant Can Lids) is potentially impacted by range-related debris (RRD) and/or chemical residues of munitions or munitions constituents (MC). Response actions are required under the Defense Environmental Restoration Program (DERP), Installation Restoration Program (IRP) to further identify these materials and investigate this AOC. The SOW identifies specific requirements that will be completed by the Contractor.

This SOW also identifies other services required of the Contractor. This portion of the SOW pertains to water removal services at Load Line 2.

1.0 GENERAL INFORMATION

1.1 Site Description and Location

Past Department of Defense (DoD) activities at the former RVAAP date back to 1940 and include the manufacturing, loading, handling, and storing of military explosives and ammunition. Until 1999, the RVAAP was identified as a 21,419-acre installation. The Ohio Army National Guard (OHARNG) resurveyed the property boundary, finishing in 2003, and the actual total acreage was found to be 21,683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP have been transferred to the National Guard Bureau (NGB) via the United States Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the OHARNG for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the OHARNG's Camp Ravenna Joint Military Training Center (Camp Ravenna). RVAAP's remaining parcels of land are located completely within the Camp Ravenna perimeter fence. The RVAAP facility is controlled by the U.S. Army Base Realignment and Closure Division (BRACD).

Camp Ravenna/RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (three miles) east/northeast of the City of Ravenna and approximately 1.6 kilometers (one mile) northwest of the Village of Newton Falls. The RVAAP portions of the property are located completely within Portage County. Camp Ravenna (inclusive of RVAAP) is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide. The facility is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick, and Berry Roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (six miles) to the northwest; Newton Falls 1.6 kilometers (one mile) to the southeast; Charlestown to the southwest, and Wayland 4.8 kilometers (three miles) to the south. The property location is depicted in Figure 1.

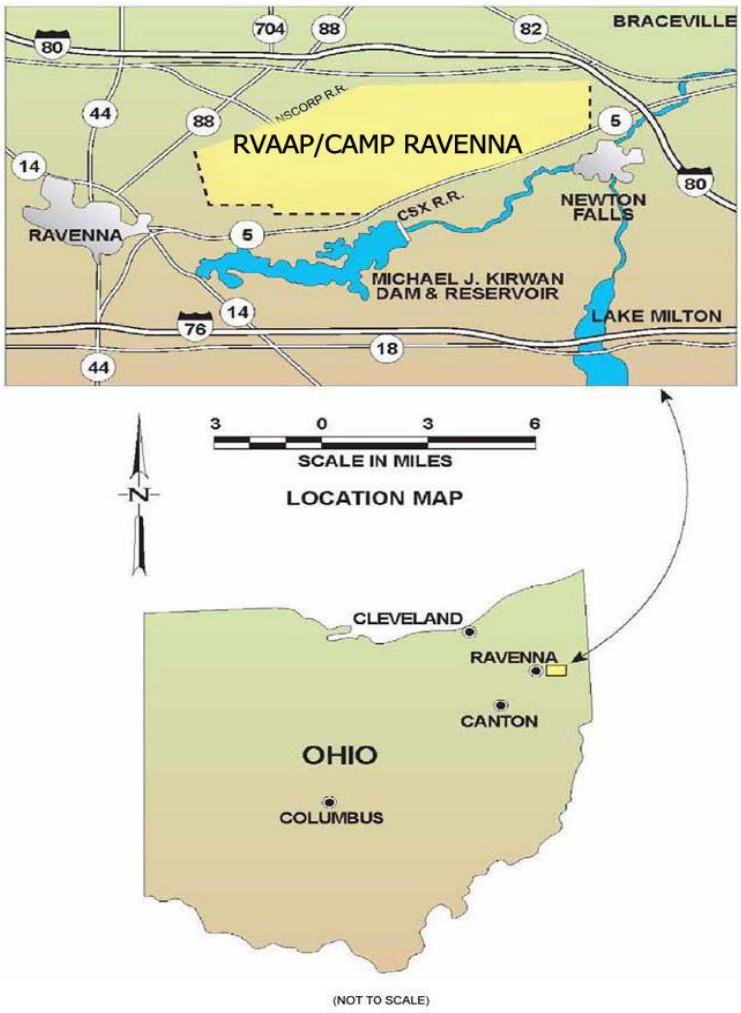


Figure 1. RVAAP/Camp Ravenna Location and General Vicinity Maps

Camp Ravenna did not exist when the RVAAP was operational, and the entire 21,683-acre parcel was a GOCO industrial facility. The RVAAP BRACD sites encompass investigation and clean up of past activities over the entire 21,683 acres of the former RVAAP. Therefore, references to the RVAAP in this document shall include the historical extent of the RVAAP, inclusive of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated.

1.2 Areas of Concern

CC-RVAAP-80: Group 2 Propellant Can Lids

CC-RVAAP-80 consists of the Group 2 Propellant Can Lids area. Propellant can lids or tops were identified on the ground surface/near surface at the southern and northern ends of the former Group 2 Ammunition Storage Area. These materials are typically classified as RRD

(similar to munitions packaging materials); however, this site was never used or classified as an operational range. It is believed that the discarded propellant can lids might qualify as inert scrap metal.

The propellant can lids located at the south end of Group 2 were initially identified by Ohio Army National Guard trainees in the winter of 2008. The propellant can lids were observed in the vegetative area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines. This area consists of approximately 539,572 square feet (12.4 acres). Reportedly, propellant can lids were also identified at the northern end of the Group 2 area by the Ohio Army National Guard. The reported northern area consists of approximately 43,418 square feet (1 acre).

The Louisville District USACE performed an emergency survey with a metal detector of a portion of the southern area ground surface. Results of the initial investigation revealed multiple magnetic anomalies in the surface and near surface soils. On-site UXO personnel visually identified the surface anomalies as propellant can lids or tops. During the emergency survey it was also noted that the ground surface had been disturbed and contained hummocks (mounds) ranging in height from 1' to 2' throughout the survey area.

As such, the propellant can lids (or RRD) are of environmental concern for the subject area. A geophysical survey is necessary to identify the anomalies and anomalous areas within the subject area, and to characterize the subject area boundary(s).

The anomalies and anomalous areas should be clearly marked during the field survey in order to facilitate a limited soil investigation, and possible future clean up activities. The limited soil investigation is warranted to assess possible releases of propellants (MC) to the surface soils in the vicinity of the can lids.

The site is a low probability site in regards to encountering munitions and explosives of concern (MEC). Therefore, only unexploded ordinance (UXO) construction support will be needed for this project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be stopped and the site will need to be re-evaluated and potentially assigned a new probability rating.

RVAAP-09: Load Line 2

Former excavation activities conducted at Load Line 2 (RVAAP-09) have resulted in the accumulation of water within the building DB-802 footprint. Restoration activities are now planned at this location, and the accumulated water needs to be removed from the excavation to assist in the restoration of the site.

2.0 PROJECT OBJECTIVES

The objective of this project is to conduct an initial investigation of the above-described Group 2 Propellant Can Lids areas. The investigation shall achieve the following objectives:

- Delineate the boundaries of the propellant can lid areas
- Confirm the presence or absence of releases of propellants and/or other MC to the surface soils at this AOC

Project objectives and the SOW associated with the water removal services at Load Line 2 are described in Section 8.0. Other portions of this document pertain to the activities and requirements associated with the Group 2 Propellant Can Lids areas.

3.0 GENERAL REQUIREMENTS

The Contractor shall possess all the required expertise, knowledge, equipment and tools required to perform the work described in this SOW in accordance with established industry standards. The Contractor shall be responsible for and shall furnish all labor, materials, plant, equipment, and supplies necessary to fully execute the Firm Fixed-Price work described herein within the contract performance period (see Section 4.0).

The Contractor shall perform all environmental services pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and National Oil and Hazardous Substances Contingency Plan (NCP) requirements, and coordinating with the Ohio Environmental Protection Agency (EPA) as appropriate. The installation is not on the National Priorities List (NPL).

The Contractor shall comply with all applicable federal, state, and local rules, laws, and regulations. The Contractor shall fulfill the work described in this SOW in a manner that is consistent with any applicable orders or permits, all cleanup agreements or guidance for the Facility, and relevant DoD and Army policy that exist or may become effective during the performance of this contract. This specifically includes the Director's Final Findings & Orders (DFFO), which the Army and Ohio EPA agreed to in 2004. The DFFO establishes certain criteria that apply to the relationship between the Army and Ohio EPA, including but not limited to approval authority, document review schedules, and various agency responsibilities. All work performed shall conform to the DFFO.

3.1 Government Property

All documents, maps, photographs, graphics, mailing lists, radio telemetry transmitters, computer files and the like developed by the Contractor while completing the requirements of this SOW are government property and will be delivered to the facility Point of Contact (POC) upon completion of this project.

3.2 Data Security

The Contractor shall not release any data, reports, or materials collected and/or developed during this project without the expressed written consent of the U.S. Army Corps of Engineers (USACE).

3.3 Deliverables and Document Format

The Contractor shall prepare and submit the following project management documents:

- Project Management Plan (PMP) including a Quality Control Plan (QCP)

In addition (but not limited to), the Contractor shall prepare the following project specific documents (as applicable) in support of the IRA:

- Work Plan (WP)
- Sampling and Analysis Plan (SAP)
- Site Safety and Health Plan (SSHP)
- Quality Assurance Project Plan (QAPP)
- Report of Findings and Conclusions

The Work Plan documents can be developed as Addenda to the approved Facility-Wide documents; however, references to the Facility-Wide documents should be held to a minimum with respect to describing actual field assessment activities. The Work Plan should be treated as the body of the report while the above associated plans are entered as tabbed sections (or incorporated by reference).

The above documents are subject to stakeholder review and approval. All documents shall be submitted by the Contractor in preliminary draft, draft, and final format. The number of documents and their distribution is described below:

Preliminary Draft Documents

Organization	Number of Paper Copies	Number of Electronic Copies
USACE	4	4
RVAAP	2	2
Ohio Army National Guard	1	1
REIMS	1	1

Draft Documents

Organization	Number of Paper Copies	Number of Electronic Copies
USACE	4	4

RVAAP	4	2
Ohio EPA	2	2
Ohio Army National Guard	1	1
REIMS	1	1

Final Documents

Organization	Number of Paper Copies	Number of Electronic Copies
USACE	4	4
RVAAP	4	2
Ohio EPA	2	2
Ohio Army National Guard	2	2
REIMS	1	1

The Army, through the Contracting Officer's Representative (COR), will receive preliminary draft documents from the Contractor and will provide review comments to the Contractor within thirty business days. Once preliminary draft comments are addressed, the Army will review draft and final documents concurrently with the other stakeholders. The Contractor shall ensure that review and response periods are consistent with the applicable regulatory drivers (see DFFO). All documents shall be identified as draft until completion of stakeholder coordination, when they will be signed and finalized. One copy of the final documents shall be placed in both the project repositories and Administrative Record (for CERCLA documents).

All documents shall be submitted in electronic and printed format in accordance with the latest version of the document entitled "Ravenna Army Ammunition Plant Deliverable Document Formatting Guidelines." The referenced document is available and can be downloaded from www.rvaap.org/docs/pub/Formatting_Guidelines.pdf.

All reports are to be typed. Field notes shall be reviewed for quality assurance (QA) and then be submitted in handwritten form. Other handwritten field originals shall also be included in the reports.

In addition, final electronic document files must be in text-searchable PDF format and be accompanied by defined metadata for upload into the Army Repository of Environmental Documents (READ).

The contractor shall secure a USACE approved laboratory that can provide analytical data in the USACE Automatic Data Review (ADR) electronic format. All samples collected and analyzed under this agreement shall be provided in the referenced electronic data deliverable (EDD) format. The project-specific library file must be maintained to accurately reflect all of the analytical quality and will be provided to both the USACE and the sub-contract laboratory for use in screening EDD submittals.
Data review must comply with the procedures outlined in the Louisville Quality System Manual (QSM) Supplement and provide compatibility with data management software, at minimum, Environmental Data Management System (EDMS) software. The Contractor shall set up

libraries in ADR/EDMS for deriving site constituents of potential concern (COPCs). The contractor is responsible for keeping ADR current.

All electronic data submitted by the contract laboratory is required to be error-free, and in complete agreement with the hardcopy data. Data files are to be delivered both by e-mail and/or high density CD accompanying the hardcopy data reports. The disk must be submitted with a transmittal letter from the laboratory that certifies the file is in agreement with hardcopy data reports and has been found to be free of errors using the latest version of the ADR evaluation software provided to the laboratory. The contract laboratory, at its cost, will correct any errors identified by the USACE, Louisville District.

All documents shall be provided in electronic format for posting to the Ravenna Environmental Information Management System (REIMS). All analytical data shall also be provided in EDD format for posting to REIMS. REIMS is currently administered by Mr. Patrick Ryan of SAIC. Mr. Ryan can be contacted at (865) 481-4664. The Contractor shall coordinate with Mr. Ryan to ensure proper sample numbering, EDD formatting, etc.

All project documents must meet the approval of the USACE. Project documents must also meet the approval of the Ohio Environmental Protection Agency (EPA) and all other stakeholders in compliance with the DFFO, and the most current version of the RVAAP Deliverable Document Format Guidelines.

3.4 Electronic Data Files

Currently the Louisville District standards for software are MicroStation Version 8 (.dgn) and MS Office Version 2003 Professional. These products are to be considered the default software of choice unless otherwise specified within individual task order scopes of work, as determined by individual customer requirements or as the District incorporates updated versions of its software.

CADD Files: When required and requested in a task order, all CADD files (survey and topographic data, remedial action design drawings, contaminant migration maps and models, etc.) shall be digitized into files compatible with Microstation vector format (or other format if directed in the individual task order). Specific design file features will be provided in the individual task orders. CADD files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract.

GIS Files: When required and requested in a task order, all GIS files (survey and topographic data, remedial action data collected, contaminant migration maps generated, etc.) shall be submitted compatible with Environmental Systems Research Institute (ESRI) 9.x (shape files or personal geodatabases) format (or other format if directed in the individual task order). All GIS data shall be made compliant to the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) version 2.6 (http://www.sdsfie.org/). Specific GIS file features will be provided in the individual task orders. GIS files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract. All GIS data shall be collected using the local State Plane coordinate system using the North American Datum of 1983 and the North

American Vertical Datum of 1988. All files shall be collected using linear units of US Survey feet for both the horizontal and vertical.

Electronic Files: All final reports and documents, including laboratory analysis data, shall be submitted on CD/DVD. Report documents shall be in Adobe (pdf) format, and shall be accompanied by the Contractor's associated work files.

3.5 Conducting Meetings

Unless otherwise specified, the Contractor shall arrange and conduct all meetings required by this SOW. Unless otherwise specified, the installation shall provide facilities for meetings.

3.6 Project Stake Holders

For the purposes of this SOW, project stakeholders include the Army, Ohio Army National Guard, National Guard Bureau, Ohio EPA, the Restoration Advisory Board (RAB), and the general public. The Contractor's required level of involvement may differ for each AOC/Site, and the Contractor shall be responsible for obtaining comments with appropriate approval or concurrence on project deliverables consistent with applicable regulatory drivers and agreements for each AOC/CR site.

4.0 STATEMENT OF WORK

CLIN No. 1 – The Contractor shall implement and complete an initial environmental investigation at Compliance Restoration site CC-RVAAP-80, the Group 2 Propellant Can Lids Areas.

CLIN No. 2 – The Contractor shall provide water removal services as described at Load Line 2.

The Contractor is encouraged to become thoroughly familiar with all programmatic and scheduling requirements contained in this SOW as well as the DFFO in order to prepare the cost proposal. The Contractor is also encouraged to attend a preliminary site visit at the RVAAP facility with the USACE, other Army representatives, and the Ohio EPA. The purpose of the site visit is to familiarize the Contractor with the AOC/CR sites, and to provide other relative information (as applicable) necessary for the Contractor to prepare the cost proposal.

The following additional details and assumptions should also be considered in the preparation of the cost proposal:

- All of the access routes on the subject property are managed by the Ohio Army National Guard (OHARNG). Additionally, the primary AOC listed in this SOW is located on OHARNG property. Military training and other OHARNG activities are priority on OHARNG property. Contractor activities must be coordinated with the OHARNG through Mr. Mark Patterson, the BRACD Facility Manager.

- Contractor is subject to OHARNG security and access procedures.

- Contractor may not disturb soil, water, vegetation, buildings, equipment or animals without prior coordination and approval of the OHARNG.

- Contractor is responsible for repairing damage to any roads, soil, vegetation, drainage, or otherwise caused by their activities on or adjacent to OHARNG property.

All work performed on this SOW shall follow the Contractor's approved Project Management Plan (PMP), and shall be performed in accordance with the following existing documents (if applicable) developed for the facility (or updates to the existing documents, if applicable):

- Ohio EPA's Director's Final Findings and Orders (DFFO) for RVAAP (Ohio EPA 2004)

- RVAAP's Facility-Wide Human Health Risk Assessor Manual (USACE 2004)

- Facility-Wide Ecological Risk Assessment Work Plan (USACE 2003a)

- Facility-Wide Sampling & Analysis Plan and Quality Assurance Project Plan (USACE 2001b)
- Facility-Wide Safety and Health Plan (USACE 2001a)
- Facility-Wide Groundwater Monitoring Program Plan (Portage 2004)
- RVAAP Community Relations Plan (USACE 2003b)
- RVAAP Final Position Paper for the Application and Use of Facility-Wide Human Health Cleanup Goals (USACE 2009)

The above documents are available for review online at http://www.rvaap.org. Following contract award, the Contractor may direct questions to the USACE by contacting Mr. Derek Kinder at 502-315-6393.

4.1 CLIN No. 1 – Environmental Investigation at Compliance Restoration Site CC-RVAAP-80.

The detailed Tasks for this SOW are discussed in the following sections.

Task 1.0: Project Management

The Contractor shall provide a Project Manager qualified to oversee all work described in the SOW. The Project Manager shall serve as the single point of contact (POC) and liaison for all work required. All work shall be accomplished with adequate internal controls and review procedures to eliminate conflicts, errors, and omissions and to ensure the accuracy of all work completed under this SOW. The Contractor shall accept direction only from the USACE Contracting Officer (KO) or the designated COR. Any changes to this SOW must be authorized in writing by the KO.

Task 1.1: Project Management Plan (PMP)

Contractor shall develop a Preliminary Draft PMP within 30 days of contract award. The PMP shall summarize Contractor's overall technical and management approach for this project. The PMP shall also include the summary of work to be performed and project schedule, project team roles and responsibilities, and a deliverable matrix in accordance with the project performance objectives.

The PMP shall also include a Quality Control Plan (QCP). The QCP will be developed to define how quality control will be executed for products and performance of work activities by all personnel, including subcontractors.

Upon receipt of USACE comment responses, Contractor shall submit a Draft PMP for stakeholder review and approval. The Contractor shall submit the Final PMP within 30 calendar

days of receipt of COR comments on the draft document or in compliance with the schedule specified by the Ohio EPA. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR, and Ohio EPA approval is achieved through receipt of EPA documentation confirming PMP approval.

Task 1.2: Site Safety and Health Plan (SSHP)

Contractor shall develop a Preliminary Draft Site-Specific Safety and Health Plan (SSHP) addenda for each appropriate task of the project. The SSHP will be presented as an addendum to the Facility-Wide Health and Safety Plan (USACE 2001a). The SSHP Addendum will address task hazard analyses, emergency response, contingency plans, and emergency contacts. The SSHP will include UXO avoidance services. The SSHP will meet the requirements of federal, state, and local regulations and will identify safety and health regulations applicable to the work. The Preliminary Draft SSHP shall be submitted to the USACE within 30 calendar days of contract award.

Upon receipt of USACE comment responses, Contractor shall submit a Draft SSHP for stakeholder review and approval. The Contractor shall submit the Draft SSHP within 30 calendar days of receipt of COR comments on the draft document or in compliance with the schedule specified by the Ohio EPA. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR. The Ohio EPA may provide review and comment on the SSHP; however, does not approve health and safety documents for USACE Contractors.

Task 1.3: Project Execution/Client Correspondence

The following activities and deliverables shall be performed in support of this project:

- Project Kick-Off Meeting
- Monthly Progress Reports
- Records of Conversations
- Teleconference Progress Updates
- Meeting Minutes Documentation
- Public Involvement / RAB Meetings

The above activities will be conducted by the Contractor to achieve project execution, and maintain client correspondence with the USACE. These activities are discussed in further detail below.

Task 1.3.1: Project Kick-Off Meeting - Upon Army and Ohio EPA approval of the PMP and SSHP, the Contractor shall implement and attend an initial Project Kick-Off Meeting at the RVAAP facility. The Contractor shall present the details of the PMP, the SSHP, and the anticipated approach to conducting the IRA Activities. The Kick-Off Meeting is intended to assist the Contractor with the submittal and stake holder approval of the related Work Plan documents.

Task 1.3.2: Monthly Progress Reports - The Contractor shall submit monthly written progress reports to the USACE for every month by the fifth (5^{th}) day of the following month. The monthly reports will include an accurate and current account of all work completed and deliverables furnished to the government. Progress reports will be prepared following the described sections presented in Section XVI of the DFFO. Contractor's payment invoices may accompany the monthly progress reports.

Task 1.3.3: Records of Conversations - The Contractor shall prepare and maintain records of telephone conversations and significant verbal conversations conducted in support of this project. These records will be forwarded with monthly progress reports.

Task 1.3.4: Teleconference Progress Updates - The Contractor shall attend periodic teleconference progress meetings with the USACE to provide project status updates. The progress update meetings are currently held on a biweekly basis.

Task 1.3.5: Meeting Minutes Documentation - The Contractor shall document discussions at all meetings held in support of this project. Meeting minutes will be typed, and distributed to the USACE and installation POCs within 7 calendar days following the meeting.

Task 1.3.6: Public Involvement / RAB Meetings – The Contractor should note that the Installation has an active Restoration Advisory Board (RAB) and detailed information concerning the RAB's organization and activities will be provided to the Contractor. The Contractor shall attend a minimum of one (1) applicable RAB meeting during the specified period of performance at the direction of the COR.

All public participation coordination shall be approved by the Army through the Facility Manager and the COR. The Contractor shall provide the necessary support to initiate, schedule, and address all public participation aspects of the project (e.g., preparation of briefings, presentations, fact sheets, newsletters, articles/public notices to news media, and notifications to RAB members). The Contractor shall be responsible for requesting and addressing all public comments consistent with the applicable regulatory drivers. The USACE COR, or designee, will attend and represent the Army at all meetings with the public.

Task 2.0: Preparation of Work Plan and Supporting Documents

The Contractor shall prepare a work plan (WP) and the necessary supporting documents to implement and complete an initial environmental investigation at the designated Group 2 Propellant Can Lid Areas. The investigation shall consist of a geophysical delineation of the designated areas, and a limited soil investigation of the surface soils in these areas.

Consistent with the RVAAP Deliverable Document Format Guidelines, the deliverables shall consist of the WP, the Sampling and Analysis Plan (SAP), the Site Safety and Health Plan (SSHP as discussed in Task 1.2), and the Quality Assurance Project Plan (QAPP). The WP documents shall follow the most recent version of the outline specified in the RVAAP Deliverable Document Format Guidelines.

The following paragraphs describe the requirements associated with the Contractor's development of the WP documents:

Contractor shall develop a Preliminary Draft WP, SAP and QAPP within 60 days of approval of the final PMP. The SAP and QAPP will be developed as an Addendum, tiered under the existing RVAAP Facility-Wide SAP (USACE 2001b), to comply with USACE and Ohio EPA requirements.

All analytical work shall be performed in accordance with the most recent version of the DOD Quality System Manual (QSM). Sampling objectives will be established and the appropriate method will be identified to satisfy the performance objectives. The chemical analytical laboratory must be selected and included in all QAPP deliverables. No sampling activities shall commence until all plans are approved.

Upon receipt of USACE comment responses, Contractor shall submit a Draft SAP and QAPP for stakeholder review and approval. The Contractor shall submit the Final documents within 30 calendar days of receipt of Ohio EPA comments. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR, and Ohio EPA approval is achieved through receipt of EPA correspondence confirming the Plan approvals.

Task 3.0: Implementation of Work Plan

Within 30 days of Final WP approval, Contractor shall begin implementation of the WP by performing the field assessment activities specified in the approved plan. A revised schedule for implementation of field activities may be warranted due to weather conditions or other unforeseen changes in the project schedule. The USACE reserves the right to modify the schedule for field activities due to inclement weather, and for safety and health purposes.

The Contractor shall be responsible for and bear all associated costs necessary to achieve the objectives of the WP. This includes, but is not limited to, possible vegetation clearing activities, the geophysical delineation, and the soil sampling and analysis activities. Right of Entry to the Ravenna facility shall be coordinated with the OHARNG and the Army. Coordination with both agencies must first go through the Ravenna Facility Manager.

Task 3.1: Geophysical Delineation

The Contractor shall implement and complete a geophysical delineation of the buried or near surface materials (propellant can lids, etc.) in the designated Group 2 areas. The geophysical equipment must be appropriate and capable of identifying horizontal and vertical anomalies cause by buried waste. The proposed equipment and anticipated limitations shall be detailed in your proposal. The geophysical survey personnel shall be capable of producing working maps in the field or be capable of transmitting data back to the office and receiving a map back from the office prior to beginning work the next day.

The Contractor shall provide a cost of mobilization and demobilization, and a unit cost per day for the total geophysical survey cost including equipment, personnel, and daily map production support.

Task 3.2: Collecting Surface Soil Samples

Contractor shall collect Multi Increment® (MI) surface soil samples based on the results of the geophysical delineation. Up to three (3) (3 maximum plus QA samples) MI surface soil samples will be collected within those areas that are identified to include near surface propellant can lids or other possible waste materials.

The MI surface soil samples shall be obtained by collecting a minimum of 30 increments per sample area from 0 to 1 foot below ground surface (bgs). MI Sample areas should be approximately one quarter of an acre or less in size. Multiple smaller areas where anomalies are found can be combined into one designated MI sample area. Anomaly avoidance should be used during sampling to ensure soils around the anomalies can be collected to the desired depth of 1 foot bgs. The Contractor shall provide a unit price and total price for this task.

Task 3.3: Sample Analysis

Contractor shall provide fixed unit costs and total cost for analyses as specified in Table 1 included in this SOW. Costs shall include all labor, materials, equipment, and supplies necessary to complete this task. All samples shall be analyzed for TAL Metals, and common propellants used by the DoD including Nitrocellulose, Nitroglycerine, Nitroguanidine, and Perchlorate. One (1) of the samples shall also be analyzed for the RVAAP full suite as prescribed in the Facility Wide SAP. Contractor shall provide for quality control testing as specified in the facility wide SAP. QA samples will be collected at a frequency of 10% and sent to a lab contracted by the USACE. All analytical data should be reported per Ravenna specific ADR specifications. Analytical methods shall be in accordance with the Facility-Wide SAP and the Contractor's approved Work Plan.

IDW samples shall be analyzed for the Full List TCLP for waste characterization purposes. Upon project completion, the Government will de-obligate any unused funds associated with this Task.

Table 1 Costs for Soil Sample Analysis

Analyte	Fixed Unit Price	Number of Tests	Total Cost
Surface Soil			

MI Sample Prep			
TAL Metals			
Mercury			
Hexavalent Chromium			
Propellants			
Explosives			
SVOCs			
VOCs			
Pesticides			
PCBs			
TCLP			

Task 3.4: Disposal of IDW

Within 90 days of the generation of IDW, Contractor shall characterize and properly dispose of all IDW at approved off-site waste disposal facilities in compliance with all applicable Federal, State, and local rules, laws and regulations. Land application of select wastes may apply (subject to approval). Contractor is responsible for maintaining all applicable waste characterization and disposal records, and for producing a waste disposal report for submittal to and approval by the Ohio EPA. IDW disposal activities shall be coordinated with the RVAAP Facility Manager and the OHARNG. **(Note: All IDW is to be removed from the subject property no later than 90 days following waste generation.)**

Task 3.5: Data Management / Data Validation

EPA CLP Level IV data validation will be required to meet the requirements of the DoD QSM. The Contractor shall perform data verification for all analytical results according to the process provided in the Louisville QSM Supplement and QC criteria in the DoD QSM. USACE Louisville District shall contract a third-party contractor for a minimum 10% or greater validation of analytical results. The Contractor shall include the completed validation report as presented by the validator as an appendix to the final document, and discuss results in the project report. The report shall also be sent directly from the validator to the USACE technical contact upon completion of validation.

Task 3.6: Surveying and Mapping

Survey maps shall be provided in the report, which delineate the boundaries of the survey site, the boundaries and locations of the metal anomalies, and the soil sample locations subject to this SOW. All data submitted shall be in the Universal Transverse Mercator (UTM) coordinate system. *(Note: All coordinates shall be collected with applicable equipment capable of gauging field surveys within an accuracy of one meter or less of error.)*

Task 4.0: Investigation Report

The Contractor shall prepare and submit a Preliminary Draft investigation report within 90 calendar days following the completion of the field investigation activities. The report shall document the process and procedures used in conducting the geophysical delineation, and describe all soil sampling activities conducted during this project. This report shall include details about pre-mobilization, mobilization, site preparation, the geophysical delineation, sample collection, decontamination, analytical results, waste management, event chronology, final site inspection, and mapping. The investigation report maps shall include the delineation of known and/or suspected buried waste materials, and the locations of MI sample area boundaries.

Upon receipt of USACE comment responses, Contractor shall submit a Draft investigation report for stakeholder review and approval. The Contractor shall submit the Draft investigation report within 30 calendar days of receipt of COR comments on the draft document or in compliance with the schedule specified by the Ohio EPA. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR.

4.2 CLIN No. 2 – Water Removal Services at Load Line 2

Task 1.0: Water Removal Services

As described in Section 1.2, former excavation activities conducted at Load Line 2 (RVAAP-09) have resulted in the accumulation of water within the building DB-802 footprint. Restoration activities are now planned at this location, and the accumulated water must be removed from the excavation to assist in the restoration activities.

The planned action for restoring this area is to push back concrete and other demolition debris into the excavation to a depth 4 feet below the surrounding grade. Then, soil will be placed on top of the rubble to match the surrounding grade. To achieve this, it is anticipated the water will need to be pumped out of the excavation in two phases. First, the Contractor shall pump water out of the excavation down to a level suitable to fill the excavation with demolition debris without causing the remaining water in the excavation to rise out of the excavation and cause excessive runoff. Once this amount of water is removed, the rubble will be immediately pushed into the excavation. Pushing rubble into the excavation will be completed under a previously awarded BRAC-D contract. After this work is complete, the Contractor shall revisit the site and pump out any water that is above the level of the demolition debris in the excavation. Once this water level is achieved, soil will be immediately placed into the excavation under a previously awarded BRAC-D contract. The Contractor must complete their work in accordance with the BRAC-D contractor's schedule. Pumping water out of the excavation must be done immediately before backfilling the excavation. Allowing time to pass between pumping water out of the excavation and backfilling may allow the excavation to again fill with water. Water should be removed from the excavation in a manner that is approved by the Army and the Ohio EPA. A Letter Work Plan shall be prepared presenting the methodology to conduct the water removal for concurrent review by all RVAAP stakeholders.

5.0 PAY ESTIMATES

The Contractor shall submit Pay Estimates using ENG Form 93 as specified in the contract. ENG Form 93 may be found on the Internet under the library of USACE publications. The Contractor shall ensure that the Pay Estimates include a separate line item for each task. All ENG Form 93 shall be submitted to the USACE COR or the COR designated representative. Electronic submission of Pay Estimates to the USACE is acceptable; however, should be followed with the mailing of a hard copy.

Release of Claims shall accompany the final Pay Estimate. The Release of Claims shall be signed and shall include the total contract amount, amount of final payment due, and a statement similar to the following:

> "The undersigned architect-engineer firm, under Contract No. ##, Delivery Order No. ##, between the United States of America and said Contractor for services at (property name) in (location) hereby release the U.S., its officers, agents, and employees from any and all claims arising under or by virtue of said contract or any modification or change thereof except with respect to those claims, if any, listed below:"

The Contractor's pay estimates must meet the CLIN structure presented in this SOW. For instance, all pay estimates for tasks performed under the environmental investigation for CC-RVAAP-80 shall appear under the CLIN No. 1 heading. All pay estimates associated with the water removal services at Load Line 2 shall appear under the CLIN No. 2 heading. Pay estimates submitted to the USACE without the proper CLIN designation shall be returned to the Contractor for clarification purposes.

6.0 PROPOSAL ESTIMATE

The Contractor shall submit a detailed estimate of the effort required to complete the described SOW. The proposal submittal shall also include the estimated costs associated with all planned sampling and analysis activities (other direct and indirect costs). The proposed sampling shall include 15% of the samples also having analyses for propellants, VOCs, SVOCs, pesticides/herbicides, and PCBs (full analyses), as prescribed in the Facility Wide SAP. The Contractor shall complete and submit Table 1 (as shown) as a summary of estimated costs.

Table 2: Contractor's Summary of Estimated Costs

Task #	Task Description	Unit	Fixed Unit Cost	Number of Units	Total Cost
CLIN No. 1 – Environmental Investigation at Compliance Restoration Site CC-RVAAP-80					
1.1	Project Management Plan				
1.2	Site Safety Health Plan				
1.3.1	Project Kickoff Meeting				

1.3.2	Monthly Progress Reports				
1.3.3	Records of Conversations				
1.3.4	Teleconference Progress Updates				
1.3.5	Meeting Minutes Documentation				
1.3.6	RAB Meetings				
2.0	Work Plan and Support Documents				
3.0	Implementation of Work Plan				
3.1	Geophysical Delineation				
3.2	Surface Soil Sampling				
3.3	Sample Analysis				
3.4	Disposal of IDW				
3.5	Data Management / Data Validation				
3.6	Surveying and Mapping				
4.0	Investigation Report				
				CLIN No. 1 – Total Cost Estimate	
CLIN No. 2 – Water Removal Services at Load Line 2					
1.0	Water Removal Services				
				CLIN No. 2 – Total Cost Estimate	

7.0 PERIOD OF PERFORMANCE / PROJECT SCHEDULE

The Period of Performance for this contract shall begin at the time of contract award, and ends 31 December 2011.

The Contractor shall submit a proposed project schedule for the described SOW. The schedule should be prepared in general conformance with the following schedule anticipated by the

USACE. *(Note: The award of this SOW to the Contractor is subject to the availability of funding.)*

Task No.	Identified Task	Duration / Due Date
CLIN No. 1 – Environmental Investigation at Compliance Restoration Site CC-RVAAP-80		
--	Preliminary Site Visit (Prior to Award)	14 Days of USACE Submittal of Request For Proposal (RFP)
--	Notice to Proceed (NTP) / Contract Award	31 March 2010
1.1	Pre-Draft Project Management Plan	30 Calendar Days of NTP
1.2	Pre-Draft Site Safety Health Plan	30 Calendar Days of NTP
1.3.1	Project Kickoff Meeting	30 Calendar Days of Approval of PMP and SSHP
1.3.2	Monthly Progress Reports	By the 5th Day of Each Month
1.3.3	Records of Conversations	By the 5th Day of Each Month
1.3.4	Teleconference Progress Updates	Bi-Weekly
1.3.5	Meeting Minutes Documentation	7 Calendar Days Following Meeting
1.3.6	RAB Meetings	Once per Army Direction
2.0	Pre-Draft Work Plan and Support Documents	60 Calendar Days of NTP
3.0	Implementation of Work Plan	Begin 30 Calendar Days of Approval of Final Work Plan
4.0	Pre-Draft Investigation Report	Within 90 Calendar Days of Completing Field Investigation Activities
CLIN No. 2 – Water Removal Services at Load Line 2		
1.0	Water Removal Services	Must adhere to BRAC-D Contractor's Schedule

Upon project award to the Contractor, the agreed upon project schedule will be updated with calendar dates and will be included in the Contractor's PMP. Adherence to the PMP project schedule will serve as a measurement of Contractor performance on this project.

8.0 ADDITIONAL INFORMATION

8.1 Additional Contractor Requirements

The Contractor shall be aware of the following requirements:

- HTRW, MEC, MC or MD may be found in munitions, containers, landfills, Open Burning/Open Detonation (OB/OD) areas, ground spills, surface water, or groundwater. If suspected HTRW, MEC, MC or MD of unknown origin and nature is encountered, the

contractor shall immediately notify the Facility Manager, the Contracting Officer or the designated COR. The contractor shall take necessary actions to protect the safety of its workforce, the public, and the environment.

- Permits. The contractor shall obtain the permits and licenses necessary to conduct his/her operations including, but not necessarily limited to, installation required permits, building permits, drilling permits, and/or waste transportation and disposal permits.

- Safety and Health Program. The contractor shall ensure that its subcontractors, suppliers, and support personnel follow all safety and health provisions established in the approved Accident Prevention Plan (APP) for the site. A Site Safety and Health Plan (SSHP) shall be included in the APP as an Attachment. The Government reserves the right to stop work under this contract for any violations at no additional cost. The Government will verify that corrective action has been implemented prior to the contractor continuing performance under the contract. All personnel performing onsite activities shall participate in an ongoing medical surveillance program meeting the requirements of 29 CFR 1910.120. The medical examination protocols and results shall be overseen by a licensed physician who is certified in Occupational Medicine by the American Board of Preventive Medicine or who by necessary training and experience is board eligible.

- Quality Management. The contractor is responsible for the control of product quality and for offering to the Government for acceptance only those products/services that conform to the contractual requirements.

Appendix B

Figures

Figure 1 – General Location and Orientation of RVAAP

Figure 2 – Compliance Restoration Site CC-RVAAP-08, Group 2 Propellant Can Tops and RVAAP-09 Load Line 2 Building DB-802 within RVAAP

Figure 3 - CC-RVAAP-08, Group 2 Propellant Can Tops Site Map

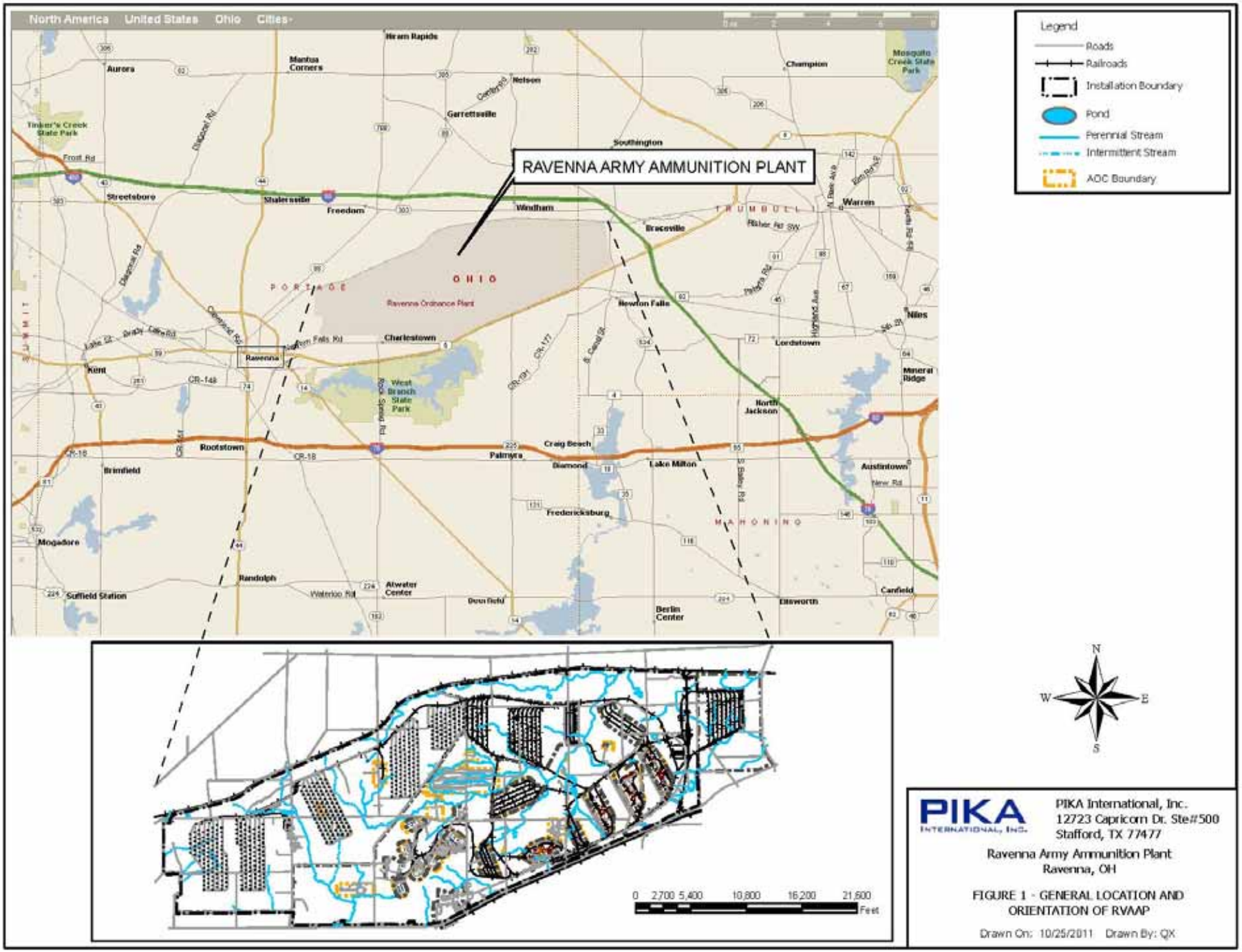
Figure 4 - Load Line 2 Building DB-802 Site Map

Figure 5 – Group 2 Sample Boundaries Area

Figure 6 – Group 2 Anomaly Cluster Areas

Figure 7 – Group 2 Sample Locations

Figure 8 – Group 2 Sample Boundaries



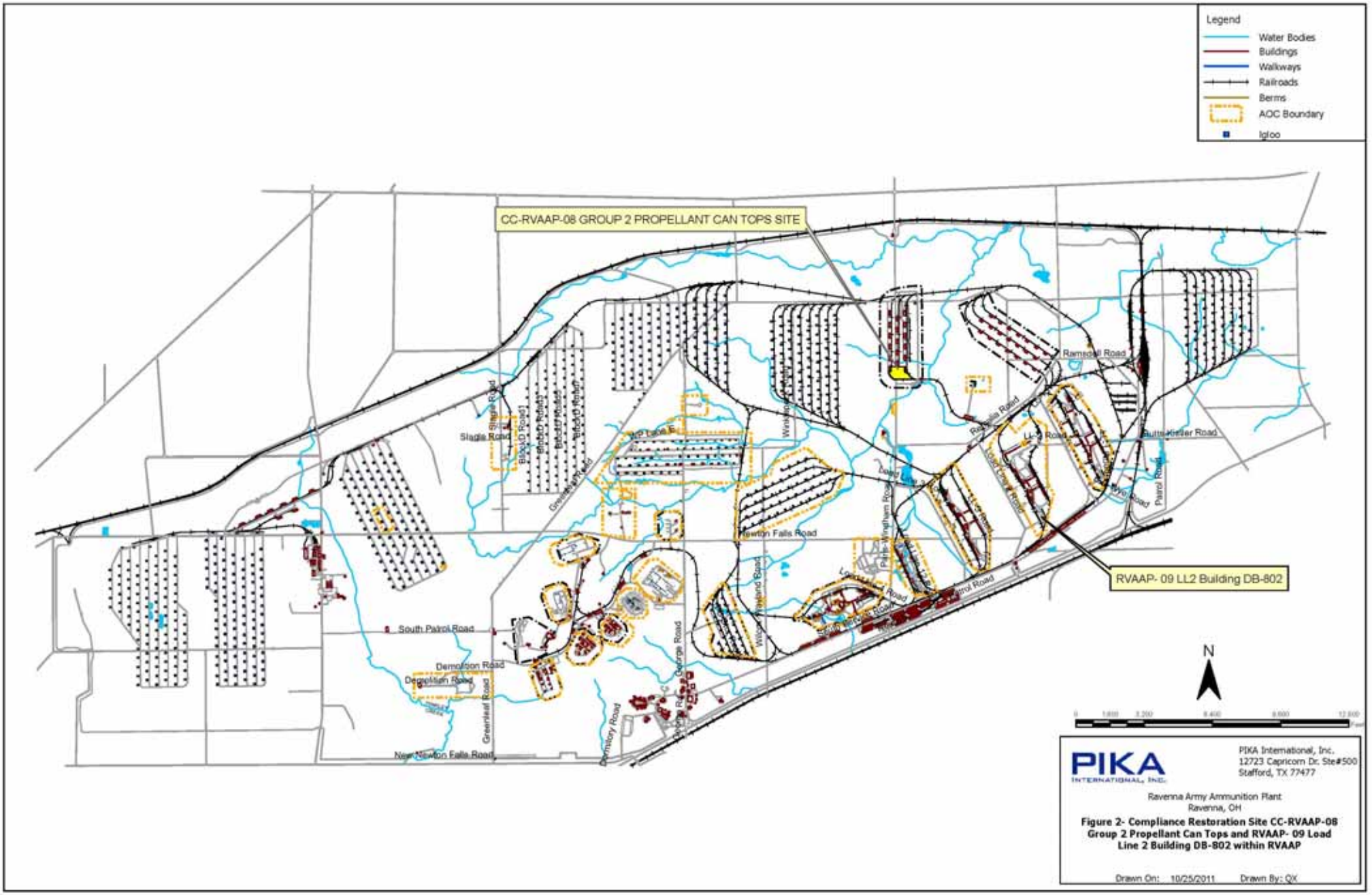
PIKA INTERNATIONAL, INC.

PIKA International, Inc.
12723 Capricorn Dr. Ste#500
Stafford, TX 77477

Ravenna Army Ammunition Plant
Ravenna, OH

FIGURE 1 - GENERAL LOCATION AND ORIENTATION OF RVAAP

Drawn On: 10/25/2011 Drawn By: QX


Legend
Water Bodies
Buildings
Walkways
Railroads
Berms
AOC Boundary
Igloo
CC-RVAAP-08 GROUP 2 PROPELLANT CAN TOPS SITE
RVAAP- 09 LL2 Building DB-802
Ramsdell Road
Slagle Road
Newton Falls Road
South Patrol Road
Demolition Road
Greenleaf Road
Dormitory Road
George Road
Patrol Road
Butts Kreider Road
N
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PIKA International, Inc.
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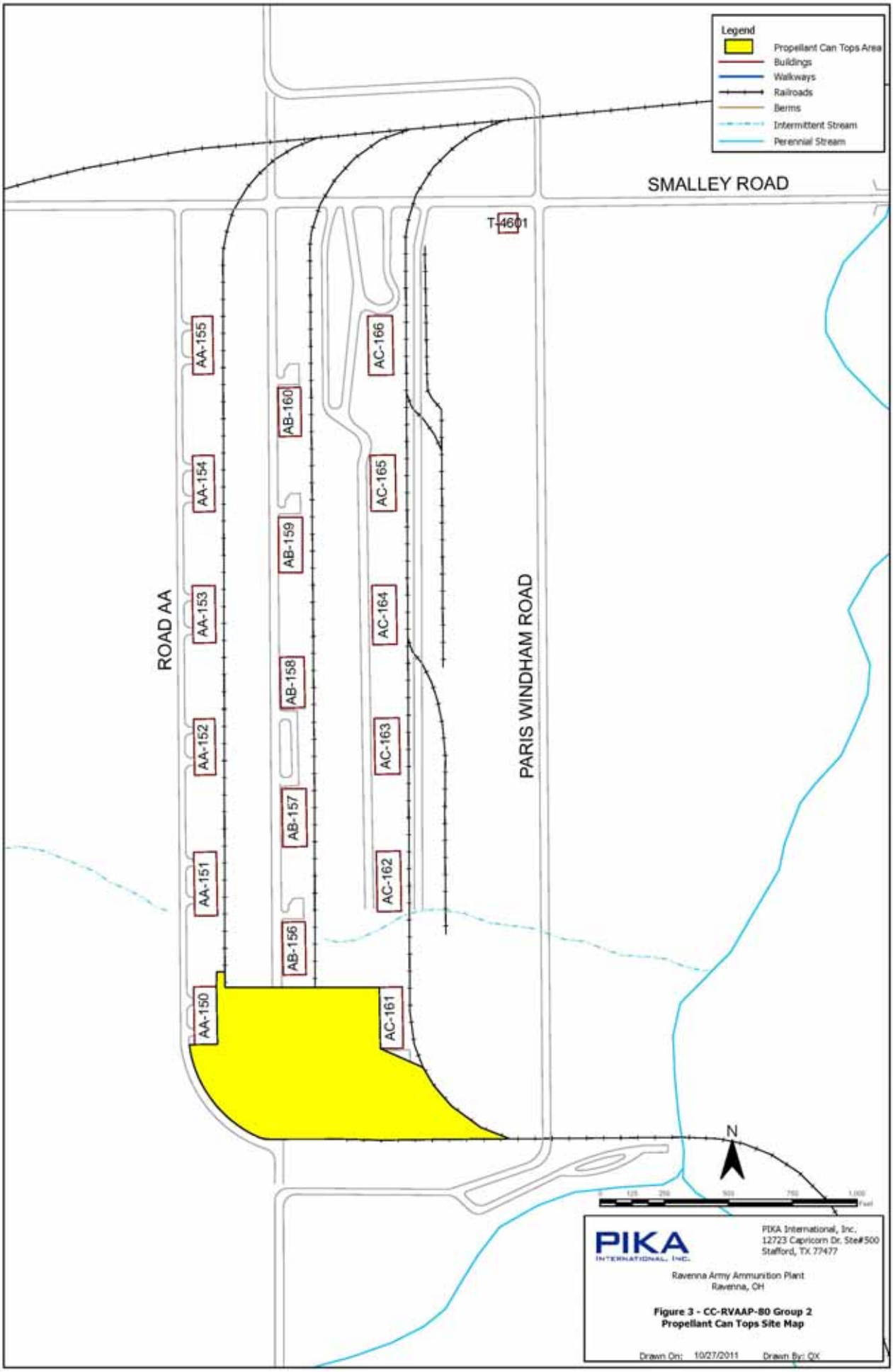
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, OH
Figure 2- Compliance Restoration Site CC-RVAAP-08
Group 2 Propellant Can Tops and RVAAP- 09 Load
Line 2 Building DB-802 within RVAAP
Drawn On: 10/25/2011 Drawn By: QX


Legend
Propellant Can Tops Area
Buildings
Walkways
Railroads
Berms
Intermittent Stream
Perennial Stream
SMALLEY ROAD
T-4601
ROAD AA
PARIS WINDHAM ROAD
AA-155
AA-154
AA-153
AA-152
AA-151
AA-150
AB-160
AB-159
AB-158
AB-157
AB-156
AC-166
AC-165
AC-164
AC-163
AC-162
AC-161
N
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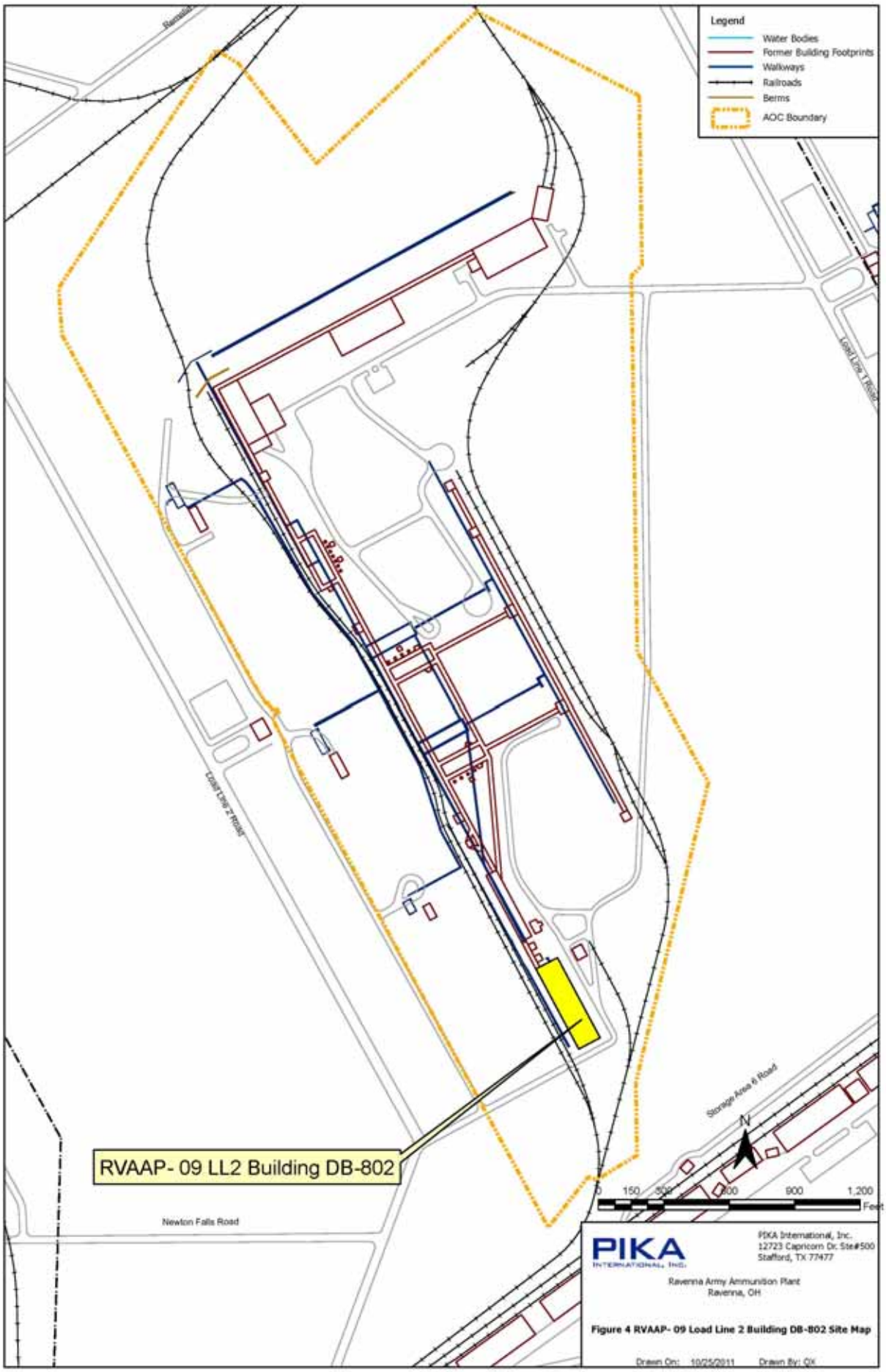
Ravenna, OH
Figure 3 - CC-RVAAP-80 Group 2
Propellant Can Tops Site Map
Drawn On: 10/27/2011
Drawn By: QX


Legend
Water Bodies
Former Building Footprints
Walkways
Railroads
Berms
AOC Boundary
Load Line 2 Road
Storage Area 8 Road
RVAAP- 09 LL2 Building DB-802
Newton Falls Road
150
300
600
900
1,200
Feet
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Ravenna, OH
Figure 4 RVAAP- 09 Load Line 2 Building DB-802 Site Map
Drawn On: 10/25/2011
Drawn By: QK

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Figure 5 - Group 2 Wetland Locations

Area Boundary (Approx.)
Brass Ingot Area
Munitions Debris Area
Sample Plot
Stream
Jurisdictional Ditch
Countour (2ft)

Wetland Category
1
1-2 Gray
Mod 2
2

150 75 0 150 Meters

500 250 0 500 Feet

N

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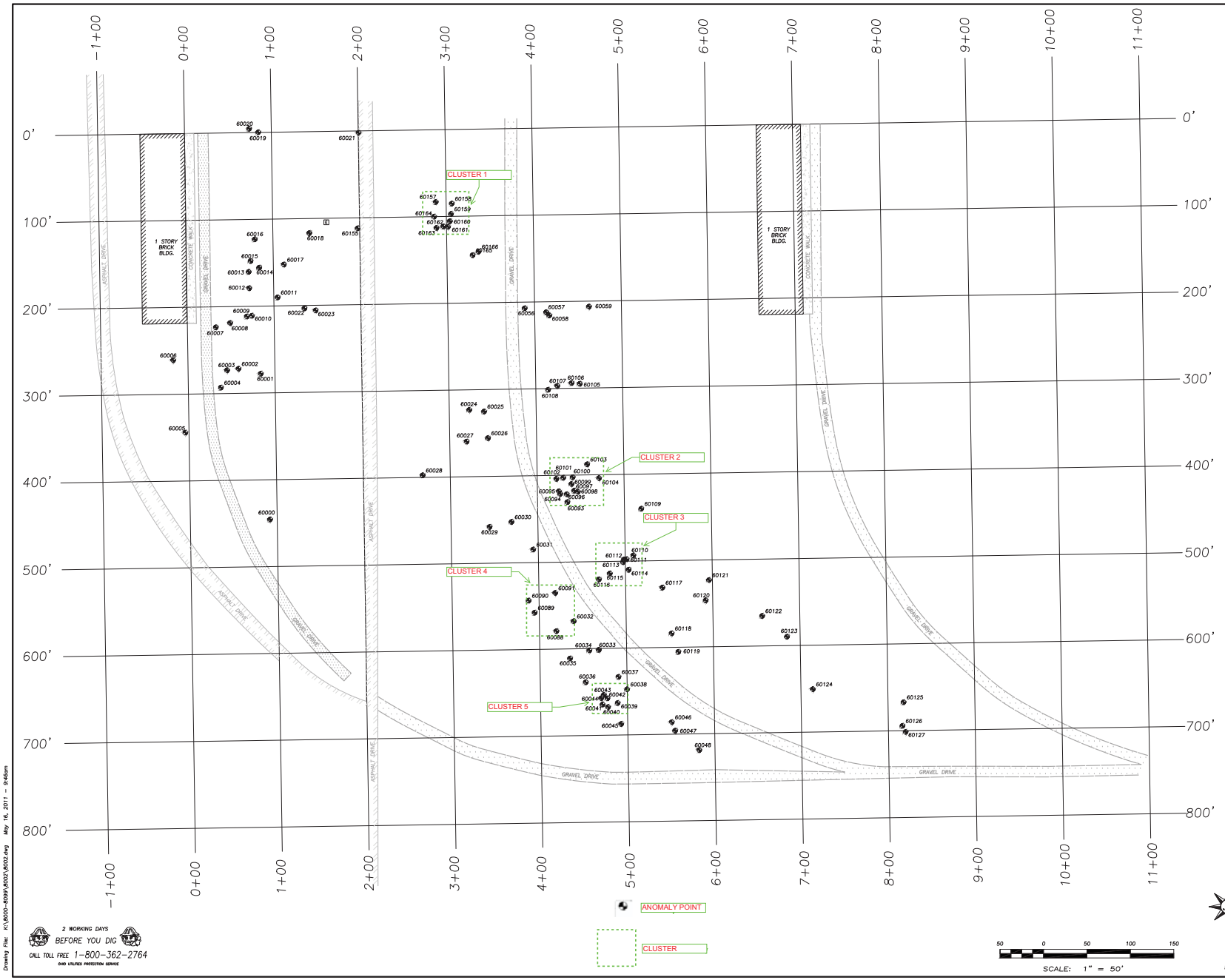


Flag	Northing	Easting	Station	Offset	Flag	Northing	Easting	Station	Offset
60005	566360.4	2367508.6	0+4.2	344.3	60088	566133.8	2367935.9	4+19.5	579.4
60006	566445.7	2367494.6	0+17.0	260.8	60102	566309.2	2367935.9	4+22.1	404.0
60007	566483.7	2367543.7	0+32.7	223.6	60095	566294.9	2367938.7	4+24.8	418.3
60004	566414.2	2367549.5	0+37.5	293.1	60107	566416.2	2367936.9	4+24.8	297.0
60003	566434.2	2367556.7	0+44.9	273.2	60094	566291.9	2367940.2	4+26.2	421.4
60008	566488.6	2367560.1	0+49.2	218.9	60101	566310.5	2367943.7	4+30.0	402.6
60002	566438.0	2367569.8	0+58.1	273.7	60096	566291.5	2367947.8	4+33.8	421.9
60009	566496.2	2367579.5	0+68.7	213.6	60093	566282.5	2367948.6	4+34.5	430.9
60013	566547.6	2367581.6	0+71.5	160.3	60035	566102.4	2367951.5	4+34.6	611.0
60012	566528.7	2367582.1	0+71.8	179.1	60099	566303.3	2367953.2	4+39.4	410.2
60015	566559.9	2367583.8	0+73.9	147.9	60032	566145.3	2367955.8	4+39.6	568.2
60010	566497.1	2367585.3	0+74.5	210.8	60100	566311.1	2367954.6	4+40.9	402.4
60020	566712.3	2367582.1	0+74.6	-4.44	60106	566419.6	2367953.3	4+41.2	293.9
60016	566585.1	2367588.6	0+79.1	122.9	60097	566295.7	2367956.5	4+42.5	417.9
60014	566553.3	2367593.6	0+83.6	155.7	60098	566294.6	2367960.7	4+46.7	419.2
60001	566483.3	2367595.6	0+83.7	277.7	60105	566418.7	2367962.8	4+50.8	394.9
60019	566708.3	2367592.6	0+85.0	-0.29	60036	566075.1	2367969.7	4+52.4	638.6
60000	566262.5	2367606.2	0+91.8	445.7	60034	566111.7	2367973.8	4+57.1	602.0
60011	566518.2	2367614.9	1+04.4	190.2	60103	566326.0	2367971.2	4+57.7	387.8
60017	566555.9	2367622.1	1+12.1	152.5	60059	566507.5	2367973.4	4+62.7	206.3
60022	566505.4	2367645.7	1+35.0	203.4	60033	566112.4	2367984.8	4+68.0	601.5
60018	566552.1	2367651.3	1+41.9	116.8	60116	566193.5	2367984.8	4+69.3	520.4
60023	566503.1	2367658.6	1+47.9	205.9	60044	566056.7	2367987.4	4+69.8	657.3
60155	566597.7	2367707.1	1+97.8	112.0	60104	566310.1	2367985.0	4+71.3	403.9
60021	566707.4	2367708.1	2+00.5	2.4	60041	566049.4	2367989.1	4+71.4	664.6
60028	566313.3	2367781.9	2+68.2	397.5	60043	566060.5	2367990.5	4+73.0	653.5
60164	566611.1	2367795.1	2+86.0	100.0	60042	566056.5	2367994.7	4+77.1	657.6
60157	566628.0	2367797.0	2+88.1	83.2	60040	566046.5	2367995.4	4+77.7	667.6
60163	566598.1	2367797.8	2+88.5	113.0	60115	566200.3	2367997.4	4+82.0	513.8
60162	566599.9	2367805.8	2+96.5	113.4	60039	566051.2	2368006.5	4+88.8	663.0
60161	566599.4	2367811.0	3+01.8	111.9	60037	566081.3	2368007.4	4+90.7	633.0
60160	566605.8	2367813.2	3+04.0	105.5	60045	566027.0	2368010.5	4+92.4	687.3
60159	566614.2	2367814.5	3+05.4	97.2	60113	566213.3	2368012.5	4+97.3	501.1
60158	566626.1	2367815.4	3+06.5	85.3	60112	566216.6	2368013.7	4+98.6	498.0
60027	566352.0	2367832.5	3+19.4	359.6	60038	566067.0	2368017.3	4+99.9	647.4
60024	566388.6	2367835.6	3+23.1	323.1	60111	566216.8	2368016.7	5+01.6	497.7
60165	566566.7	2367839.4	3+29.6	145.1	60114	566204.5	2368019.0	5+03.6	510.0
60166	566570.8	2367846.3	3+36.5	141.1	60110	566221.2	2368024.5	5+09.4	493.4
60025	566380.3	2367853.7	3+40.1	325.1	60109	566274.9	2368033.6	5+19.3	439.8
60026	566356.1	2367857.1	3+44.1	355.9	60117	566184.0	2368057.9	5+42.2	531.0
60029	566253.8	2367859.0	3+44.4	458.2	60046	566029.1	2368068.7	5+50.7	686.1
60030	566259.6	2367884.2	3+69.7	452.8	60118	566131.3	2368068.6	5+52.1	583.9
60090	566169.3	2367904.0	3+88.1	543.6	60047	566019.2	2368072.5	5+54.4	696.0
60056	566505.7	2367899.4	3+88.6	207.0	60119	566110.0	2368076.1	5+59.5	605.5
60031	566277.9	2367909.1	3+94.2	484.9	60048	565997.0	2368100.4	5+81.9	718.7
60089	566155.1	2367930.8	3+94.7	557.7	60120	566169.3	2368107.8	5+91.9	546.5
60057	566503.1	2367924.0	4+13.2	212.0	60121	566192.7	2368111.6	5+96.1	523.1
60108	566411.8	2367926.4	4+14.3	303.3	60122	566151.4	2368172.8	6+56.6	565.3
60058	566497.5	2367927.8	4+16.9	215.6	60123	566127.4	2368201.3	6+84.7	589.8
60091	566177.8	2367934.5	4+18.7	535.4	60124	566067.7	2368231.1	7+13.7	650.6
					60126	566024.9	2368334.3	8+16.2	694.4
					60125	566052.1	2368335.6	8+18.0	667.1
					60127	566017.8	2368338.1	8+19.8	701.5

LEGEND

GEOSEARCHES FLAG

E ELECTRIC PEDESTAL

PIKA INTERNATIONAL, INC.

FIGURE 6 - GROUP 2
ANOMALY CLUSTER AREAS

I HEREBY STATE THAT THIS MAP IS BASED ON AN ACTUAL FIELD SURVEY PREPARED BY ME. THE SURVEY IS CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF. ALL DIMENSIONS GIVEN ARE EXPRESSED IN FEET AND DECIMAL PARTS THEREOF. BEARINGS ARE BASED ON GRID NORTH OF THE OHIO STATE PLANE COORDINATE SYSTEM, NORTH ZONE NAD 83 DATUM.

CHRISTOPHER J. DEMPSEY
PROFESSIONAL SURVEYOR NO. 6914
DATE OF SURVEY: MAY 11, 2011

DATE SIGNED:_____

STATE OF OHIO CHRISTOPHER J. DEMPSEY S-6914 REGISTERED PROFESSIONAL SURVEYOR

LOCATION SURVEY
FOR
GEOSEARCHES
OF
RAVENNA ARMY AMMUNITION PLANT

JOB NO.	HORZ. SCALE	VERT. SCALE	DRAWN BY	FIELD CREW
8002	1" = 50'	NONE	MS	MS-SB
LAST PLOT DATE: May 16, 2011	DATE OF SURVEY: MAY 11, 2011			CHECKED BY: CJD

SHEET 1 OF 1

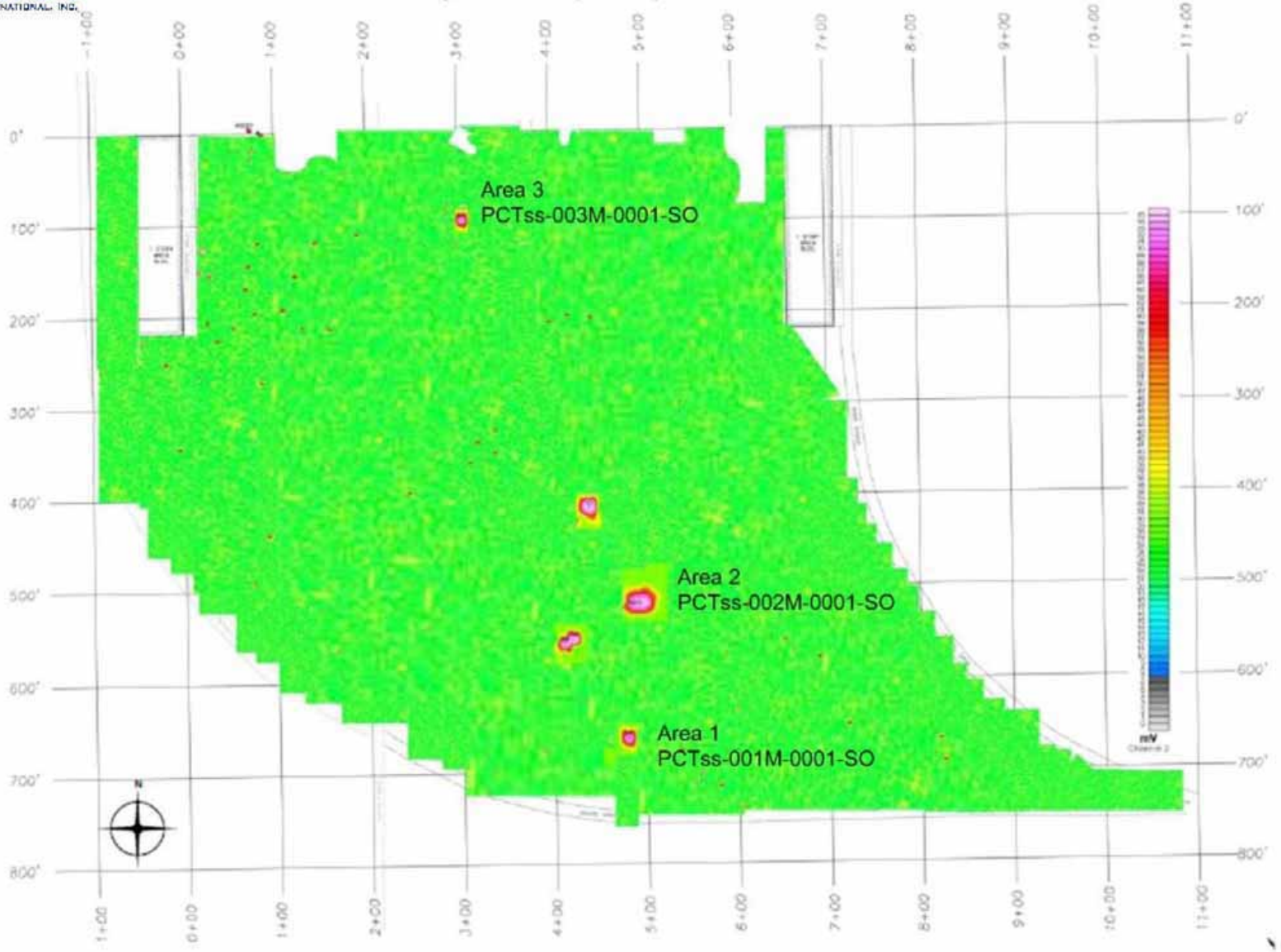
DEMPSEY / SURVEYING / COMPANY
12815 DETROIT AVENUE
CLEVELAND, OH 44107-2835
P 216/226/1130
F 216/226/1131

2 WORKING DAYS
BEFORE YOU DIG
CALL TOLL FREE 1-800-362-2764
OHIO UTILITIES PROTECTION SERVICE

Drawing File: K:\8000-8099\8002\8002.dwg May 16, 2011 - 9:46am

PIKA
INTERNATIONAL, INC.

Figure 7 - Group 2 Sample Locations



METAL CLUSTER AREAS

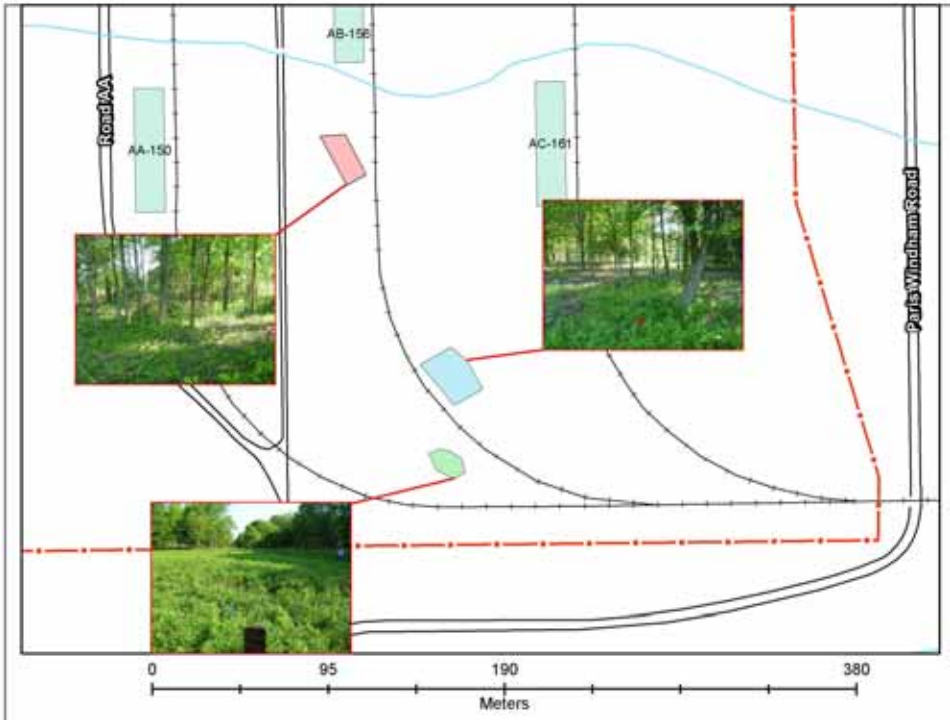
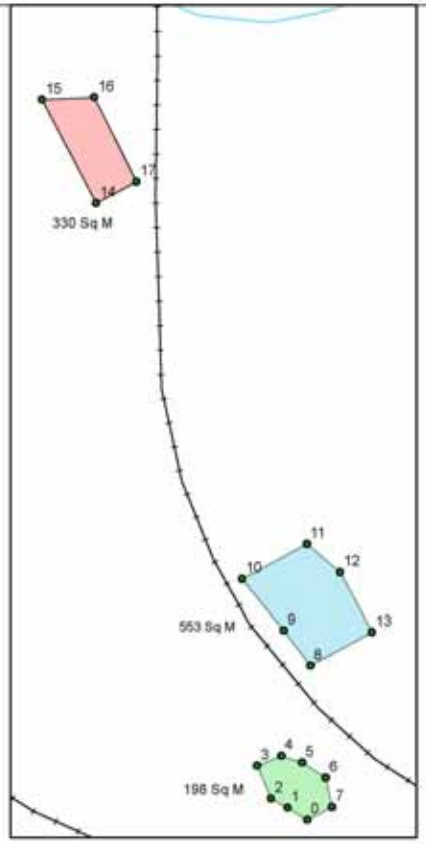


FIGURE 8 - GROUP 2 SAMPLE BOUNDARIES
PIKA INTERNATIONAL, INC.
GROUP 2 PROPELLANT CAN SITE INVESTIGATION

Ravenna Army Ammunition Plant Ravenna, Ohio

Prepared May 31, 2011 by:

VISTA SCIENCES CORPORATION
205 W. Boutz Rd. Bldg. 3 Suite C
Las Cruces, New Mexico 88005
575-526-9558



UTM Coordinates shown in meters
Zone 17N

FID	X	Y
0	495987	4562199
1	495982	4562202
2	495978	4562204
3	495974	4562213
4	495981	4562215
5	495986	4562213
6	495992	4562209
7	495994	4562202
8	495988	4562238
9	495981	4562247
10	495971	4562261
11	495987	4562270
12	495996	4562262
13	496004	4562247
14	495933	4562318
15	495919	4562385
16	495932	4562385
17	495943	4562364

Legend

- Multi Increment Sample Boundaries Area 3
- Multi Increment Sample Boundaries Area 2
- Multi Increment Sample Boundaries Area 1
- Former Railroad Bed

0 40 80 160
Meters

Appendix C

Weekly Reports and Photo Documentation

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	1
PIKA Projects #:	10-08-130		**Date:**	4-04-11 to 4-08-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Initiated surface sweep operation to ensure the site is free of surface MEC/UXO prior to initiating the brush clearing and geophysical survey operations. Approximately 1/3 of the site is complete.
- No MEC or MD items encountered during the surface sweep operations to date.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information)

Upon arrival to the site on Thursday, April 7, 2011 to initiate the surface sweep operations, it was noted that Ohio Army National Guard (OHARNG) training exercises were being conducted within the AOC along the western quarter of the site adjacent to building AA-150. Additionally, it was noted that seibert stakes had been installed along a portion of the perimeter of the AOC which did not match the extent of the AOC as depicted in the scope of work and approved work plan. PIKA visited the site the same day with Ohio EPA (Eileen Mohr) and VISTA Sciences representative Jim McGee for clarification/correction. In the afternoon of April 7, 2011 USACE – Louisville, Ohio EPA and RVAAP Facility Manager verified that the AOC boundaries were correct as depicted in the approved work plan.

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	35%	35%
Brush Clearing	-	0%
Geophysical Investigation	-	0%
Conducting MI Sampling	-	0%

Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: Discrepancy with the AOC boundary as previously noted.

Schedule for Next Week

- Complete surface sweep operation.
- Initiate brush clearing operation.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

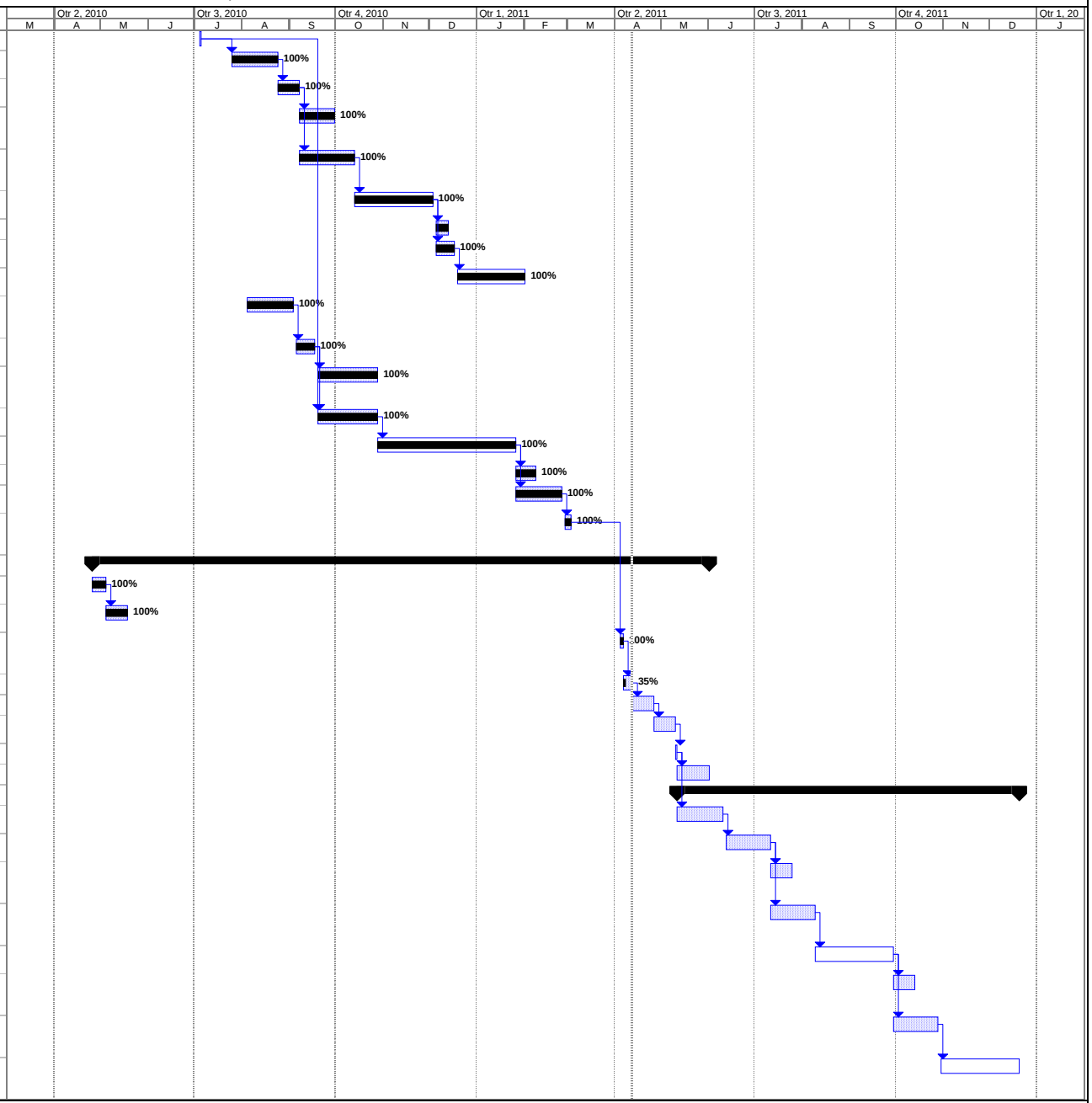
Photo Log

UXO technicians conducting surface sweep operations with Group 2 Propellant Can site.

Schedule

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Contract Award**	1 day	Mon 7/5/10	Mon 7/5/10	
2	Prepare Pre-draft PMP and SSHP	22 days	Mon 7/26/10	Tue 8/24/10	1
3	Army review Pre-Draft Work Plans	10 days	Wed 8/25/10	Tue 9/7/10	2
4	Pre-draft comment resolution for PMP and SSHP	17 days	Wed 9/8/10	Thu 9/30/10	3
5	Develop Draft PMP and SSHP and submit to OEPA/Stakeholders	26 days	Wed 9/8/10	Wed 10/13/10	3
6	Army/OEPA Review of Draft PMP and SSHP	37 days	Thu 10/14/10	Fri 12/3/10	5
7	Draft Comment Resolution	6 days	Mon 12/6/10	Mon 12/13/10	6
8	Develp Final PMP and SSHP Work Plans	10 days	Mon 12/6/10	Fri 12/17/10	6
9	Army/OEPA Review of Final PMP and SSHP Plans	32 days	Mon 12/20/10	Tue 2/1/11	8
10	Prepare Pre Draft Work Plan, SAP and QAAP	22 days	Thu 8/5/10	Fri 9/3/10	
11	Army review of Pre Draft Work Plan, SAP and QAPP	10 days	Mon 9/6/10	Fri 9/17/10	10
12	Pre-draft comment resolution for Work Plan, SAP and QAAP	29 days	Mon 9/20/10	Thu 10/28/10	11
13	Develop Draft WP, SAP and QAPP	29 days	Mon 9/20/10	Thu 10/28/10	11,1
14	Army/OEPA review of Draft WP, SAP and QAPP	64 days	Fri 10/29/10	Wed 1/26/11	13
15	Draft Comment Resolution	9 days	Thu 1/27/11	Tue 2/8/11	14
16	Develop Final WP, SAP and QAPP	22 days	Thu 1/27/11	Fri 2/25/11	14
17	Army/OEPA Review of Final WP, SAP and QAPP	4 days	Mon 2/28/11	Thu 3/3/11	16
18	**Begin Field Work**	**288 days**	**Mon 4/26/10**	**Wed 6/1/11**	
19	Submit Water Removal Letter work plan for	7 days	Mon 4/26/10	Tue 5/4/10	
20	Conduct Water removal At LL2 bldg 802	10 days	Wed 5/5/10	Tue 5/18/10	19
21	Mobilization for Geophysical Study at Group 2	2 days	Tue 4/5/11	Wed 4/6/11	17
22	Surface Sweep	4 days	Thu 4/7/11	Tue 4/12/11	21
23	Brush Clearing	10 days	Wed 4/13/11	Tue 4/26/11	22
24	Geophysical investigation at Group 2	10 days	Wed 4/27/11	Tue 5/10/11	23
25	Soil Sampling	1 day	Wed 5/11/11	Wed 5/11/11	24
26	Disposal of IDW	15 days	Thu 5/12/11	Wed 6/1/11	25
27	**Investigation Report**	**159 days**	**Thu 5/12/11**	**Tue 12/20/11**	
28	Prepare and submit Pre-Draft Investigation	22 days	Thu 5/12/11	Fri 6/10/11	25
29	USACE Review of Pre-draft Report	21 days	Mon 6/13/11	Mon 7/11/11	28
30	Respond to USACE Comments on Pre-draft Report	10 days	Tue 7/12/11	Mon 7/25/11	29
31	Prepare and submit Draft Report for OEPA/Stakeholder review	21 days	Tue 7/12/11	Tue 8/9/11	29
32	Review Draft by OEPA/Stakeholders	37 days	Wed 8/10/11	Thu 9/29/11	31
33	Respond to OEPA/Stakeholder Comments on Pre-draft Report	10 days	Fri 9/30/11	Thu 10/13/11	32
34	Revise doc and Submit Final Iteration	21 days	Fri 9/30/11	Fri 10/28/11	32
35	Review Final Iteration by OEPA	37 days	Mon 10/31/11	Tue 12/20/11	34



Project: Group 2 schedule
Date: Tue 4/12/11

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	2
PIKA Projects #:	10-08-130		**Date:**	4-11-11 to 4-15-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Completed surface sweep operation to ensure the site is free of surface MEC/UXO prior to initiating the brush clearing and geophysical survey operations.
- No MEC or MD items encountered during the surface sweep operations.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information)

Due to extensive training by OHARNG within Group 2 through 22 April 2011, the brush clearing operations will be delayed until the week of 25 April 2011.

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	65%	100%
Brush Clearing	-	0%
Geophysical Investigation	-	0%
Conducting MI Sampling	-	0%
Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: The delay to the brush clearing operation pushes the final completion date for the project right up to the end date for project period of performance. PIKA notified CELRL for a contract extension at no cost to the government to ensure no issues.

Schedule for Next Week

- Survey and mark wetland locations within AOC to facilitate brush clearing operations during week of 25 April 2011.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

Photo Log

UXO technicians conducting surface sweep operations with Group 2 Propellant Can site.

Schedule

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Contract Award**	1 day	Mon 7/5/10	Mon 7/5/10	
2	Prepare Pre-draft PMP and SSHP	22 days	Mon 7/26/10	Tue 8/24/10	1
3	Army review Pre-Draft Work Plans	10 days	Wed 8/25/10	Tue 9/7/10	2
4	Pre-draft comment resolution for PMP and SSHP	17 days	Wed 9/8/10	Thu 9/30/10	3
5	Develop Draft PMP and SSHP and submit to OEPA/Stakeholders	26 days	Wed 9/8/10	Wed 10/13/10	3
6	Army/OEPA Review of Draft PMP and SSHP	37 days	Thu 10/14/10	Fri 12/3/10	5
7	Draft Comment Resolution	6 days	Mon 12/6/10	Mon 12/13/10	6
8	Develp Final PMP and SSHP Work Plans	10 days	Mon 12/6/10	Fri 12/17/10	6
9	Army/OEPA Review of Final PMP and SSHP Plans	32 days	Mon 12/20/10	Tue 2/1/11	8
10	Prepare Pre Draft Work Plan, SAP and QAAP	22 days	Thu 8/5/10	Fri 9/3/10	
11	Army review of Pre Draft Work Plan, SAP and QAPP	10 days	Mon 9/6/10	Fri 9/17/10	10
12	Pre-draft comment resolution for Work Plan, SAP and QAAP	29 days	Mon 9/20/10	Thu 10/28/10	11
13	Develop Draft WP, SAP and QAPP	29 days	Mon 9/20/10	Thu 10/28/10	11,1
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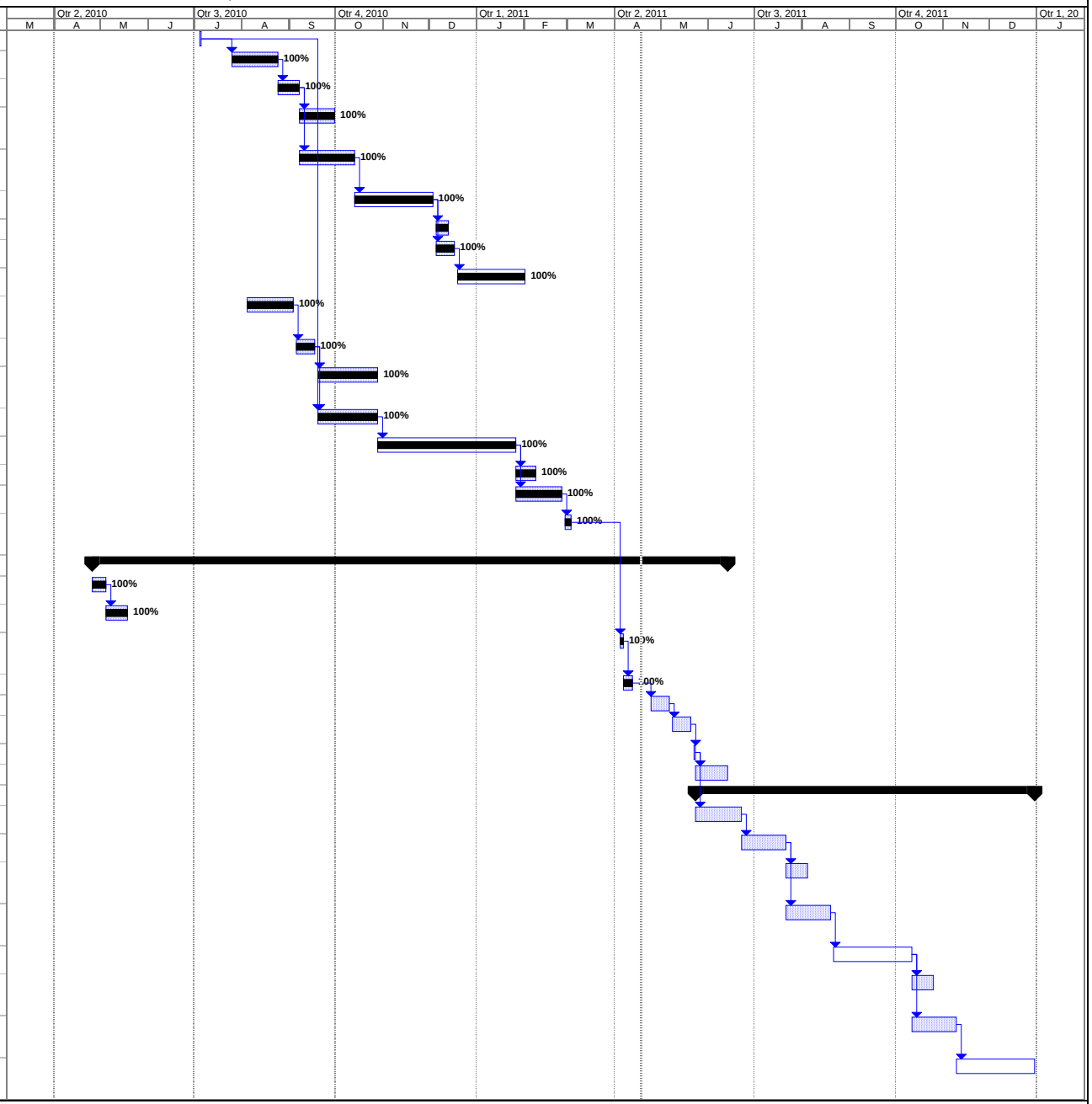
15	Draft Comment Resolution	9 days	Thu 1/27/11	Tue 2/8/11	14
16	Develop Final WP, SAP and QAPP	22 days	Thu 1/27/11	Fri 2/25/11	14
17	Army/OEPA Review of Final WP, SAP and QAPP	4 days	Mon 2/28/11	Thu 3/3/11	16
18	**Begin Field Work**	**296 days**	**Mon 4/26/10**	**Mon 6/13/11**	
19	Submit Water Removal Letter work plan for	7 days	Mon 4/26/10	Tue 5/4/10	
20	Conduct Water removal At LL2 bldg 802	10 days	Wed 5/5/10	Tue 5/18/10	19
21	Mobilization for Geophysical Study at Group 2	2 days	Tue 4/5/11	Wed 4/6/11	17
22	Surface Sweep	4 days	Thu 4/7/11	Tue 4/12/11	21
23	Brush Clearing	10 days	Mon 4/25/11	Fri 5/6/11	22
24	Geophysical investigation at Group 2	10 days	Mon 5/9/11	Fri 5/20/11	23
25	Soil Sampling	1 day	Mon 5/23/11	Mon 5/23/11	24
26	Disposal of IDW	15 days	Tue 5/24/11	Mon 6/13/11	25
27	**Investigation Report**	**159 days**	**Tue 5/24/11**	**Fri 12/30/11**	
28	Prepare and submit Pre-Draft Investigation	22 days	Tue 5/24/11	Wed 6/22/11	25
29	USACE Review of Pre-draft Report	21 days	Thu 6/23/11	Thu 7/21/11	28
30	Respond to USACE Comments on Pre-draft Report	10 days	Fri 7/22/11	Thu 8/4/11	29
31	Prepare and submit Draft Report for OEPA/Stakeholder review	21 days	Fri 7/22/11	Fri 8/19/11	29
32	Review Draft by OEPA/Stakeholders	37 days	Mon 8/22/11	Tue 10/11/11	31
33	Respond to OEPA/Stakeholder Comments on Pre-draft Report	10 days	Wed 10/12/11	Tue 10/25/11	32
34	Revise doc and Submit Final Iteration	21 days	Wed 10/12/11	Wed 11/9/11	32
35	Review Final Iteration by OEPA	37 days	Thu 11/10/11	Fri 12/30/11	34



Project: Group 2 schedule
Date: Mon 4/18/11

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	3
PIKA Projects #:	10-08-130		**Date:**	4-18-11 to 4-22-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Located and marked existing wetlands within AOC using data from Ohio Army National Guard wetland surveys. Wetlands marked to ensure no disturbance during site operations.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information)

None

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	-	100%
Brush Clearing	-	0%
Geophysical Investigation	-	0%
Conducting MI Sampling	-	0%
Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: None.

Schedule for Next Week

- Initiate brush clearing operations.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

Photo Log

Pictures showing Surveyor (with UXO support) locating and marking the wetland locations within AOC.

Schedule

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Contract Award**	1 day	Mon 7/5/10	Mon 7/5/10	
2	Prepare Pre-draft PMP and SSHP	22 days	Mon 7/26/10	Tue 8/24/10	1
3	Army review Pre-Draft Work Plans	10 days	Wed 8/25/10	Tue 9/7/10	2
4	Pre-draft comment resolution for PMP and SSHP	17 days	Wed 9/8/10	Thu 9/30/10	3
5	Develop Draft PMP and SSHP and submit to OEPA/Stakeholders	26 days	Wed 9/8/10	Wed 10/13/10	3
6	Army/OEPA Review of Draft PMP and SSHP	37 days	Thu 10/14/10	Fri 12/3/10	5
7	Draft Comment Resolution	6 days	Mon 12/6/10	Mon 12/13/10	6
8	Develp Final PMP and SSHP Work Plans	10 days	Mon 12/6/10	Fri 12/17/10	6
9	Army/OEPA Review of Final PMP and SSHP Plans	32 days	Mon 12/20/10	Tue 2/1/11	8
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11	Army review of Pre Draft Work Plan, SAP and QAPP	10 days	Mon 9/6/10	Fri 9/17/10	10
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13	Develop Draft WP, SAP and QAPP	29 days	Mon 9/20/10	Thu 10/28/10	11,1
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18	**Begin Field Work**	**296 days**	**Mon 4/26/10**	**Mon 6/13/11**	
19	Submit Water Removal Letter work plan for	7 days	Mon 4/26/10	Tue 5/4/10	
20	Conduct Water removal At LL2 bldg 802	10 days	Wed 5/5/10	Tue 5/18/10	19
21	Mobilization for Geophysical Study at Group 2	2 days	Tue 4/5/11	Wed 4/6/11	17
22	Surface Sweep	4 days	Thu 4/7/11	Tue 4/12/11	21
23	Brush Clearing	10 days	Mon 4/25/11	Fri 5/6/11	22
24	Geophysical investigation at Group 2	10 days	Mon 5/9/11	Fri 5/20/11	23
25	Soil Sampling	1 day	Mon 5/23/11	Mon 5/23/11	24
26	Disposal of IDW	15 days	Tue 5/24/11	Mon 6/13/11	25
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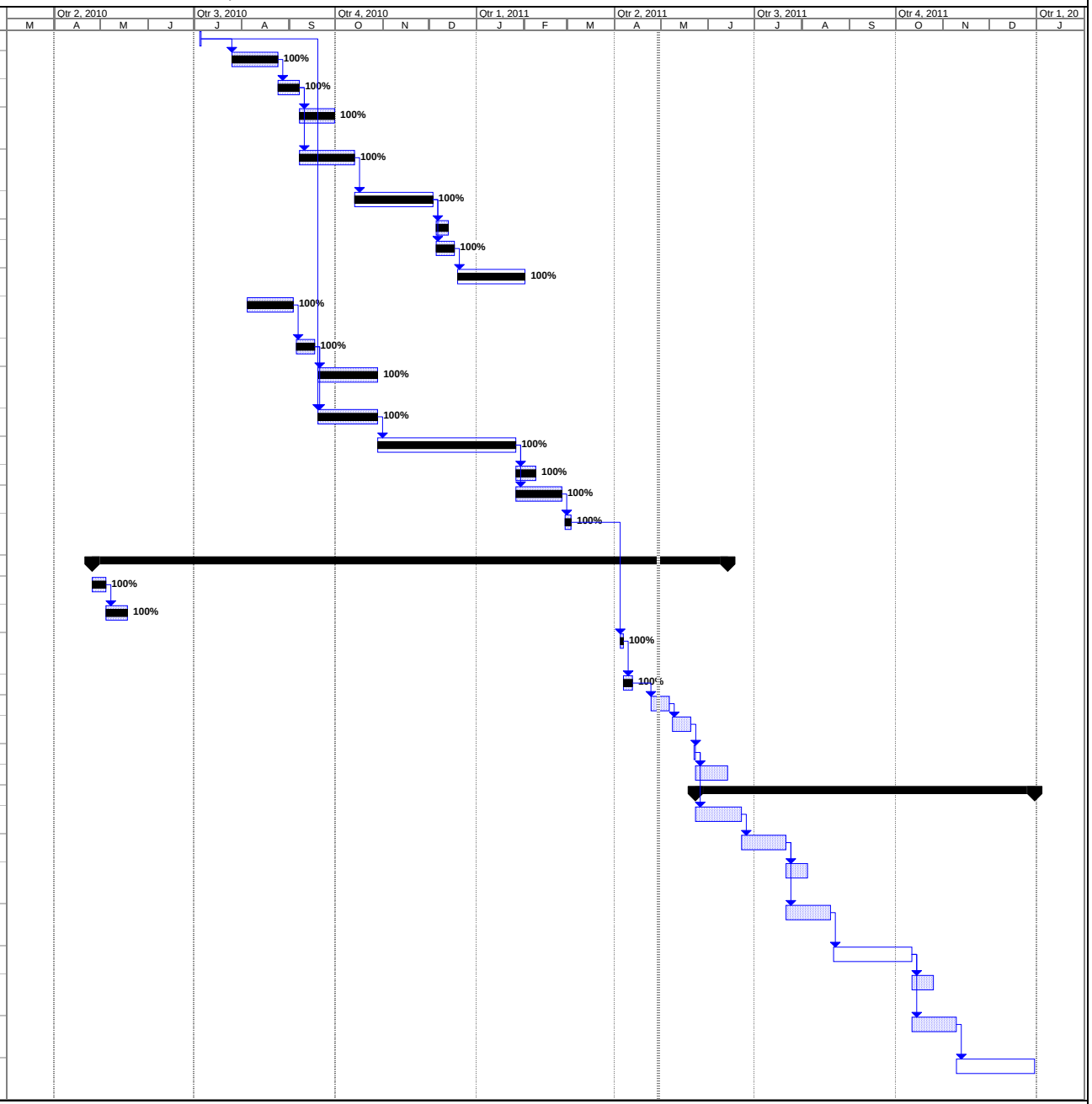

Project: Group 2 schedule
Date: Fri 4/29/11

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	4
PIKA Projects #:	10-08-130		**Date:**	4-25-11 to 4-29-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Initiated brush clearing operations.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information)

Visitors: Eric Cheng – CELRL

Received no cost contract extension to April 2012.

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	-	100%
Brush Clearing	50	50%
Geophysical Investigation	-	0%
Conducting MI Sampling	-	0%
Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: None

Schedule for Next Week

- Complete brush clearing operations.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

Photo Log





Brush clearing operation at Group 2 propellant can site.

Schedule

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Contract Award**	1 day	Mon 7/5/10	Mon 7/5/10	
2	Prepare Pre-draft PMP and SSHP	22 days	Mon 7/26/10	Tue 8/24/10	1
3	Army review Pre-Draft Work Plans	10 days	Wed 8/25/10	Tue 9/7/10	2
4	Pre-draft comment resolution for PMP and SSHP	17 days	Wed 9/8/10	Thu 9/30/10	3
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23	Brush Clearing	10 days	Mon 4/25/11	Fri 5/6/11	22
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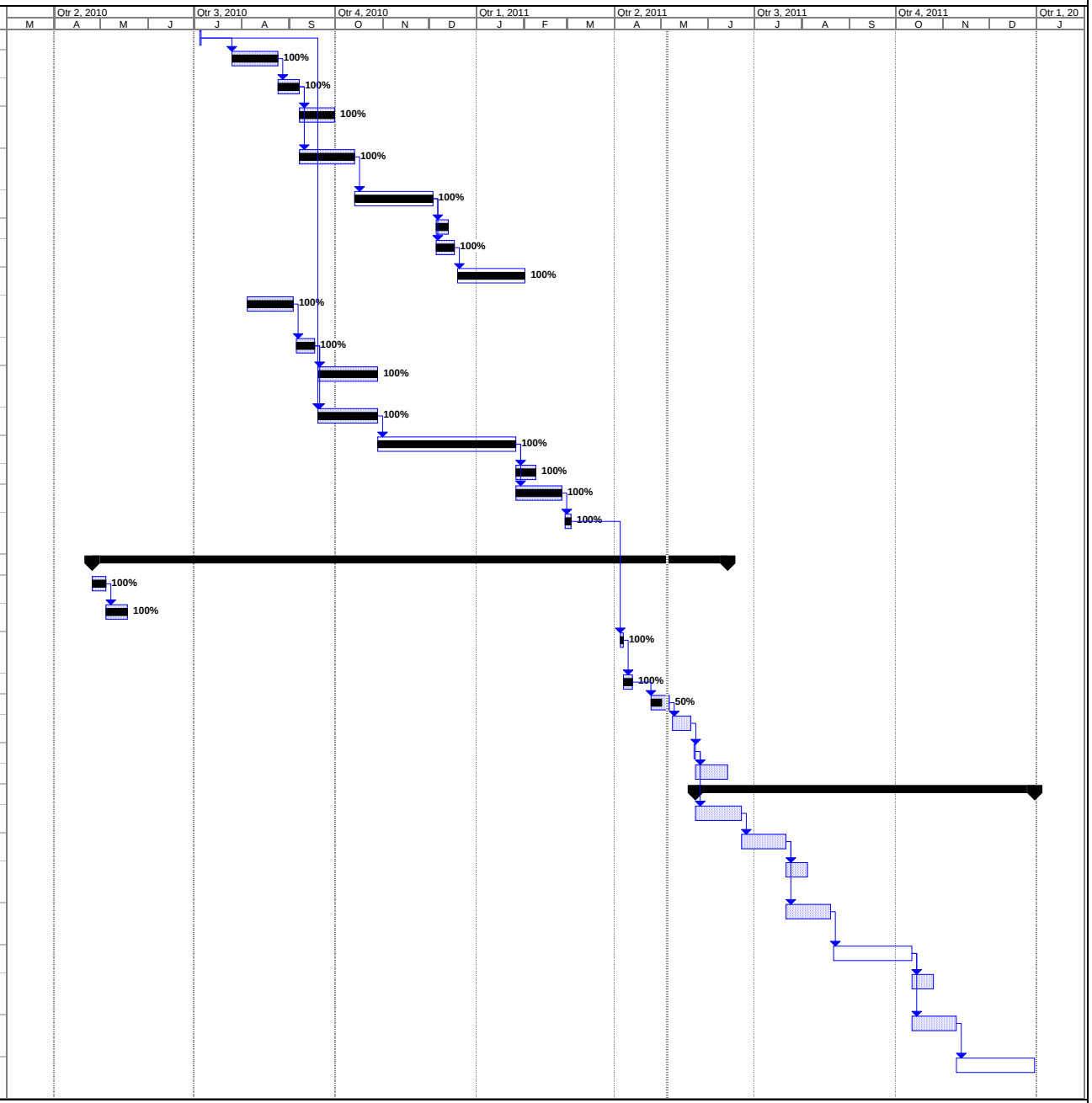

Project: Group 2 schedule
Date: Thu 5/5/11

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	5
PIKA Projects #:	10-08-130		**Date:**	5-2-11 to 5-6-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Completed brush clearing operations.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information)

Site Visitor – Terence Hamill – GeoSearches Project Geophysicist. Conducted site visit to view site conditions during brush clearing operations. No issues or problems.

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	-	100%
Brush Clearing	50	100%
Geophysical Investigation	-	0%
Conducting MI Sampling	-	0%
Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: None.

Schedule for Next Week

- Initiate geophysical investigation.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

Photo Log

Brush clearing operation at Group 2 site.

Views of Group 2 site following brush clearing operation.

Schedule

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Contract Award**	1 day	Mon 7/5/10	Mon 7/5/10	
2	Prepare Pre-draft PMP and SSHP	22 days	Mon 7/26/10	Tue 8/24/10	1
3	Army review Pre-Draft Work Plans	10 days	Wed 8/25/10	Tue 9/7/10	2
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7	Draft Comment Resolution	6 days	Mon 12/6/10	Mon 12/13/10	6
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18	**Begin Field Work**	**296 days**	**Mon 4/26/10**	**Mon 6/13/11**	
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20	Conduct Water removal At LL2 bldg 802	10 days	Wed 5/5/10	Tue 5/18/10	19
21	Mobilization for Geophysical Study at Group 2	2 days	Tue 4/5/11	Wed 4/6/11	17
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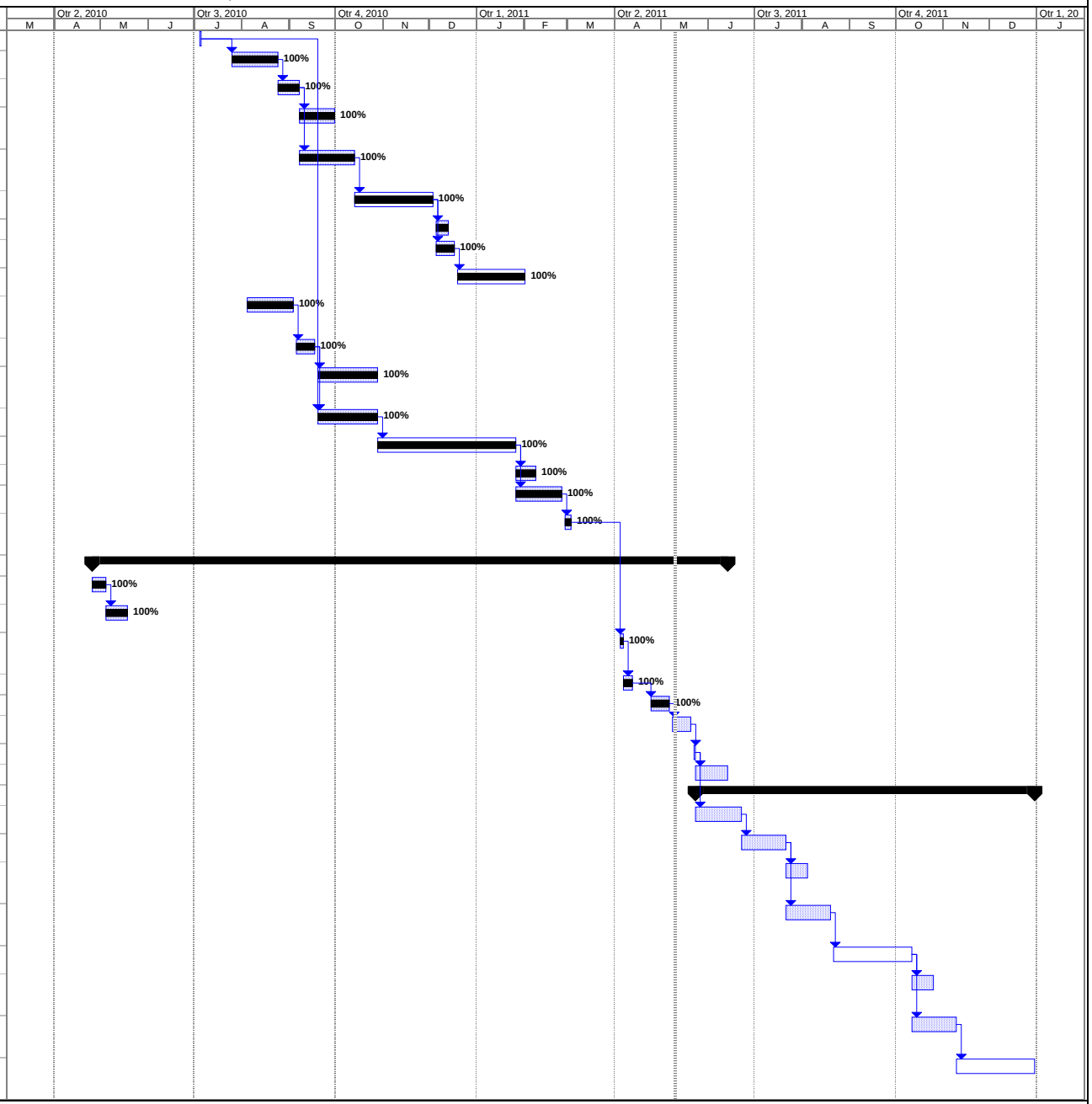


Project: Group 2 schedule
Date: Tue 5/10/11

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	6
PIKA Projects #:	10-08-130		**Date:**	5-9-11 to 5-13-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Completed geophysical investigation of the Group 2 propellant can tops area.
- Marked and surveyed all the identified anomaly areas.
- Initiated geophysical data report.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information)

Visitors: Eileen Mohr and Todd Fisher – Ohio EPA. Visited the site to look at the grouping of anomalies flagged by the geophysicist. A total of 5 separate areas containing anomalies were detected across the site and marked with pin flags. Based on geographic spacing of the areas, discussions will be needed between all stakeholders to decide on path forward relative to the surface soil samples that will be collected at the site. A meeting will be scheduled upon receipt of the completed geophysical maps to help aid in the decision making.

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	-	100%
Brush Clearing	-	100%
Geophysical Investigation	90%	90%
Conducting MI Sampling	-	0%
Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: None.

Schedule for Next Week

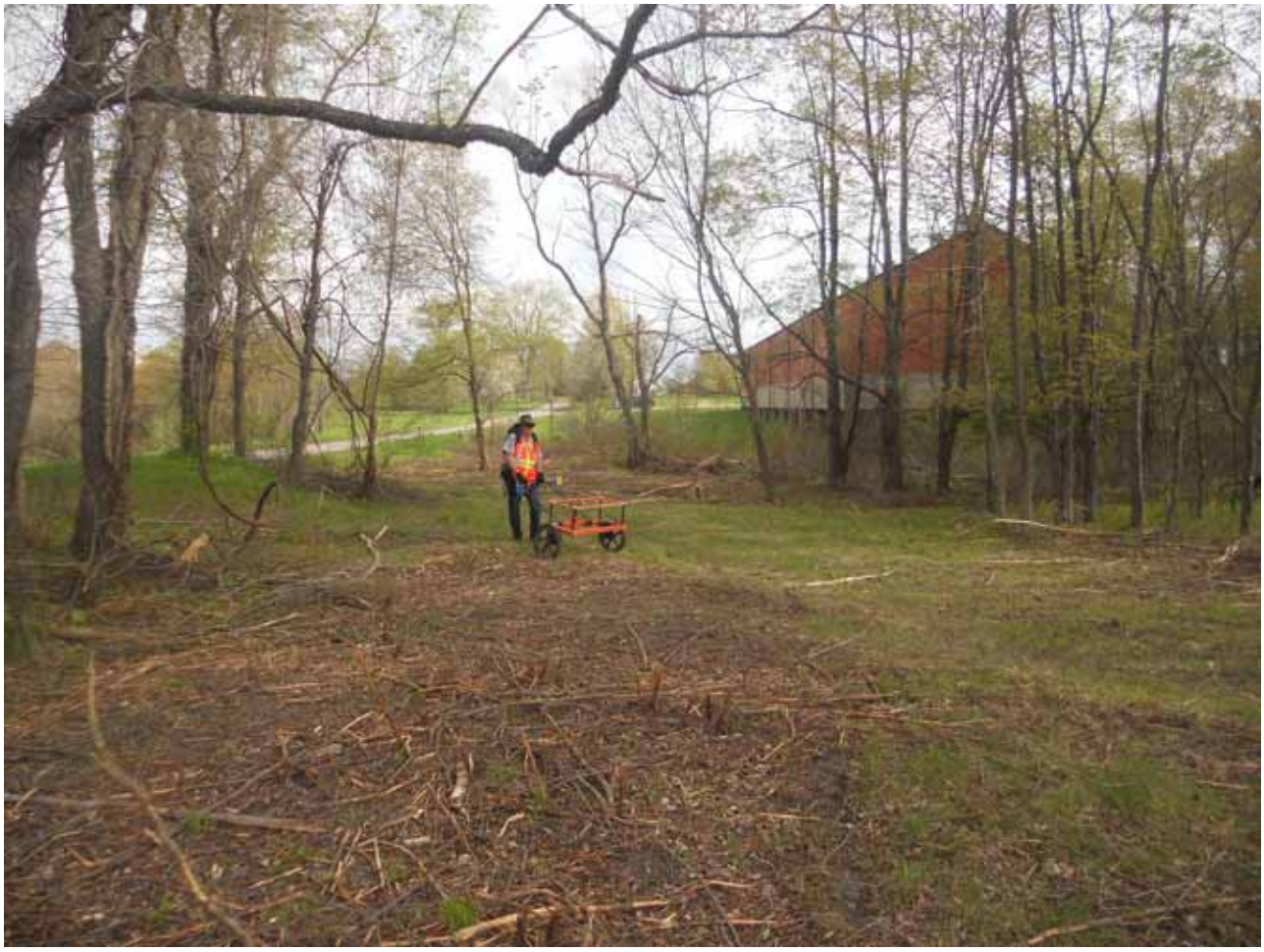
- Continue preparation of geophysical data report.
- Discuss path forward for the MI sampling operations based on the geophysical data obtained at the site.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

Photo Log

Surveying and installing site grids at Group 2 area to facilitate the geophysical survey.



Pictures showing geophysical survey operations at RVAAP Group 2 propellant can tops site.

Schedule

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

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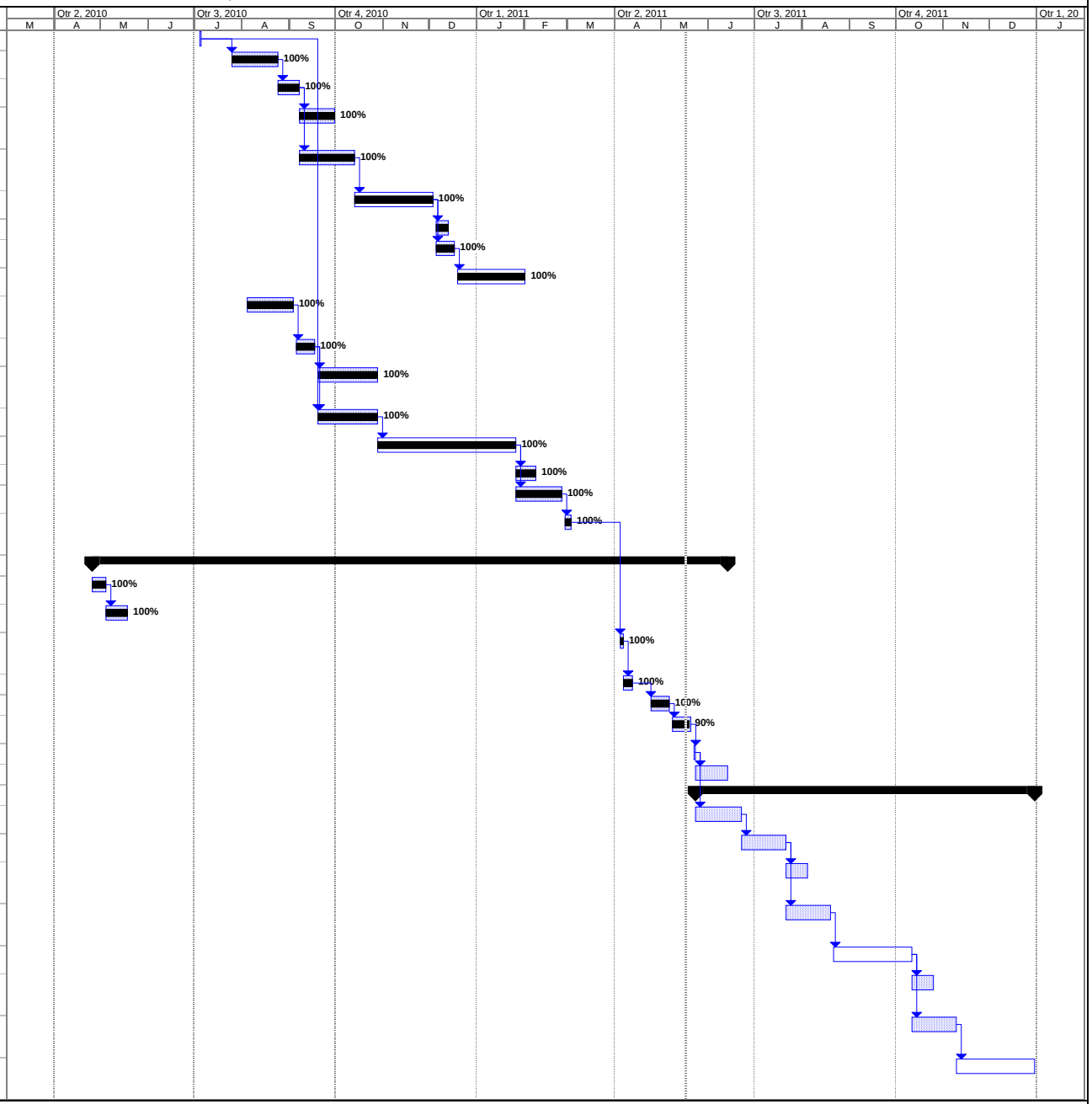

Project: Group 2 schedule
Date: Tue 5/17/11

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	7
PIKA Projects #:	10-08-130		**Date:**	5-16-11 to 5-20-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Received EM-61 data maps from Geophysicist to further aid in discussion relative to selecting the surface sample locations.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information) None

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	-	100%
Brush Clearing	-	100%
Geophysical Investigation	-	95%
Conducting MI Sampling	-	0%
Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: None.

Schedule for Next Week

- Conduct surface soil sampling operations.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

Schedule

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

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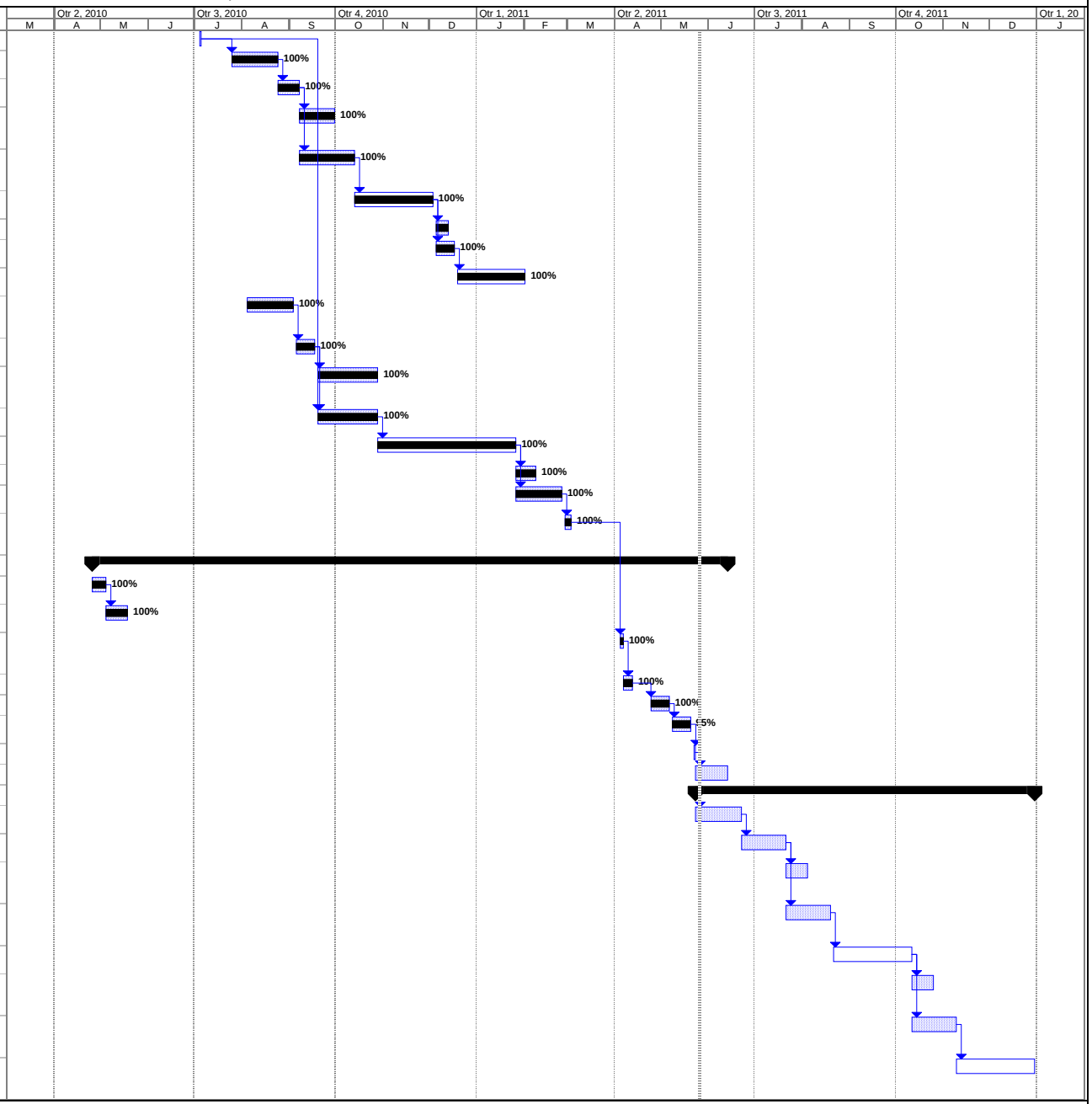

Project: Group 2 schedule
Date: Thu 5/26/11

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

WEEKLY REPORT

Prime Contracts No:	W912QR-10-P-0058		**Report No.**	8
PIKA Projects #:	10-08-130		**Date:**	5-23-11 to 5-27-11
Project:	RVAAP Compliance Rest. Site-CC-RVAAP-80 & Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio			

Summary of Activities:

- Based upon results of the geophysical delineation, a site visit was conducted with Ohio EPA representative Eileen Mohr and PIKA representatives Brian Stockwell and Jim King on May 25, 2011 to select the locations and boundaries of the Multi Increment (MI) surface soil sample areas. See attached figure for the locations of the areas that were selected for each sample (i.e., areas 1, 2, and 3).
- Collected 3 Multi Increment (MI) surface soil samples on May 26, 2011. All samples were collected in accordance with the approved work plan.

Others:

- Conducted daily safety briefings.

Remarks (include directions received from client's representative or regulators, visitors, compliance notices received, pertinent information) Visitors: Eileen Mohr – Ohio EPA. Conducted site visit to select location and boundaries of the MI surface soil samples.

Work Completed:

	This Week	Cumulative to-date
Surface clearance operations	-	100%
Brush Clearing	-	100%
Geophysical Investigation	5%	100%
Conducting MI Sampling	95%	95%
Final Report Preparation	-	0%

Health and Safety-

Conducted health and safety meetings and task order meetings every morning, prior to commencement of daily activities.

Were there any lost time accidents this week? No [x] Yes [ ].

If "yes", refer attached summary of incident or OSHA report.

Quality Control

Inspections Performed	Non-Conformances	Corrective Action (CA)	Follow-up on CA
None	None	None	Not Applicable

Major Problems and Resolution: None.

Schedule for Next Week

Initiate preparation of investigation report.

Refer attached **Schedule** for percentage of work completed and projected completion dates.

SUXOS	Mel Lau	Site Safety Officer	Lew Kovarik
Project Manager	Brian Stockwell		

PHOTO LOG

Pictures showing MI surface soil sampling operations with UXO support.

MAP SHOWING MI SURFACE SOIL SAMPLE LOCATIONS

0'
100'
200'
300'
400'
500'
600'
700'
800'
11+00
10+00
9+00
8+00
7+00
6+00
5+00
4+00
3+00
2+00
1+00
0+00
-1+00
mV
Channel 2
Area 1
Area 2
Area 3

SCHEDULE

Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

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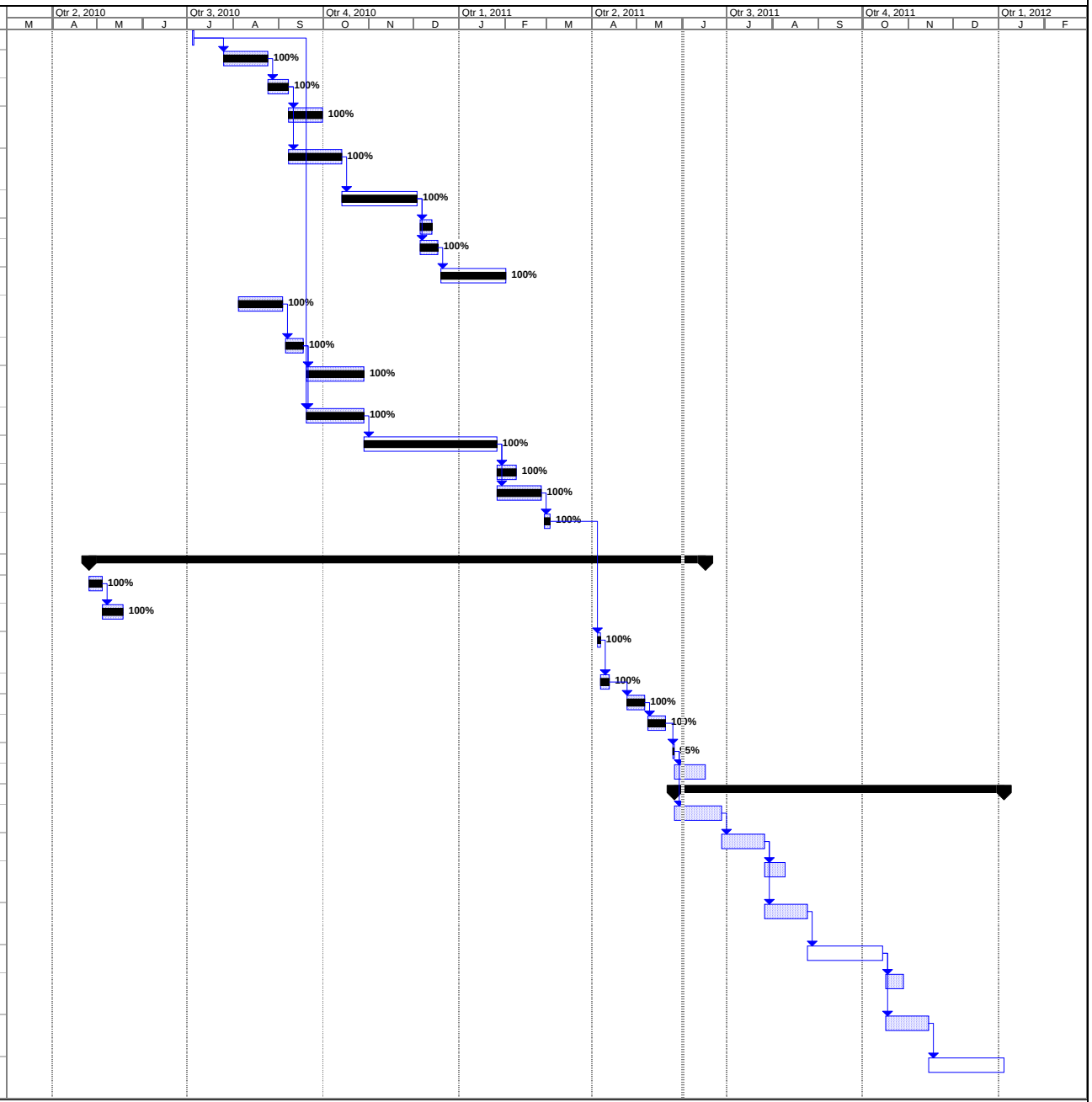


Project: Group 2 schedule
Date: Wed 6/1/11

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Appendix D

Geophysical Report

Group 2 Propellant Can Top
Geophysical Survey
Ravenna Army Ammunition Plant

Prepared For
Mr. Brian Stockwell
PIKA International
Ravenna, Ohio

By

TERENCE M. HAMILL

May 20, 2011

GeoSearches, Inc.

200 Industrial Parkway, Suite 6B

Chagrin Falls, Ohio44022

(440) 893-0642

May 20, 2011

Mr. Brian Stockwell
PIKA International

SUBJECT: Group 2 Propellant Can Top

Geophysical Survey

Dear Mr. Stockwell:

GeoSearches, Inc has completed the Geophysical survey dated May12, 2011 at Group 2 site at the RVAAP.
This Full Report presents the results regarding the targeted survey, delineating the boundaries of the Propellant Can Top areas.
If you have further questions please contact GeoSearches, Inc it has been a pleasure working with you on this project.

Best regard's,

Terence M. Hamill
President / Principal Geophysicist
GeoSearches, Inc.

Table of Contents

Section One

SITE PROJECT AND DESCRIPTION

Introduction:

GeoSearches, Inc. was retained by PIKA International to conduct a Geophysical survey at the Ravenna Army Ammunition Plant. The object of the survey was to delineate the areas within the designated site Group 2 containing Propellant Can Tops.

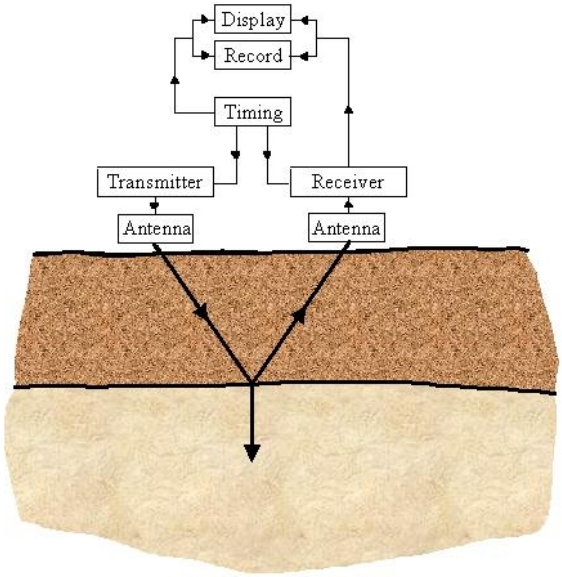
The Geophysical survey was conducted over an area approximately 12 acres in size.

The non-intrusive, subsurface investigation was conducted using Electromagnetics.

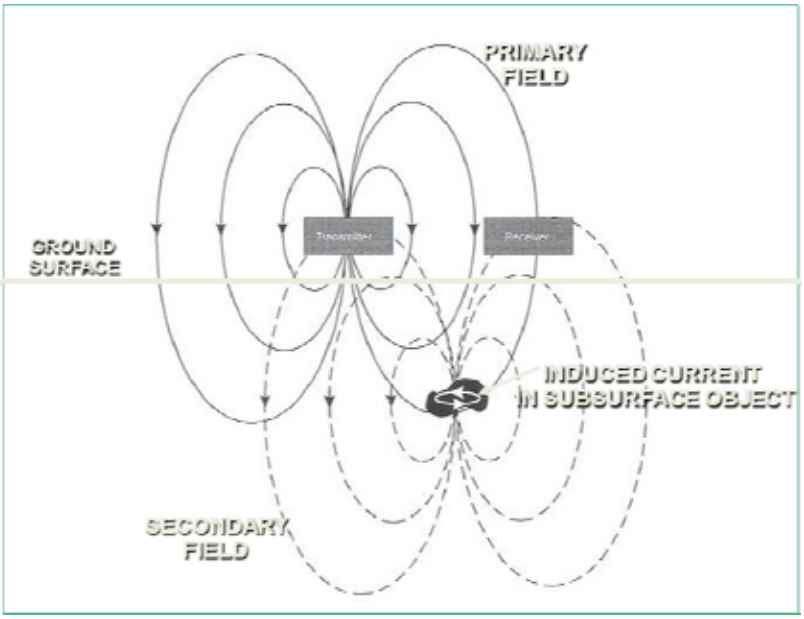
The EM61-MK2 consists of two 1-meter (m) by 0.5m rectangular coils arranged such that the source/receiver coil is located 40 centimeters (cm) below a second receiver coil. An electromagnetic pulse induces subsurface eddy currents with associated secondary magnetic fields. The decay of the secondary magnetic fields induced in subsurface materials is measured by the receiver coil(s) and digitally recorded.

The EM61-MK2 is capable of detecting all metals and is generally not affected by magnetic geology or soils. The EM61-MK2 may detect buried metal beyond four (4) feet below ground surface (ft bgs) depending on the size of the item and the contrast between the native soils/geology and the item. Additionally, the EM61-MK2 response is focused directly beneath the coils so the response from nearby metal structures (e.g., monitoring wells, fences, etc.) is minimal compared to other sensors such as a total field magnetometer.

Ground Penetrating Radar (GPR) detects subsurface structures by transmitting radio frequency waves into the ground and monitoring the strength and time delay of the reflection. The returning signal can then be evaluated to locate subsurface anomalies. Anomalies can be caused by void spaces, differences in soil/bedrock texture, differences in soil/bedrock moisture content, differences in the sediment compaction, and the presence of subsurface structures such as pipelines.



GROUND PENETRATING RADAR THEORY DIAGRAM



EM61 MK2 ELECTROMAGNETIC THEORY DIAGRAM

Part One: Method

Before fieldwork was started, historical data and detailed diagrams were reviewed to provide background information on the site.

An instrument verification strip (IVS) was conducted over a known area with surface targets. This was conducted over the area that is known as Cluster 1 so that was well representative of the expected targets. The objective of the IVS is to verify that the geophysical detection system is operating properly. The IVS targets should be observed in the data with signals that are consistent with both historical measurements and physics-based model predictions. Adjacent measurements of the site noise determine whether targets of interest can be detected reliably to their depth of interest under the site conditions.

System daily tests were also conducted which consisted of a Static Noise test, Spike Test and cable shake test. These tests were conducted before and after the geophysical survey.

A preliminary, straight-line GPR survey was conducted at the beginning of the investigation, establishing the typical response based on the site geology and subsurface structures. The survey was conducted by moving the GPR equipment along the grid lines in two, perpendicular directions. The GPR data were reviewed in the field before processing. This review consisted of data quality and also specifically in this case if excavated areas could be interpreted through the raw data collection.

The Trimble RTK GPS was used to augment geophysical data and improve geophysical mapping through visual observations made during site walk-over. During this process, the GPS was used to record the positions of cultural features (e.g., signposts, monitor wells, etc.) so that these features can be accounted for during the interpretation of the geophysical data.

The survey was conducted using Geonics EM-61 MK 2 and a Noggin GPR from Sensors and Software, Inc., with a 250MHz antenna. The data were acquired using the common-offset reflection profiling method. The depth of penetration ranged from 0 to 15 feet below the surface.

A surveyed grid was laid out over the survey area to facilitate GPR data collection and ensure complete coverage with both the GPS-integrated EM61, and the GPR. Numbered points were spaced 100 feet apart, and data acquisition intervals were 5 feet apart. The survey equipment used was:

TDS Ranger Data Collector
Topcon Total Station
Topcon Hiper Lite GPS
ODOT VRS Network

Part Two: Processing

This the data processing procedures and interpretation of results based on the geophysical information collected during the geophysical survey. Geosoft Oasis Montaj (Oasis) was the primary software used to complete data processing tasks. All data grids and anomalies were uploaded.

At the end of the field day the field geophysicist uploaded the data to the office computer, where the data was archived, backed-up, and processed and analyzed. The data processing sequence included verifying the validity of the data using the performance metrics, assessment of the track path and spatial sample density, latency correction, data leveling, and color-coded image generation utilizing software from the equipment manufacturers and Geosoft Oasis Montaj. Subsequent to the processing and review of the data, color-coded images of the geophysical sensor data were created for review and planning of the next day's field activities.

GeoSearches utilized the following software to process the data:

Oasis for latency correction; data leveling; interpolation and generation of color-coded images; and statistical analysis of the data in terms of the performance metrics such as spatial sample density, static background, and repeat tests.

The Ground Penetrating Radar data was processed by applying filters and gains to better define the anomalies of interest. Tools used to process the data and improve image quality included SPIVIEW TOOLS and WIN EKKO software from Sensors and Software, Inc.

Once each data survey is loaded and the grid properly oriented spatially, a short (3-sample) temporal median trim filter is applied to each GPR trace (one gridline) to attenuate noise spikes that degrades the data quality. A residual median filter is then applied to attenuate the wow (Short range GPR signals often possess a low-frequency component, commonly referred to as a "wow" that causes amplitude distortion along an individual trace), this filtering attenuates both the low and high frequency components of the wow, without adding precursors or other artifacts to the wavelet.

Time zero determination and datuming is also performed.

The data is then processed by applying amplitude compensation. For each GPR survey line, the rectified-amplitude versus time fall-off is determined. The inverse of this curve is scaled by a multiplier (0.3) to form the gain function. The multiplier is used to slightly reduce the gain function so that anomalously high amplitude values are not clipped after amplitude compensation.

Part Three: Interpretation and data quality

After completion of the data processing, each GPR and EM reflection image was evaluated to:

(1) Evaluate the GPR and EM penetration depth and resolution of the data collected at 250MHz and compare reflection character of the two, perpendicular line orientations;

(2) Interpret GPR and EM reflections and image patterns as bounding surfaces and architectural elements in profile; and

(3) EM61 anomalies that correlated with known surface features such as an electric junction box or utilities are not reported. All other anomalies that were not caused by known surface features or utilities were further analyzed with corresponding GPR data.

Section Two

CONDITIONS and OBJECTIVE

Part One: Conditions

The Geophysical survey included:

- The survey area was 95% accessible and covered all areas of interest. The larger wetter areas in the North were difficult to acquire data in.
- Project area consisted of grass, gravel tracks and brush.

Part Two: Objective

The primary objectives of the Geophysical survey were to determine the boundaries of the Propellant Can Tops.

Section Three

RESULTS

FIGURE 1

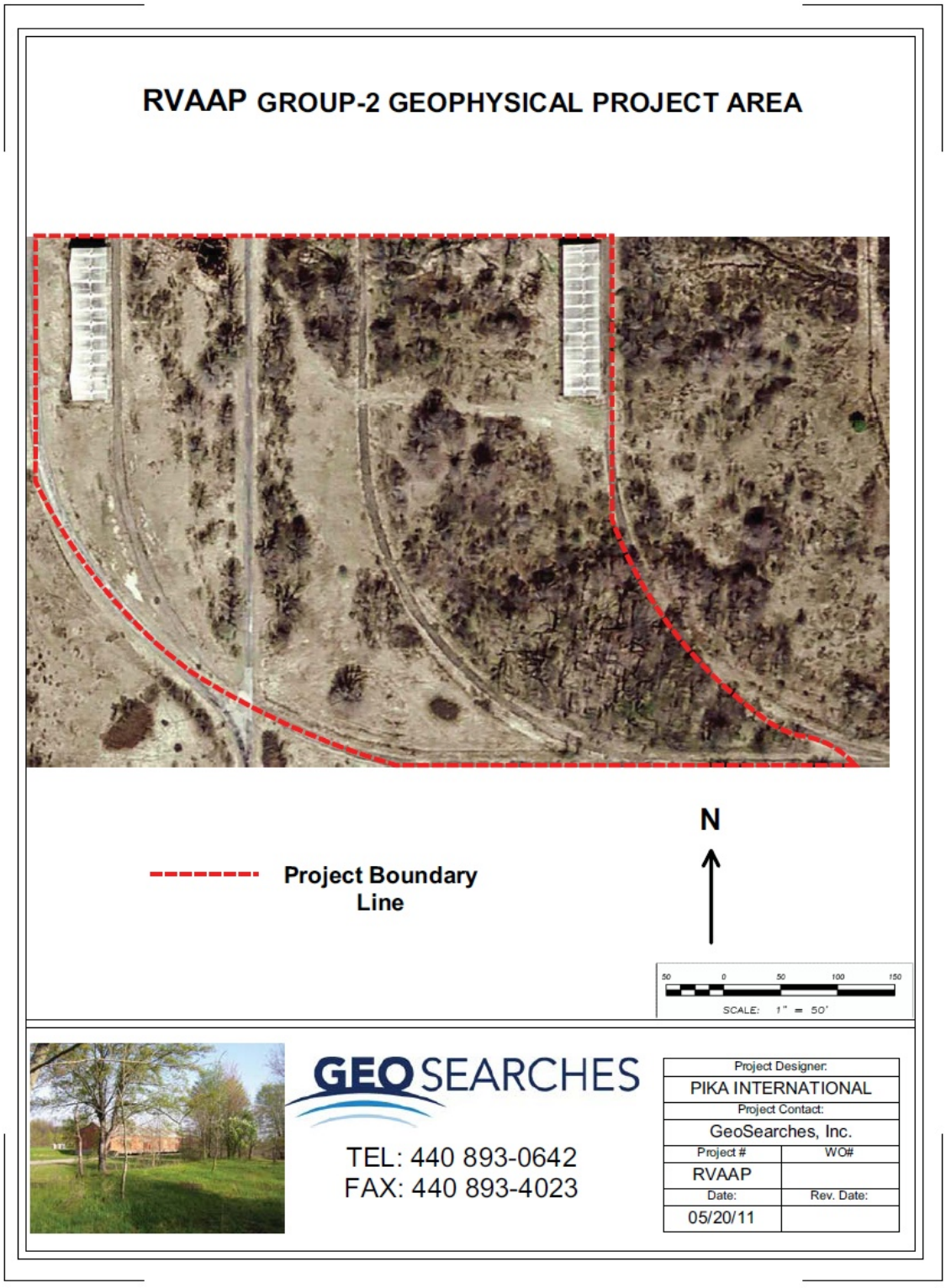
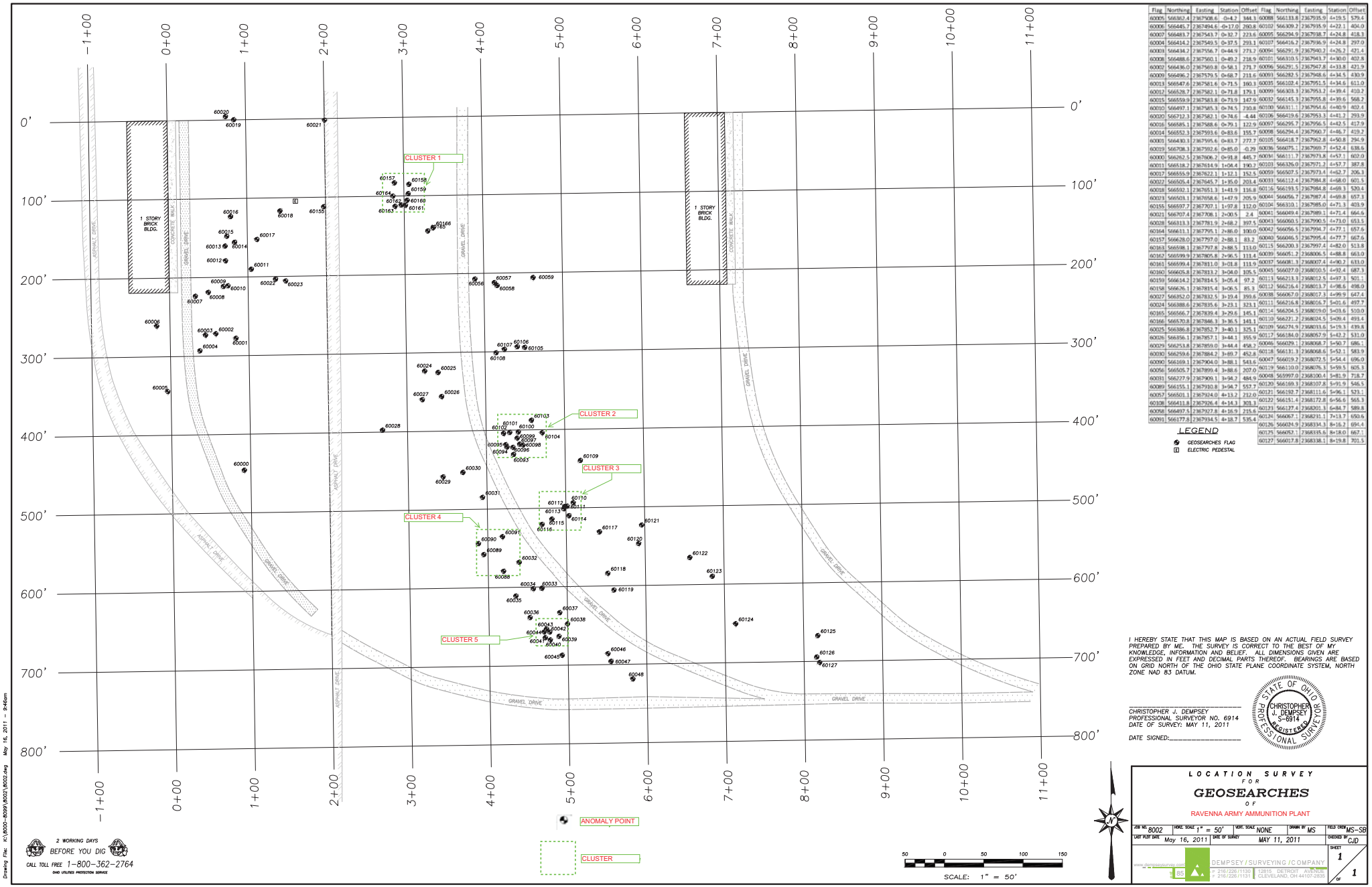

RVAAP GROUP-2 GEOPHYSICAL PROJECT AREA
Project Boundary Line
N
50 0 50 100 150
SCALE: 1" = 50'
GEOSEARCHES
TEL: 440 893-0642
FAX: 440 893-4023
Project Designer:
PIKA INTERNATIONAL
Project Contact:
GeoSearches, Inc.
Project #
WO#
RVAAP
Date:
Rev. Date:
05/20/11

FIGURE 2



Flag	Northing	Easting	Station	Offset	Flag	Northing	Easting	Station	Offset
60005	566360.4	2367908.6	0+4.2	344.3	60088	566133.8	2367935.9	4+19.5	579.4
60006	566445.7	2367494.6	0+17.0	260.8	60102	566309.2	2367935.9	4+22.1	404.0
60007	566483.7	2367543.7	0+32.7	223.6	60095	566294.9	2367938.7	4+24.8	418.3
60004	566414.2	2367549.5	0+37.5	293.1	60107	566416.2	2367936.9	4+24.8	297.0
60003	566434.2	2367556.7	0+44.9	273.7	60094	566291.9	2367940.2	4+26.2	421.4
60008	566488.6	2367560.1	0+49.2	218.9	60101	566310.5	2367943.7	4+30.0	407.6
60002	566438.0	2367569.8	0+58.1	273.7	60096	566291.5	2367947.8	4+33.8	421.9
60009	566496.2	2367579.5	0+68.7	213.6	60093	566282.5	2367948.6	4+34.5	430.9
60013	566547.6	2367581.6	0+71.5	160.3	60035	566102.4	2367951.5	4+34.6	611.0
60012	566528.7	2367582.1	0+71.8	179.1	60099	566303.3	2367953.2	4+39.4	410.2
60015	566559.9	2367583.8	0+73.9	147.9	60032	566145.3	2367955.8	4+39.6	568.2
60010	566497.1	2367585.3	0+74.5	210.8	60100	566311.1	2367954.6	4+40.9	402.4
60020	566712.3	2367582.1	0+74.6	-4.44	60106	566419.6	2367953.3	4+41.2	293.9
60016	566585.1	2367588.6	0+79.1	122.9	60097	566295.7	2367956.5	4+42.5	417.9
60014	566552.3	2367593.6	0+83.6	155.7	60098	566294.6	2367960.7	4+46.7	419.2
60001	566483.3	2367595.6	0+83.7	277.7	60105	566418.7	2367962.8	4+50.8	394.9
60019	566708.3	2367592.6	0+85.0	-0.29	60036	566075.1	2367969.7	4+52.4	638.6
60000	566262.5	2367606.2	0+91.8	445.7	60094	566111.7	2367973.8	4+57.1	602.0
60011	566518.2	2367614.9	1+04.4	190.2	60103	566326.0	2367971.2	4+57.7	387.8
60017	566555.9	2367622.1	1+12.1	152.5	60059	566507.5	2367973.4	4+62.7	206.3
60027	566505.4	2367645.7	1+35.0	203.4	60033	566112.4	2367984.8	4+68.0	601.5
60018	566592.1	2367651.3	1+41.9	116.8	60116	566193.5	2367984.8	4+69.3	520.4
60013	566503.1	2367658.6	1+47.9	205.9	60044	566056.7	2367987.4	4+69.8	657.3
60155	566597.7	2367707.1	1+97.8	112.0	60104	566310.1	2367985.0	4+71.3	403.9
60021	566707.4	2367708.1	2+00.5	2.4	60041	566049.4	2367989.1	4+71.4	664.6
60028	566313.3	2367781.9	2+68.2	397.5	60043	566060.5	2367990.5	4+73.0	653.5
60164	566611.1	2367795.1	2+86.0	100.0	60042	566056.5	2367994.7	4+77.1	657.6
60157	566628.0	2367797.0	2+88.1	83.2	60040	566046.5	2367995.4	4+77.7	667.6
60163	566598.1	2367797.8	2+88.5	113.0	60115	566200.3	2367997.4	4+82.0	513.8
60162	566599.9	2367805.8	2+96.5	113.4	60039	566051.2	2368006.5	4+88.8	663.0
60161	566599.4	2367811.0	3+01.8	111.9	60037	566081.3	2368007.4	4+90.7	633.0
60160	566605.8	2367813.2	3+04.0	105.5	60045	566027.0	2368010.5	4+92.4	687.3
60159	566614.2	2367814.5	3+05.4	97.2	60113	566213.3	2368012.5	4+97.3	501.1
60158	566626.1	2367815.4	3+06.5	85.3	60112	566216.6	2368013.7	4+98.6	498.0
60027	566352.0	2367832.5	3+19.4	359.6	60038	566067.0	2368017.3	4+99.9	647.4
60024	566388.6	2367835.6	3+23.1	323.1	60111	566216.8	2368016.7	5+01.6	497.7
60165	566566.7	2367839.4	3+29.6	145.1	60114	566204.5	2368019.0	5+03.6	510.0
60166	566570.8	2367846.3	3+36.5	141.1	60110	566221.2	2368024.5	5+09.4	493.4
60025	566386.8	2367853.7	3+40.1	325.1	60109	566274.9	2368033.6	5+19.3	439.8
60026	566356.1	2367857.1	3+44.1	355.9	60117	566184.0	2368057.9	5+42.2	531.0
60029	566253.8	2367859.0	3+44.4	458.2	60046	566029.1	2368068.7	5+50.7	686.1
60030	566259.6	2367884.2	3+69.7	452.8	60118	566131.3	2368068.6	5+52.1	583.9
60090	566169.3	2367904.0	3+88.1	543.6	60047	566019.2	2368072.5	5+54.4	696.0
60056	566505.7	2367899.4	3+88.6	207.0	60119	566110.0	2368076.1	5+59.5	605.5
60031	566277.9	2367909.1	3+94.2	484.9	60048	565997.0	2368100.4	5+81.9	718.7
60089	566155.1	2367930.8	3+94.7	557.7	60120	566169.3	2368107.8	5+91.9	546.5
60058	566497.5	2367927.8	4+16.9	215.6	60121	566192.7	2368111.6	5+96.1	523.1
60091	566177.8	2367934.5	4+18.7	535.4	60122	566151.4	2368172.8	6+56.6	565.3
					60123	566127.4	2368201.3	6+84.7	589.8
					60124	566067.7	2368231.1	7+13.7	650.6
					60126	566024.9	2368334.3	8+16.2	694.4
					60125	566052.3	2368335.6	8+18.0	667.1
					60127	566017.8	2368338.1	8+19.8	701.5

LEGEND
GEOSEARCHES FLAG
ELECTRIC PEDESTAL

I HEREBY STATE THAT THIS MAP IS BASED ON AN ACTUAL FIELD SURVEY PREPARED BY ME. THE SURVEY IS CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF. ALL DIMENSIONS GIVEN ARE EXPRESSED IN FEET AND DECIMAL PARTS THEREOF. BEARINGS ARE BASED ON GRID NORTH OF THE OHIO STATE PLANE COORDINATE SYSTEM, NORTH ZONE NAD 83 DATUM.

CHRISTOPHER J. DEMPSEY
PROFESSIONAL SURVEYOR NO. 6914
DATE OF SURVEY: MAY 11, 2011

DATE SIGNED:_____

STATE OF OHIO — CHRISTOPHER J. DEMPSEY S-6914 — REGISTERED PROFESSIONAL SURVEYOR

LOCATION SURVEY FOR
GEOSEARCHES OF
RAVENNA ARMY AMMUNITION PLANT

JOB NO.	HORZ. SCALE	VERT. SCALE	DRAWN BY	FIELD CREW
8002	1" = 50'	NONE	MS	MS-SB
LAST PLOT DATE: May 16, 2011	DATE OF SURVEY: MAY 11, 2011			CHECKED BY: CJD

DEMPSEY / SURVEYING / COMPANY
12815 DETROIT AVENUE
CLEVELAND, OH 44107-2835
P 216/226/1130
F 216/226/1131

SHEET 1 OF 1

Drawing File: K:\8000-8099\8002\8002.dwg May 16, 2011 - 9:46am

FIGURE 3

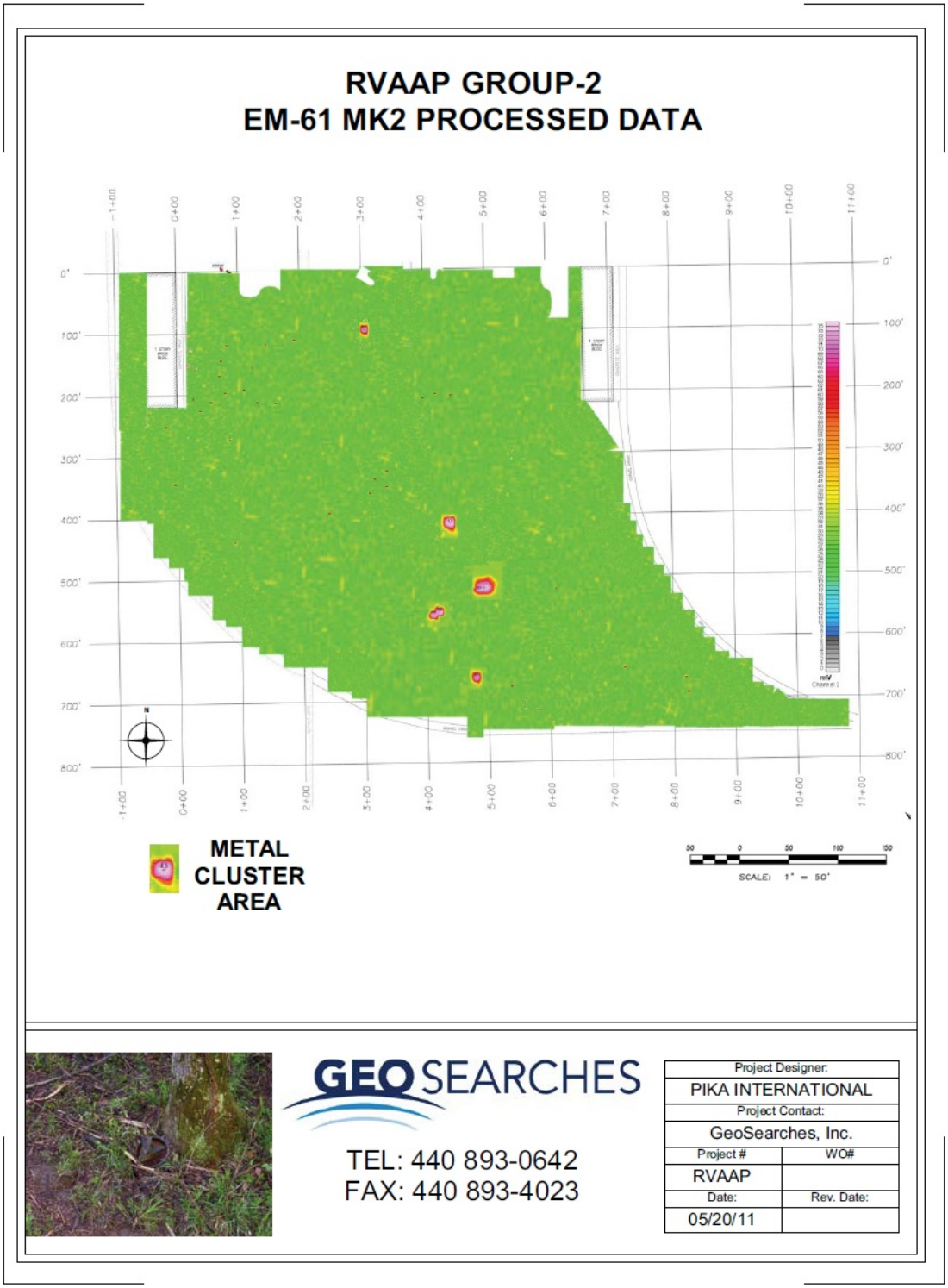

RVAAP GROUP-2
EM-61 MK2 PROCESSED DATA
METAL CLUSTER AREA
SCALE: 1" = 50'
GEOSEARCHES
TEL: 440 893-0642
FAX: 440 893-4023
Project Designer:
PIKA INTERNATIONAL
Project Contact:
GeoSearches, Inc.
Project #
RVAAP
WO#
Date:
05/20/11
Rev. Date:

FIGURE 4

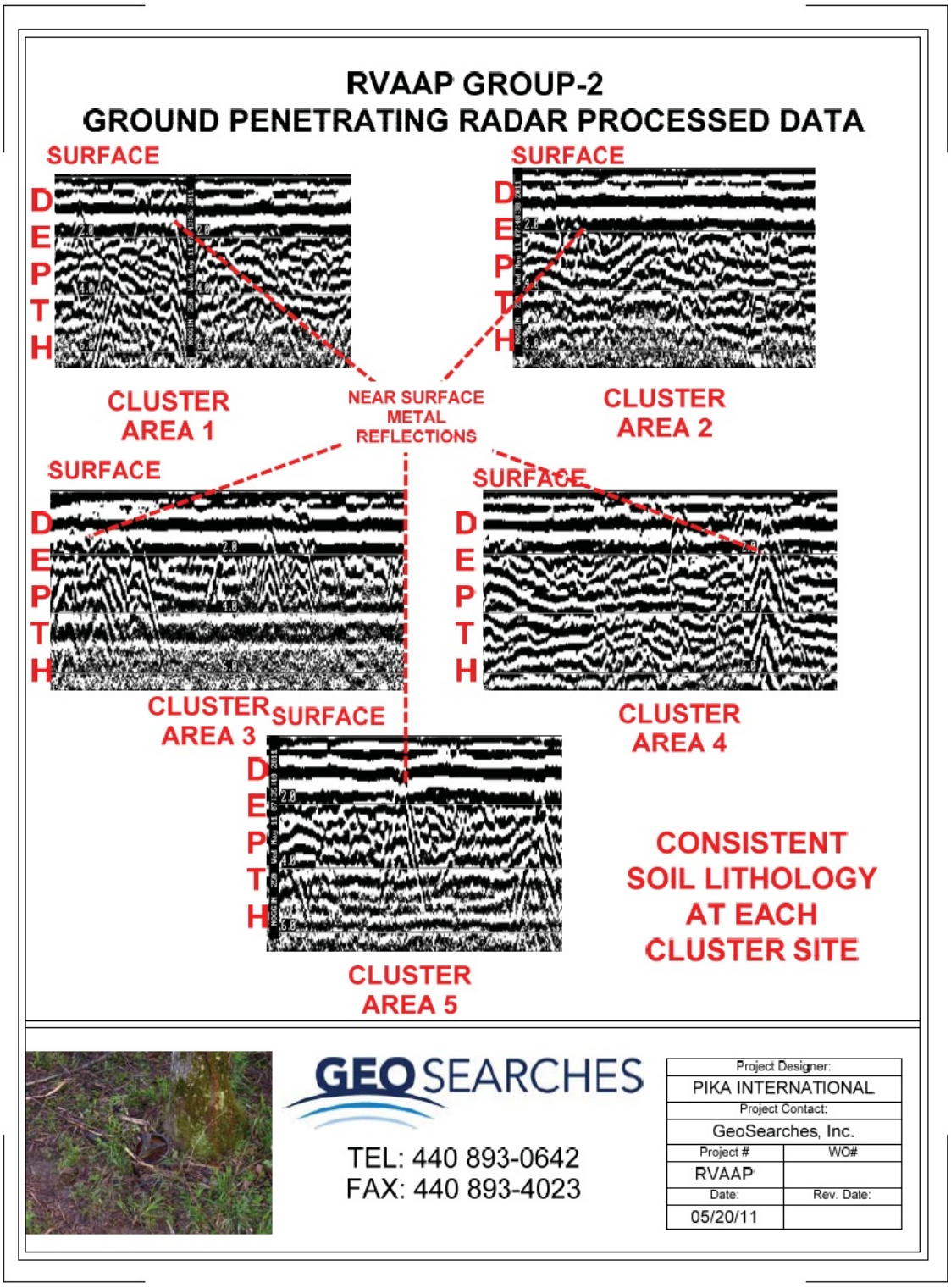

RVAAP GROUP-2
GROUND PENETRATING RADAR PROCESSED DATA
SURFACE
DEPTH
CLUSTER AREA 1
NEAR SURFACE METAL REFLECTIONS
SURFACE
DEPTH
CLUSTER AREA 2
SURFACE
DEPTH
CLUSTER AREA 3
SURFACE
DEPTH
CLUSTER AREA 4
SURFACE
DEPTH
CLUSTER AREA 5
CONSISTENT SOIL LITHOLOGY AT EACH CLUSTER SITE
GEOSEARCHES
TEL: 440 893-0642
FAX: 440 893-4023
Project Designer:
PIKA INTERNATIONAL
Project Contact:
GeoSearches, Inc.
Project #
RVAAP
WO#
Date:
05/20/11
Rev. Date:

FIGURE 5


RVAAP GROUP-2
ANOMALY EXTENT
ANOMALY
50 0 50 100 150
SCALE: 1" = 50'
N
GEOSEARCHES
TEL: 440 893-0642
FAX: 440 893-4023
Project Designer:
PIKA INTERNATIONAL
Project Contact:
GeoSearches, Inc.
Project #
WO#
RVAAP
Date:
Rev. Date:
05/20/11

Results

The object of the Geophysical survey and the use of Ground Penetrating Radar and Electromagnetics were to delineate the areas that Propellant Can Tops exist and also to determine if areas had been excavated to bury the cans.

During the survey it was physically possible to see on the surface Propellant Can Tops and also a few shot gun shells.

The EM61-MK2 survey data did display distinct areas of high anomaly density that can be seen in **Figures 2 and 3.** The signal data established that 5 areas exist within the survey area with anomalies close or on the surface and the processed data **[Figures 3 and 4]** suggests that all of these areas have anomalies that are on the surface or just below the surface and < 9 inches in depth.

Due to the anomaly density of the 5 areas it is difficult to characterize individual anomalies.

The "white areas"**[Figure 3]** in the north portion of the defined survey boundary represent locations with limited coverage (buildings) and due to wet conditions that could not be accessed.

The EM data did not detect any other Propellant Can Top areas apart from the 5 distinct anomaly areas.

Smaller events near the surface did register on the raw data when collecting, and these have been noted, however these events are much smaller than the Propellant Can Tops. At this stage the anomalies cannot be identified.

Ground Penetrating Radar was utilized after all determined clustered areas were established to ascertain if the cluster areas had been excavated [**Figure 4]**.

The GPR did establish that metallic anomalies did exist at near surface depths and also clarified that the objects had been dumped there as the subsurface lithology was consistent throughout with no evidence of excavation based upon the GPR data results.

All anomalies have been surveyed and the coordinates are included on Figure 2.

Conclusion

The Geophysical investigations performed at the Group2 Site, have identified areas of dense anomalies at the 5 locations. The data collection achieved the overall defined objectives for the project by delineating the boundaries of the propellant can top areas in order to confirm the presence or absence of releases of propellants and/or other MC to the surface soils at the Group 2 Propellant Cans Tops Site.

Further Geophysical investigations in the future, with tighter parameters may be needed to identify the smaller anomalies found within the survey area.

General Qualifications

The data presented herein are interpreted. No warranty, certification, or statement of fact, either expressed or implied, regarding actual subsurface conditions within the surveyed area is contained herein. No interpretation of subsurface conditions can be made for areas not surveyed.

Appendix E

Summary Table, Field Sample Reports, Lab Results and COC

TABLE 1 - SUMMARY OF MULTI-INCREMENT SOIL SAMPLES INORGANIC RESULTS

ANALYTE**, UNITS, METHOD NO.	FWCUGs for National Guard Trainee HI=1 mg/kg	FWCUGs for National Guard Trainee Risk = 10^{-5} mg/kg	Regional Screening Level (RSL) mg/kg	Surface Soil Background Criteria mg/kg	PCTss-001M-0001-SO	Reporting Limits	PCTss-001M-0001-DUP	Reporting Limits	PCTss-002D-0001-SO	Reporting Limits	PCTss-002M-0001-SO	Reporting Limits	PCTss-002M-0001-ER	Reporting Limits	PCTss-003M-0001-SO	Reporting Limits	TRIP BLANK
Sample Date					5/26/2011		5/26/2011		5/26/2011		5/26/2011		5/26/2011		5/26/2011		5/27/2011
													UG/L				UG/L
METALS 6010B mg/kg																	
Arsenic	1140	27.8	0.39	15.4	--		--		--		8.4	2.2	< RL	21.0	--		--
Lead	351	--	400	26.1	--		--		--		**34.1**	34.1	< RL	10.0	--		--
Selenium	--	--	390	1.4	--		--		--		< RL	2.1	0.0206 B	25.0	--		--
Thallium	477	--	--	0	--		--		--		< RL	2.1	< RL	15.0	--		--
Silver	31049	--	390	0	--		--		--		< RL	0.53	< RL	5.0	--		--
Aluminum	34960	--	77000	17700	--		--		--		10600	22.1	< RL	200	--		--
Barium	3506	--	15000	88.4	--		--		--		81.7	2.1	< RL	21.0	--		--
Beryllium	--	--	160	0.88	--		--		--		0.45	0.32	< RL	3.0	--		--
Calcium (essential nutrient)	--	--	--(n)	15800	--		--		--		954	105	52.1 B	500	--		--
Cadmium	3292	109	70	0.0	--		--		--		0.13 B	0.32	< RL	1000	--		--
Cobalt	140	70.3	23	10.4	--		--		--		7.7	0.63	< RL	6.0	--		--
Chromium, hexavalent	56.1	16.4	--	--	--		--		--		2.42	1.3	< RL	12.0	--		--
Copper	253680	--	3100	17.7	--		--		--		12.1	2.6	< RL	20.0	--		--
Iron	1000000	--	55000	23100	--		--		--		17600	10.5	< RL	100	--		--
Potassium (essential nutrient)	--	--	--(n)	927	--		--		--		654	105	< RL	1000	--		--
Magnesium (essential nutrient)	--	--	--(n)	3030	--		--		--		1770	52.7	< RL	500	--		--
Manganese	--	--	1800	1450	--		--		--		833	1.3	< RL	12.0	--		--
Sodium (essential nutrient)	--	--	--(n)	123	--		--		--		35.6 B	527	< RL	1000	--		--
Nickel	126391	--	--	21.1	--		--		--		18.5	1.1	< RL	50.0	--		--
Antimony	1753	--	31	0.96	--		--		--		< RL	1.6	< RL	60.0	--		--
Vanadium	23045	--	5.5	31.1	--		--		--		24.4	1.1	< RL	5.0	--		--
Zinc	1000000	--	23000	61.8	--		--		--		**62.4**	3.2	< RL	20.	--		--
Mercury 7471A mg/kg																	
Mercury	1722	--	--	0.036					--		**0.049**	0.040	< RL		--		--
Perchlorate 6860 ug/kg																	
Perchlorate	--	--	--	0.00	**0.000093 J**	**0.47**	**0.00011 J**	**0.49**	--		< RL	0.50	< RL	0.05	**0.000093 J**	0.47	--
Cyanide 9012 mg/kg																	
Cyanide	--	--	--	0.00	--		--		--		0.19 B	0.53	< RL	0.010	--		--

-- = data not available
ug/L = micrograms per liter (parts per billion)
ug/kg = micrograms per kilogram (parts per billion)
mg/kg = milligrams per kilogram (parts per million)
Inorganics:
RL = Reporting Limit
< RL = Indicates that the compound was analyzed for but not detected
J = Method blank contamination. The associated method blank contains the target analyte at a reportable level.
B = Estimated result. Result is less than Reporting Limit
E = Matrix Interference
Highlighted = > Regional Screening Level
Bold = > Background
Italics = > Cleanup goals
ER = Equipment Rinse
SO = Soil

TABLE 2 - SUMMARY OF MULTI-INCREMENT SOIL SAMPLES ORGANIC RESULTS

ANALYTE**, UNITS, METHOD NO.	FWCUGs for National Guard Trainee HI=1 mg/kg	FWCUGs for National Guard Trainee Risk = 10^{-5} mg/kg	Regional Screening Level (RSL) mg/kg	Surface Soil Background Criteria mg/kg	PCTss-001M-0001-SO	Reporting Limit	PCTss-001M-0001-DUP	Reporting Limit	PCTss-002D-0001-SO	Reporting Limit	PCTss-002M-0001-SO	Reporting Limit	PCTss-002M-0001-ER	Reporting Limit	PCTss-003M-0001-SO	Reporting Limit	TRIP BLANK	Reporting Limit
Sample Date					5/26/2011		5/26/2011		5/26/2011		5/26/2011		5/26/2011		5/26/2011		5/27/2011	
					PCTss-001M-0001-SO								UG/L				UG/L	
EXPLOSIVES mg/kg																		
1,3,5-Trinitrobenzene	165422	--	2200	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
1,3-Dinitrobenzene	596	--	6.1	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
2,4,6-Trinitrotoluene	2488	4643	19	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
2,4-Dinitrotoluene	6519	134	1.6	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
2,6-Dinitrotoluene	3309	136	61	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
2-Amino-4,6-Dinitrotoluene	1237	--	150	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
2-Nitrotoluene	59611	726	2.9	--	--		--		--		< RL	0.24	< RL	0.52	--		--	
3-Nitrotoluene	--	--	6.1	--	--		--		--		< RL	0.24	< RL	0.52	--		--	
4-Amino-2,6-Dinitrotoluene	1237	--	150	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
4-Nitrotoluene	59611	9818	30	--	--		--		--		< RL	0.24	< RL	0.52	--		--	
HMX	234645	--	3800	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
Nitrobenzene	--	--	4.8	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
PETN	--	--	--	--	--		--		--		< RL	0.48	< RL	0.68	--		--	
RDX	17113	1452	5.5	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
Tetryl	--	--	240	--	--		--		--		< RL	0.24	< RL	0.10	--		--	
Propellants mg/kg																		
Nitrocellulose	--	--	180000000	--	1.1	B 5.0	0.82	B 5.0	--		< RL	5.0	< RL	2.0	< RL	5.0	--	
Nitroglycerine	--	9818	6.1	--	< RL	0.48	< RL	0.49	--		< RL	0.48	< RL	0.68	< RL	0.50	--	
Nitroguanidine	--	--	6100	--	0.063	J 0.24	0.12	J 0.24	--		< RL	0.25	< RL	20	0.17	J 0.26	--	
VOCS 8260B ug/kg																		
Chloromethane	--	--	120	--	--		--		< RL	10	--		--		--		< RL	2.0
Bromomethane	--	--	7.3	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Vinyl chloride	--	--	0.06	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Chloroethane	--	--	15000	--	--		--		< RL	5.0	--		--		--		< RL	2.0
Methylene Chloride	--	--	11	--	--		--		< RL	5.0	--		--		--		< RL	2.0
Acetone	--	--	61000	--	--		--		0.0053	J,B 10	--		--		--		< RL	10
Carbon disulfide	--	--	820	--	--		--		< RL	5.0	--		--		--		< RL	2.0
1,1-Dichloroethene	--	--	3.3	--	--		--		< RL	5.0	--		--		--		< RL	1.0
1,1-Dichloroethane	--	--	240	--	--		--		< RL	5.0	--		--		--		< RL	3.0
1,2-Dichloroethene (total)	--	--	150	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Chloroform	--	--	0.29	--	--		--		< RL	5.0	--		--		--		< RL	1.0
1,2-Dichloroethane	--	--	0.43	--	--		--		< RL	5.0	--		--		--		< RL	1.0
2-Butanone	--	--	28000	--	--		--		< RL	10	--		--		--		< RL	10
1,1,1-Trichloroethane	--	--	8700	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Carbon tetrachloride	--	--	0.61	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Bromodichloromethane	--	--	0.27	--	--		--		< RL	5.0	--		--		--		< RL	1.0
1,2-Dichloropropane	--	--	0.89	--	--		--		< RL	5.0	--		--		--		< RL	1.0

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cis-1,3-Dichloropropene	--	--	1.7	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Trichloroethene	--	--	2.8	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Dibromochloromethane	--	--	0.68	--	--		--		< RL	5.0	--		--		--		< RL	1.0
1,1,2-Trichloroethane	--	--	1.1	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Benzene	--	--	1.1	--	--		--		< RL	5.0	--		--		--		< RL	1.0
trans-1,3-Dichloropropene	--	--	1.7	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Bromoform	--	--	61	--	--		--		< RL	5.0	--		--		--		< RL	1.0
4-Methyl-2-pentanone	--	--	5300	--	--		--		< RL	10	--		--		--		< RL	10
2-Hexanone	--	--	210	--	--		--		< RL	10	--		--		--		< RL	10
Tetrachloroethene	--	--	0.55	--	--		--		< RL	5.0	--		--		--		< RL	1.0
1,1,2,2-Tetrachloroethane	--	--	0.56	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Toluene	--	--	5000	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Chlorobenzene	--	--	290	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Ethylbenzene	--	--	5.4	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Styrene	--	--	6300	--	--		--		< RL	5.0	--		--		--		< RL	1.0
Xylenes (Total)	--	--	630	--	--		--		< RL	5.0	--		--		--		< RL	1.0
SVOC 8270 mg/kg																		
Phenol	--	--	18000	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Bis(2-chloroethyl) ether	--	--	0.21	--	--		--		--		< RL	0.99	< RL	19	--		--	
2-Chlorophenol	--	--	390	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
1,3-Dichlorobenzene	--	--	--	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
1,4-Dichlorobenzene	--	--	2.4	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
1,2-Dichlorobenzene	--	--	1900	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
2-Methylphenol	--	--	3100	--	--		--		--		< RL	2.0	< RL	9.5	--		--	
2,2-oxybis (1-chloropropane)	--	--	--	--	--		--		--		< RL	2.0	< RL	19	--		--	
4-Methylphenol	--	--	310	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
N-Nitroso-di-n-propylamine	--	18.8	0.069	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Hexachloroethane	--	--	35	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
Nitrobenzene	--	--	4.8	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Isophorone	--	--	510	--	--		--		--		< RL	5.0	< RL	24	--		--	
2-Nitrophenol	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2,4-Dimethylphenol	--	--	1200	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Bis(2-chloroethoxy)methane	17883	--	180	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2,4-Dichlorophenol	--	--	180	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
1,2,4-Trichlorobenzene	--	--	22	--	--		--		--		< RL	2.0	< RL	9.5	--		--	
Naphthalene	15407	--	3.6	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
4-Chloroaniline	--	--	2.4	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
Hexachlorobutadiene	--	--	6.2	--	--		--		--		< RL	5.0	< RL	24	--		--	
4-Chloro-3-methylphenol	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2-Methylnaphthalene	--	--	310	--	--		--		--		< RL	2.0	< RL	9.5	--		--	
Hexachlorocyclopentadiene	--	--	370	--	--		--		--		< RL	16	< RL	48	--		--	

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2,4,6-Trichlorophenol	--	--	44	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2,4,5-Trichlorophenol	--	--	6100	--	--		--		--		< RL	2.0	< RL	48	--		--	
2-Chloronaphthalene	--	--	6300	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2-Nitroaniline	--	--	610	--	--		--		--		< RL	16	< RL	48	--		--	
Dimethyl phthalate	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Acenaphthylene	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2,6-Dinitrotoluene	--	--	61	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
3-Nitroaniline	--	--	--	--	--		--		--		< RL	16	< RL	48	--		--	
Acenaphthene	--	--	3400	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2,4-Dinitrophenol	--	--	120	--	--		--		--		< RL	16	< RL	48	--		--	
4-Nitrophenol	--	--	--	--	--		--		--		< RL	0.99	< RL	48	--		--	
Dibenzofuran	11922	--	78	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
2,4-Dinitrotoluene	--	--	1.6	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Diethyl phthalate	--	--	49000	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
4-Chlorophenyl phenyl ether	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Fluorene	114583	--	2300	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
4-Nitroaniline	--	--	24	--	--		--		--		< RL	16	< RL	48	--		--	
4,6-Dinitro-2-methylphenol	--	--	--	--	--		--		--		0.14 J	2.0	< RL	48	--		--	
n-Nitrosodiphenylamine	--		99	--	--		--		--		< RL	3.3	< RL	9.5	--		--	
4-Bromophenyl phenyl ether	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Hexachlorobenzene	--	--	0.3	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Pentachlorophenol	56558	440	0.89	--	--		--		--		< RL	16	< RL	9.5	--		--	
Phenanthrene	--	--	--	--	--		--		--		< RL	0.99	< RL	48	--		--	
Anthracene	--	--	17000	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Carbazole	--	8346	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Di-n-butyl phthalate	--	--	6100	--	--		--		--		< RL	5.0	< RL	24	--		--	
Fluoranthene	50868	--	2300	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Pyrene	38151	--	1700	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Butyl benzyl phthalate	--	--	260	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
3,3'-Dichlorobenzidine	--	--	1.1	--	--		--		--		< RL	5.0	< RL	48	--		--	
Benzo(a)anthracene	--	47.7	0.15	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Chrysene	--	4774	15	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Bis(2-ethylhexyl) phthalate	--	--	35	--	--		--		--		< RL	5.0	1.1 J	24	--		--	
Di-n-octyl phthalate	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Benzo(b)fluoranthene	--	47.7	0.15	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Benzo(k)fluoranthene	--	477	1.5	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Benzo(a)pyrene	--	4.77	0.015	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Indeno(1,2,3-cd)pyrene	--	47.7	0.15	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Dibenz(a,h)anthracene		4.77	0.015	--	--		--		--		< RL	0.99	< RL	9.5	--		--	
Benzo(g,h,i)perylene	--	--	--	--	--		--		--		< RL	0.99	< RL	9.5	--		--	

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PESTICIDES 8081A ug/kg																		
alpha-BHC	--	--	0.077	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
beta-BHC	--	74.2	0.27	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
delta-BHC	--	--	--	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
gamma-BHC	--	--	0.52	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
Heptachlor	2981	29.8	0.11	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
Aldrin	179	7.88	0.029	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
Heptachlor epoxide	77.5	14.8	0.053	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
Endosulfan I	--	--	370	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
Dieldrin	298	8.39	0.030	--	--		--		--		< RL	3.4	< RL	0.097	--		--	
4,4'-DDE	--	--	1.4	--	--		--		--		0.00073 J,PG	3.4	< RL	0.097	--		--	
Endrin	330	--	18	--	--		--		--		< RL	3.4	< RL	0.097	--		--	
Endosulfan II	--	--	--	--	--		--		--		< RL	3.4	< RL	0.097	--		--	
4,4'-DDD	--	--	2.0	--	--		--		--		< RL	3.4	< RL	0.097	--		--	
Endosulfan sulfate	--	--	--	--	--		--		--		< RL	3.4	< RL	0.048	--		--	
4,4'-DDT	--	--	1.7	--	--		--		--		< RL	3.4	< RL	0.097	--		--	
Methoxychlor	--	--	310	--	--		--		--		< RL	1.7	< RL	1.9	--		--	
Endrin ketone	--	--	--	--	--		--		--		< RL	3.4	< RL	0.048	--		--	
Endrin aldehyde	--	--	--	--	--		--		--		< RL	3.4	< RL	0.097	--		--	
alpha-Chlordane	--	--	--	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
gamma-Chlordane	--	--	1.6	--	--		--		--		< RL	1.7	< RL	0.048	--		--	
Toxaphene	--	--	0.44	--	--		--		--		< RL	66	< RL	1.9	--		--	
PCBs 8082 ug/kg																		
Aroclor-1016	192	34.6	3.9	--	--		--		--		< RL	33	< RL	0.97	--		--	
Aroclor-1221	--	--	0.14	--	--		--		--		< RL	33	< RL	1.9	--		--	
Aroclor-1232	--	--	0.14	--	--		--		--		< RL	33	< RL	0.97	--		--	
Aroclor-1242	--	--	0.22	--	--		--		--		< RL	33	< RL	0.97	--		--	
Aroclor-1248	--	34.6	0.22	--	--		--		--		< RL	33	< RL	0.97	--		--	
Aroclor-1254	54.9	34.6	0.22	--	--		--		--		< RL	33	< RL	0.97	--		--	
Aroclor-1260	--	34.6	0.22	--	--		--		--		< RL	33	< RL	0.97	--		--	

-- = data not available
ug/L = micrograms per liter (parts per billion)
ug/kg = micrograms per kilogram (parts per billion)
mg/kg = milligrams per kilogram (parts per million)
Organics:
RL - Reporting Limit
< RL = Indicates that the compound was analyzed for but not detected
J = Estimated result. Result is less than Reporting Limit
B = Method blank contamination. The associated method blank contains the target analyte at a reportable level.
PG - The percent difference between the original and confirmation analyses is greater than 40%
Highlighted = > Regional Screening Level
Bold = > Background
Italics = > Cleanup goals
ER = Equipment Rinse
SO = Soil

Field Sampling Report

PIKA INTERNATIONAL, INC.

Project Name: RVAAP

Location ID: PCTss-001M-0001-SO

Ravenna Army Ammunition Plant
Ravenna Ohio

Date: 05/26/2011 **Weather** Cloudy **Temperature** 67

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
	Micro-purge				Push Probe	X	Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1025 hrs **Sample Type:** Composite - MI - Grab
If MI, # of increments taken: _____
Location: Plotted on Map - Staked in Field Estimated - Measured - Surveyed

Sample Depth: 0-1' FT (below surface) **Decon:** Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	ppm	
Sample:	ppm	
Water Level	FT	
Temperature	°C	
Sp. Conductance:	uMHOs	
pH	units	
Turbidity	N.T.U.	

Analytical Parameters

VOC		TPH GRO	
Nitrocellulose	X	TPH DRO	
Nitroguanidine	X	Chromium +6	
Nitroglycerine	X	Nitrate	
Perchlorate	X	Sulfate	
Pesticides/PCBs		Asbestos	
RVAAP Full Suite		Arsenic	
TOC		Chromium	
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID	Yes / No	NA
Equipment Rinse ID	Yes / No	NA
Trip Blank ID	Yes / No	NA

Sample Description

COLOR: Brown ODOR: None
STAINING: None TEXTURE: Massive SORTING
PLASTICITY: None MOISTURE: Moist

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: James L King JR (Please Print)

Signature: James L King JR

Reviewed by: S Mummaw (Please Print)

Signature: S Mummaw Date: 6/16/11

Field Sampling Report

PIKA INTERNATIONAL, INC.

Project Name: RVAAP

Location ID: PCTss-002M-0001-SO

Ravenna Army Ammunition Plant
Ravenna Ohio

Date: 05/26/2011 Weather Cloudy Temperature 60s

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
	Micro-purge				Push Probe	X	Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1120 hrs

Sample Type: Composite - MI - Grab
If MI, # of increments taken: _____

Location: Plotted on Map - Staked in Field
Estimated - Measured - Surveyed

Sample Depth: 0-1' FT (below surface) Decon: Dedicated (Each Day) - Each Location

Field Parameters
(at time of sample)

PID / FID Readings: Background:	ppm
Sample:	ppm
Water Level	FT
Temperature	°C
Sp. Conductance:	uMHOs
pH	units
Turbidity	N.T.U.

Analytical Parameters

VOC	X	SVOCs	X
Nitrocellulose	X	TAL Metal	X
Nitroguanidine	X	Mercury	X
Nitroglycerine	X	Cyanide	X
Perchlorate	X	Solids	X
Pesticides/PCBs	X	Reactivity	X
Full TCLP	X	Flash Point	X
PCB	X	PH	X
Explosives	X		

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID	Yes / No	NA
Equipment Rinse ID	Yes / No	NA
Trip Blank ID	Yes / No	NA

Sample Description

C
OLOR: Brown ODOR: None
STAI
NING: None TEXTURE: Inactive
SORTIN
G: Poor PLACTICITY: None
MOISTURE:
Moist

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: James King Jr (Please Print)

Signature: James L King Jr

Reviewed by: S. A Mercinc (Please Print)

Signature: _____ Date: 6/14/11

Note: VOC's were taken as a discrete sample.

Field Sampling Report

PIKA INTERNATIONAL, INC.

Project Name: RVAAP

Location ID: PCTss-003M-0001-SO

Ravenna Army Ammunition Plant
Ravenna Ohio

Date: 05/26/2011 **Weather** Cloudy **Temperature** 71°

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge			
Method	Bailer		Sample Bottle		Scoop		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
	Micro-purge				Push Probe	X	Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1305 hrs **Sample Type:** Composite - MI - Grab
If MI, # of increments taken: _____
Location: Plotted on Map - Staked in Field Estimated - Measured - Surveyed

Sample Depth: 0-1' FT (below surface) **Decon:** Dedicated Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	ppm	
Sample:	ppm	
Water Level	FT	
Temperature	°C	
Sp. Conductance:	uMHOs	
pH	units	
Turbidity	N.T.U.	

Analytical Parameters

VOC		TPH GRO	
Nitrocellulose	X	TPH DRO	
Nitroguanidine	X	Chromium +6	
Nitroglycerine	X	Nitrate	
Perchlorate	X	Sulfate	
Pesticides/PCBs		Asbestos	
RVAAP Full Suite		Arsenic	
TOC		Chromium	
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID	Yes / No	NA
Equipment Rinse ID	Yes / No	NA
Trip Blank ID	Yes / No	NA

Sample Description

COLOR: Brown ODOR: None
STAINING: None TEXTURE: Mostly SORTING: poor
PLACTICITY: None MOISTURE: moist

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: James King Jr (Please Print)

Signature: James L King Jr

Reviewed by: S Stapleton (Please Print)

Signature: _____ Date: 6/16/11

PIKA International, Inc.

Client Sample ID: PCTss-001M-0001-SO

General Chemistry

Lot-Sample #...: G1F030473-001 Work Order #...: MJ07E Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
% Moisture.....:

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrocellulose	1.1 B	5.0	mg/kg	TAL-SOP WS-WC-005	06/15-06/16/11	1166054

Dilution Factor: 1

NOTE(S):

RL Reporting Limit

B Estimated result. Result is less than RL.

PIKA International, Inc.

Client Sample ID: PCTss-001M-0001-SO

HPLC

Lot-Sample #...:	G1F030473-001	Work Order #...:	MJ07E1AE	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159146				
Dilution Factor:	0.97				
% Moisture.....:		Method.....:	SW846 8330 (Modif		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroguanidine	0.063 J	0.24	mg/kg	0.019

NOTE(S):

J Estimated result. Result is less than RL

PIKA International, Inc.

Client Sample ID: PCTss-001M-0001-SO

HPLC

Lot-Sample #...: G1F030473-001	Work Order #...: MJ07E1AF		Matrix.....: SOLID	
Date Sampled...: 05/26/11	Date Received..: 06/03/11			
Prep Date.....: 06/08/11	Analysis Date..: 06/13/11			
Prep Batch #...: 1159133				
Dilution Factor: 0.96				
% Moisture.....:	Method.....: SW846 8330			

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroglycerin	ND	0.48	mg/kg	0.12

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

Client: TestAmerica Laboratories, Inc.

Job Number: 280-16702-1
Sdg Number: G1F030473

Client Sample ID: PCTSS-001M-0001-SO

Lab Sample ID: 280-16702-1
Client Matrix: Solid

Date Sampled: 05/26/2011 1025
Date Received: 06/08/2011 0930

6860 Perchlorate by IC/MS or IC/MS/MS

Analysis Method:	6860	Analysis Batch:	280-72023	Instrument ID:	LC_LCMS1
Prep Method:	6860	Prep Batch:	280-71229	Lab File ID:	IC11F15024.d
Dilution:	1.0			Initial Weight/Volume:	10.58 g
Analysis Date:	06/15/2011 1857			Final Weight/Volume:	100 mL
Prep Date:	06/09/2011 1658			Injection Volume:	250 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Perchlorate		0.093	J	0.038	0.47

PIKA International, Inc.

Client Sample ID: PCTss-001M-0001-DUP

General Chemistry

Lot-Sample #...: G1F030473-002 Work Order #...: MJ07K Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
% Moisture.....:

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrocellulose	0.82 B	5.0	mg/kg	TAL-SOP WS-WC-005	06/15-06/16/11	1166054

Dilution Factor: 1 MDL.....: 0.78

NOTE(S):

RL Reporting Limit

B Estimated result. Result is less than RL.

PIKA International, Inc.

Client Sample ID: PCTss-001M-0001-DUP

HPLC

Lot-Sample #...:	G1F030473-002	Work Order #...:	MJ07K1AF	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159133				
Dilution Factor:	0.98				
% Moisture.....:		Method.....:	SW846 8330		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroglycerin	ND	0.49	mg/kg	0.13

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

PIKA International, Inc.

Client Sample ID: PCTss-001M-0001-DUP

HPLC

Lot-Sample #...:	G1F030473-002	Work Order #...:	MJ07K1AE	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159146				
Dilution Factor:	0.97				
% Moisture.....:		Method.....:	SW846 8330 (Modif		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroguanidine	0.12 J	0.24	mg/kg	0.019

NOTE(S):

J Estimated result. Result is less than RL.

Client: TestAmerica Laboratories, Inc.

Job Number: 280-16702-1
Sdg Number: G1F030473

Client Sample ID: **PCTSS-001M-0001-DUP**

Lab Sample ID: 280-16702-2FD
Client Matrix: Solid

Date Sampled: 05/26/2011 1025
Date Received: 06/08/2011 0930

6860 Perchlorate by IC/MS or IC/MS/MS

Analysis Method:	6860	Analysis Batch:	280-72023	Instrument ID:	LC_LCMS1
Prep Method:	6860	Prep Batch:	280-71229	Lab File ID:	IC11F15025.d
Dilution:	1.0			Initial Weight/Volume:	10.29 g
Analysis Date:	06/15/2011 1925			Final Weight/Volume:	100 mL
Prep Date:	06/09/2011 1658			Injection Volume:	250 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Perchlorate		0.11	J	0.039	0.49

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

HPLC

Lot-Sample #...: G1F030473-004	Work Order #...: MJ07R1A9	Matrix.....: SOLID	
Date Sampled...: 05/26/11	Date Received..: 06/03/11		
Prep Date.....: 06/08/11	Analysis Date..: 06/13/11		
Prep Batch #...: 1159133			
Dilution Factor: 0.95			
% Moisture.....: 5.1	Method.....: SW846 8330		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.028
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.095
2-Nitrotoluene	ND	0.24	mg/kg	0.076
3-Nitrotoluene	ND	0.24	mg/kg	0.066
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
4-Nitrotoluene	ND	0.24	mg/kg	0.076
HMX	ND	0.24	mg/kg	0.028
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

HPLC

Lot-Sample #...:	G1F030473-004	Work Order #...:	MJ07R1A8	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159146				
Dilution Factor:	1				
% Moisture.....:	5.1	Method.....:	SW846 8330 (Modif		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroguanidine	ND	0.25	mg/kg	0.020

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

General Chemistry

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
% Moisture.....: 5.1

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Cyanide, Total	0.19 B	0.53	mg/kg	SW846 9012A	06/08-06/09/11	1160026
		Dilution Factor: 1		MDL.....: 0.11		
Nitrocellulose	ND	5.0	mg/kg	TAL-SOP WS-WC-005	06/15-06/16/11	1166054
		Dilution Factor: 1		MDL.....: 0.78		
Percent Moisture	5.1	0.10	%	ASTM D 2216-90	06/15-06/16/11	1166183
		Dilution Factor: 1		MDL.....: 0.10		

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

Client: TestAmerica Laboratories, Inc.

Job Number: 280-16702-1
Sdg Number: G1F030473

Client Sample ID: PCTSS-002M-0001-SO

Lab Sample ID: 280-16702-3
Client Matrix: Solid

Date Sampled: 05/26/2011 1120
Date Received: 06/08/2011 0930

6860 Perchlorate by IC/MS or IC/MS/MS

Analysis Method:	6860	Analysis Batch:	280-72023	Instrument ID:	LC_LCMS1
Prep Method:	6860	Prep Batch:	280-71229	Lab File ID:	IC11F15026.d
Dilution:	1.0			Initial Weight/Volume:	10.02 g
Analysis Date:	06/15/2011 1954			Final Weight/Volume:	100 mL
Prep Date:	06/09/2011 1658			Injection Volume:	250 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Perchlorate		ND		0.040	0.50

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

TOTAL Metals

Lot-Sample #...: G1F030473-004 Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
% Moisture.....: 5.1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1161109						
Silver	ND	0.53	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AC
		Dilution Factor: 1		MDL.....: 0.095		
Aluminum	10600	22.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AD
		Dilution Factor: 1		MDL.....: 5.9		
Arsenic	8.4	2.2	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AE
		Dilution Factor: 1		MDL.....: 1.4		
Barium	81.7	2.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AF
		Dilution Factor: 1		MDL.....: 0.13		
Beryllium	0.45	0.32	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AG
		Dilution Factor: 1		MDL.....: 0.032		
Calcium	954	105	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AH
		Dilution Factor: 1		MDL.....: 4.7		
Cadmium	0.13 B	0.32	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AJ
		Dilution Factor: 1		MDL.....: 0.032		
Cobalt	7.7	0.63	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AK
		Dilution Factor: 1		MDL.....: 0.26		
Chromium	14.5	1.3	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AL
		Dilution Factor: 1		MDL.....: 0.15		
Copper	12.1	2.6	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AM
		Dilution Factor: 1		MDL.....: 0.23		
Iron	17600	10.5	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AN
		Dilution Factor: 1		MDL.....: 1.2		
Potassium	654	105	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AP
		Dilution Factor: 1		MDL.....: 10.5		
Magnesium	1770	52.7	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AQ
		Dilution Factor: 1		MDL.....: 4.7		
Manganese	833	1.3	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AR
		Dilution Factor: 1		MDL.....: 0.26		

(Continued on next page)

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

TOTAL Metals

Lot-Sample #...: G1F030473-004 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Sodium	35.6 B	527	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AT
		Dilution Factor: 1		MDL.....: 11.6		
Nickel	18.5	1.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AU
		Dilution Factor: 1		MDL.....: 0.25		
Lead	34.1	2.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AV
		Dilution Factor: 1		MDL.....: 0.27		
Antimony	ND	1.6	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AW
		Dilution Factor: 1		MDL.....: 0.99		
Selenium	ND	2.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AX
		Dilution Factor: 1		MDL.....: 1.5		
Thallium	ND	2.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1A0
		Dilution Factor: 1		MDL.....: 0.89		
Vanadium	24.4	1.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1A1
		Dilution Factor: 1		MDL.....: 0.20		
Zinc	62.4	3.2	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1A2
		Dilution Factor: 1		MDL.....: 0.20		
Prep Batch #...: 1165205						
Mercury	0.049	0.040	mg/kg	SW846 7471A	06/14/11	MJ07R1CC
		Dilution Factor: 1		MDL.....: 0.0086		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1A4 Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/09/11 Analysis Date..: 06/20/11
Prep Batch #...: 1160142
Dilution Factor: 0.99
% Moisture.....: 5.1 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Acenaphthene	ND	0.99	mg/kg	0.082
Acenaphthylene	ND	0.99	mg/kg	0.084
Anthracene	ND	0.99	mg/kg	0.085
Benzo(a)anthracene	ND	0.99	mg/kg	0.091
Benzo(b)fluoranthene	ND	0.99	mg/kg	0.094
Benzo(k)fluoranthene	ND	0.99	mg/kg	0.11
Benzo(ghi)perylene	ND	0.99	mg/kg	0.11
Benzo(a)pyrene	ND	0.99	mg/kg	0.093
bis(2-Chloroethoxy) methane	ND	0.99	mg/kg	0.087
bis(2-Chloroethyl)-ether	ND	0.99	mg/kg	0.080
bis(2-Ethylhexyl) phthalate	ND	5.0	mg/kg	0.097
4-Bromophenyl phenyl ether	ND	0.99	mg/kg	0.084
Butyl benzyl phthalate	ND	0.99	mg/kg	0.094
Carbazole	ND	0.99	mg/kg	0.094
4-Chloroaniline	ND	3.3	mg/kg	0.057
4-Chloro-3-methylphenol	ND	0.99	mg/kg	0.091
2-Chloronaphthalene	ND	0.99	mg/kg	0.080
2-Chlorophenol	ND	0.99	mg/kg	0.087
4-Chlorophenyl phenyl ether	ND	0.99	mg/kg	0.092
Chrysene	ND	0.99	mg/kg	0.083
Dibenzo(a,h)anthracene	ND	0.99	mg/kg	0.10
Dibenzofuran	ND	0.99	mg/kg	0.085
Di-n-butyl phthalate	ND	5.0	mg/kg	0.096
1,2-Dichlorobenzene	ND	3.3	mg/kg	0.074
1,3-Dichlorobenzene	ND	3.3	mg/kg	0.077
1,4-Dichlorobenzene	ND	3.3	mg/kg	0.076
3,3'-Dichlorobenzidine	ND	5.0	mg/kg	0.093
2,4-Dichlorophenol	ND	3.3	mg/kg	0.088
Diethyl phthalate	ND	0.99	mg/kg	0.089
2,4-Dimethylphenol	ND	0.99	mg/kg	0.17
Dimethyl phthalate	ND	0.99	mg/kg	0.086
4,6-Dinitro-2-methylphenol	0.14 J	2.0	mg/kg	0.080

(Continued on next page)

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1A4 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2,4-Dinitrophenol	ND	16	mg/kg	0.21
2,4-Dinitrotoluene	ND	0.99	mg/kg	0.088
2,6-Dinitrotoluene	ND	3.3	mg/kg	0.098
Di-n-octyl phthalate	ND	0.99	mg/kg	0.096
Fluoranthene	ND	0.99	mg/kg	0.094
Fluorene	ND	0.99	mg/kg	0.091
Hexachlorobenzene	ND	0.99	mg/kg	0.088
Hexachlorobutadiene	ND	5.0	mg/kg	0.081
Hexachlorocyclopenta-diene	ND	16	mg/kg	0.061
Hexachloroethane	ND	3.3	mg/kg	0.080
Indeno(1,2,3-cd)pyrene	ND	0.99	mg/kg	0.095
Isophorone	ND	5.0	mg/kg	0.092
2-Methylnaphthalene	ND	2.0	mg/kg	0.084
2-Methylphenol	ND	2.0	mg/kg	0.057
4-Methylphenol	ND	0.99	mg/kg	0.15
Naphthalene	ND	0.99	mg/kg	0.081
2-Nitroaniline	ND	16	mg/kg	0.083
3-Nitroaniline	ND	16	mg/kg	0.17
4-Nitroaniline	ND	16	mg/kg	0.087
Nitrobenzene	ND	0.99	mg/kg	0.075
2-Nitrophenol	ND	0.99	mg/kg	0.081
4-Nitrophenol	ND	16	mg/kg	0.28
N-Nitrosodiphenylamine	ND	3.3	mg/kg	0.085
N-Nitrosodi-n-propyl-amine	ND	0.99	mg/kg	0.083
2,2'-oxybis (1-Chloropropane)	ND	2.0	mg/kg	0.078
Pentachlorophenol	ND	16	mg/kg	0.050
Phenanthrene	ND	0.99	mg/kg	0.093
Phenol	ND	0.99	mg/kg	0.082
Pyrene	ND	0.99	mg/kg	0.093
1,2,4-Trichloro-benzene	ND	2.0	mg/kg	0.082
2,4,5-Trichloro-phenol	ND	2.0	mg/kg	0.082
2,4,6-Trichloro-phenol	ND	0.99	mg/kg	0.083

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PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1A4 Matrix.....: SOLID

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorobiphenyl	72	(65 - 135)
2-Fluorophenol	68	(65 - 135)
Nitrobenzene-d5	62 *	(65 - 135)
Phenol-d5	74	(65 - 135)
Terphenyl-d14	81	(65 - 135)
2,4,6-Tribromophenol	77	(65 - 135)

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC Semivolatiles

Lot-Sample #...:	G1F030473-004	Work Order #...:	MJ07R1CA	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/09/11	Analysis Date..:	06/22/11		
Prep Batch #...:	1160137				
Dilution Factor:	0.99				
% Moisture.....:	5.1	Method.....:	SW846 8081A		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
alpha-BHC	ND	1.7	ug/kg	0.22
gamma-BHC (Lindane)	ND	1.7	ug/kg	0.17
Heptachlor	ND	1.7	ug/kg	0.19
Aldrin	ND	1.7	ug/kg	0.21
beta-BHC	ND	1.7	ug/kg	0.33
delta-BHC	ND	1.7	ug/kg	0.16
Heptachlor epoxide	ND	1.7	ug/kg	0.12
Endosulfan I	ND	1.7	ug/kg	0.051
gamma-Chlordane	ND	1.7	ug/kg	0.052
alpha-Chlordane	ND	1.7	ug/kg	0.20
4,4'-DDE	0.73 J,PG	3.4	ug/kg	0.22
Dieldrin	ND	3.4	ug/kg	0.090
Endrin	ND	3.4	ug/kg	0.11
4,4'-DDD	ND	3.4	ug/kg	0.26
Endosulfan II	ND	3.4	ug/kg	0.099
4,4'-DDT	ND	3.4	ug/kg	0.40
Endrin aldehyde	ND	3.4	ug/kg	0.11
Methoxychlor	ND	17	ug/kg	1.3
Endosulfan sulfate	ND	3.4	ug/kg	0.091
Endrin ketone	ND	3.4	ug/kg	0.34
Toxaphene	ND	66	ug/kg	20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Decachlorobiphenyl	85	(50 - 150)
Tetrachloro-m-xylene	85	(50 - 150)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC Semivolatiles

Lot-Sample #...:	G1F030473-004	Work Order #...:	MJ07R1A5	Matrix.....: SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11	
Prep Date.....:	06/09/11	Analysis Date..:	06/15/11	
Prep Batch #...:	1160138			
Dilution Factor:	0.99			
% Moisture.....:	5.1	Method.....:	SW846 8082	

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Aroclor 1016	ND	33	ug/kg	8.2
Aroclor 1221	ND	66	ug/kg	11
Aroclor 1232	ND	33	ug/kg	8.2
Aroclor 1242	ND	33	ug/kg	8.2
Aroclor 1248	ND	33	ug/kg	8.2
Aroclor 1254	ND	33	ug/kg	8.2
Aroclor 1260	ND	33	ug/kg	8.2

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Decachlorobiphenyl	95	(65 - 135)
Tetrachloro-m-xylene	88	(65 - 135)

PIKA International, Inc.

Client Sample ID: PCTss-002D-0001-SO

GC/MS Volatiles

Lot-Sample #...: G1F030473-003 Work Order #...: MJ07L1AC Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/07/11 Analysis Date..: 06/07/11
Prep Batch #...: 1159051
Dilution Factor: 1
% Moisture.....: 24 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Methylene chloride	ND	5.0	ug/kg	0.84
4-Methyl-2-pentanone (MIBK)	ND	10	ug/kg	0.92
Styrene	ND	5.0	ug/kg	0.31
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	0.68
Tetrachloroethene	ND	5.0	ug/kg	0.61
Toluene	ND	5.0	ug/kg	0.61
1,1,1-Trichloroethane	ND	5.0	ug/kg	0.36
1,1,2-Trichloroethane	ND	5.0	ug/kg	0.44
Trichloroethene	ND	5.0	ug/kg	0.60
Vinyl chloride	ND	5.0	ug/kg	0.36
Xylenes (total)	ND	5.0	ug/kg	0.81
Acetone	5.3 J,B	10	ug/kg	1.4
Benzene	ND	5.0	ug/kg	0.26
Bromodichloromethane	ND	5.0	ug/kg	0.53
Bromoform	ND	5.0	ug/kg	0.40
Bromomethane	ND	5.0	ug/kg	0.86
2-Butanone (MEK)	ND	10	ug/kg	1.4
Carbon disulfide	ND	5.0	ug/kg	0.49
Carbon tetrachloride	ND	5.0	ug/kg	0.53
Chlorobenzene	ND	5.0	ug/kg	0.29
Dibromochloromethane	ND	5.0	ug/kg	0.21
Chloroethane	ND	5.0	ug/kg	0.45
Chloroform	ND	5.0	ug/kg	0.26
Chloromethane	ND	10	ug/kg	0.50
1,1-Dichloroethane	ND	5.0	ug/kg	0.29
1,2-Dichloroethane	ND	5.0	ug/kg	0.73
1,1-Dichloroethene	ND	5.0	ug/kg	0.26
1,2-Dichloroethene (total)	ND	5.0	ug/kg	0.64
1,2-Dichloropropane	ND	5.0	ug/kg	0.60
cis-1,3-Dichloropropene	ND	5.0	ug/kg	0.64
trans-1,3-Dichloropropene	ND	5.0	ug/kg	0.75
Ethylbenzene	ND	5.0	ug/kg	0.34
2-Hexanone	ND	10	ug/kg	0.74

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	92	(65 - 135)
1,2-Dichloroethane-d4	98	(65 - 135)
Toluene-d8	104	(65 - 135)

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PIKA International, Inc.

Client Sample ID: PCTss-002D-0001-SO

GC/MS Volatiles

Lot-Sample #...: G1F030473-003 Work Order #...: MJ07L1AC Matrix.....: SOLID

NOTE(S):

J Estimated result Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

HPLC

Lot-Sample #...: G1F030473-005	Work Order #...: MJ0701AC	Matrix.....: WATER	
Date Sampled...: 05/26/11	Date Received..: 06/03/11		
Prep Date.....: 06/06/11	Analysis Date..: 06/09/11		
Prep Batch #...: 1157073			
Dilution Factor: 1.04	Method.....: SW846 8330		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroglycerin	ND	0.68	ug/L	0.34
PETN	ND	0.68	ug/L	0.31
2-Amino-4,6-dinitrotoluene	ND	0.10	ug/L	0.10
4-Amino-2,6-dinitrotoluene	ND	0.10	ug/L	0.052
1,3-Dinitrobenzene	ND	0.10	ug/L	0.052
2,4-Dinitrotoluene	ND	0.10	ug/L	0.052
2,6-Dinitrotoluene	ND	0.10	ug/L	0.052
HMX	ND	0.10	ug/L	0.037
Nitrobenzene	ND	0.10	ug/L	0.052
2-Nitrotoluene	ND	0.52	ug/L	0.092
3-Nitrotoluene	ND	0.52	ug/L	0.059
4-Nitrotoluene	ND	0.52	ug/L	0.092
RDX	ND	0.10	ug/L	0.037
Tetryl	ND	0.10	ug/L	0.052
1,3,5-Trinitrobenzene	ND	0.10	ug/L	0.031
2,4,6-Trinitrotoluene	ND	0.10	ug/L	0.052

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	82	(79 - 111)

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

Dissolved HPLC

Lot-Sample #...:	G1F030473-005	Work Order #...:	MJ0701AE
Date Sampled...:	05/26/11	Date Received..:	06/03/11
Prep Date.....:	06/09/11	Analysis Date..:	06/13/11
Prep Batch #...:	1160065		
Dilution Factor:	1	Method.....:	SW846 8330 (Modif

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroguanidine	ND	20	ug/L	2.4

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

General Chemistry

Lot-Sample #...: G1F030473-005 Work Order #...: MJ070 Matrix.....: WATER
Date Sampled...: 05/26/11 Date Received..: 06/03/11

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Cyanide, Total	ND	0.010	mg/L	SW846 9012A	06/08-06/09/11	1160025
		Dilution Factor: 1		MDL.....: 0.0050		
Nitrocellulose	ND	2.0	mg/L	TAL-SOP WS-WC-005	06/09-06/10/11	1160040
		Dilution Factor: 1		MDL.....: 0.48		

Client: TestAmerica Laboratories, Inc.

Job Number: 280-16702-1
Sdg Number: G1F030473

Client Sample ID: **PCTSS-002M-0001-ER**

Lab Sample ID: 280-16702-4
Client Matrix: Water

Date Sampled: 05/26/2011 0840
Date Received: 06/08/2011 0930

6860 Perchlorate by IC/MS or IC/MS/MS

Analysis Method:	6860	Analysis Batch:	280-72016	Instrument ID:	LC_LCMS1
	N/A	Prep Batch:	N/A	Lab File ID:	IC11F15017.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/15/2011 1538			Final Weight/Volume:	1.0 mL
Prep Date:	N/A			Injection Volume:	250 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Perchlorate	ND		0.0088	0.050

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

TOTAL Metals

Lot-Sample #...: G1F030473-005 **Matrix.....:** WATER
Date Sampled...: 05/26/11 Date Received..: 06/03/11

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1160035						
Calcium	**52.1 B**	**500**	**ug/L**	**SW846 6010B**	**06/09/11**	**MJ0701D1**
		Dilution Factor: 1		MDL.....: 50.0		
Silver	ND	5.0	ug/L	SW846 6010B	06/09/11	MJ0701AH
		Dilution Factor: 1		MDL.....: 0.84		
Aluminum	ND	200	ug/L	SW846 6010B	06/09/11	MJ0701AJ
		Dilution Factor: 1		MDL.....: 48.0		
Arsenic	ND	21.0	ug/L	SW846 6010B	06/09/11	MJ0701AK
		Dilution Factor: 1		MDL.....: 12.0		
Barium	ND	21.0	ug/L	SW846 6010B	06/09/11	MJ0701AL
		Dilution Factor: 1		MDL.....: 2.5		
Beryllium	ND	3.0	ug/L	SW846 6010B	06/09/11	MJ0701AM
		Dilution Factor: 1		MDL.....: 0.30		
Cadmium	ND	1000	ug/L	SW846 6010B	06/09/11	MJ0701AN
		Dilution Factor: 1		MDL.....: 0.50		
Cobalt	ND	6.0	ug/L	SW846 6010B	06/09/11	MJ0701AP
		Dilution Factor: 1		MDL.....: 3.0		
Chromium	ND	12.0	ug/L	SW846 6010B	06/09/11	MJ0701AQ
		Dilution Factor: 1		MDL.....: 1.2		
Copper	ND	20.0	ug/L	SW846 6010B	06/09/11	MJ0701AR
		Dilution Factor: 1		MDL.....: 2.1		
Iron	ND	100	ug/L	SW846 6010B	06/09/11	MJ0701AT
		Dilution Factor: 1		MDL.....: 20.0		
Potassium	ND	1000	ug/L	SW846 6010B	06/09/11	MJ0701AU
		Dilution Factor: 1		MDL.....: 93.0		
Magnesium	ND	500	ug/L	SW846 6010B	06/09/11	MJ0701AV
		Dilution Factor: 1		MDL.....: 40.0		
Manganese	ND	12.0	ug/L	SW846 6010B	06/09/11	MJ0701AW
		Dilution Factor: 1		MDL.....: 2.5		

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PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

TOTAL Metals

Lot-Sample #...: G1F030473-005 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Sodium	ND	1000	ug/L	SW846 6010B	06/09/11	MJ0701AX
		Dilution Factor: 1		MDL.....: 250		
Nickel	ND	50.0	ug/L	SW846 6010B	06/09/11	MJ0701A0
		Dilution Factor: 1		MDL.....: 2.4		
Lead	ND	10.0	ug/L	SW846 6010B	06/09/11	MJ0701A1
		Dilution Factor: 1		MDL.....: 2.5		
Antimony	ND	60.0	ug/L	SW846 6010B	06/09/11	MJ0701A2
		Dilution Factor: 1		MDL.....: 9.8		
Selenium	**20.6 B**	**25.0**	**ug/L**	**SW846 6010B**	**06/09/11**	**MJ0701A3**
		Dilution Factor: 1		MDL.....: 13.0		
Thallium	ND	15.0	ug/L	SW846 6010B	06/09/11	MJ0701A4
		Dilution Factor: 1		MDL.....: 9.0		
Vanadium	ND	5.0	ug/L	SW846 6010B	06/09/11	MJ0701A5
		Dilution Factor: 1		MDL.....: 1.9		
Zinc	ND	20.0	ug/L	SW846 6010B	06/09/11	MJ0701A6
		Dilution Factor: 1		MDL.....: 3.0		
Prep Batch #...: 1167094						
Mercury	ND	0.00020	mg/L	SW846 7470A	06/15-06/16/11	MJ0701A7
		Dilution Factor: 1		MDL.....: 0.00010		

NOTE(S):

B Estimated result. Result is less than RL.

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-005 Work Order #...: MJ0701AF Matrix.....: WATER
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/07/11 Analysis Date..: 06/20/11
Prep Batch #...: 1158062
Dilution Factor: 0.95 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Acenaphthene	ND	9.5	ug/L	1.0
Acenaphthylene	ND	9.5	ug/L	1.0
Anthracene	ND	9.5	ug/L	0.95
Benzo(a)anthracene	ND	9.5	ug/L	0.95
Benzo(b)fluoranthene	ND	9.5	ug/L	1.1
Benzo(k)fluoranthene	ND	9.5	ug/L	0.91
Benzo(ghi)perylene	ND	9.5	ug/L	1.3
Benzo(a)pyrene	ND	9.5	ug/L	0.65
bis(2-Chloroethoxy) methane	ND	9.5	ug/L	0.95
bis(2-Chloroethyl)-ether	ND	19	ug/L	1.4
bis(2-Ethylhexyl) phthalate	1.1 J	24	ug/L	0.95
4-Bromophenyl phenyl ether	ND	9.5	ug/L	1.0
Butyl benzyl phthalate	ND	9.5	ug/L	1.3
4-Chloroaniline	ND	9.5	ug/L	1.9
4-Chloro-3-methylphenol	ND	9.5	ug/L	1.9
2-Chloronaphthalene	ND	9.5	ug/L	1.2
2-Chlorophenol	ND	9.5	ug/L	1.5
4-Chlorophenyl phenyl ether	ND	9.5	ug/L	1.0
Chrysene	ND	9.5	ug/L	0.58
Dibenzofuran	ND	9.5	ug/L	1.0
Di-n-butyl phthalate	ND	24	ug/L	1.0
1,2-Dichlorobenzene	ND	9.5	ug/L	1.4
1,3-Dichlorobenzene	ND	9.5	ug/L	1.4
1,4-Dichlorobenzene	ND	9.5	ug/L	1.3
3,3'-Dichlorobenzidine	ND	48	ug/L	0.91
2,4-Dichlorophenol	ND	9.5	ug/L	2.5
Diethyl phthalate	ND	9.5	ug/L	0.88
2,4-Dimethylphenol	ND	9.5	ug/L	2.1
Dimethyl phthalate	ND	9.5	ug/L	0.84
Di-n-octyl phthalate	ND	9.5	ug/L	1.4
4,6-Dinitro-2-methylphenol	ND	48	ug/L	2.1
2,4-Dinitrophenol	ND	48	ug/L	19
2,4-Dinitrotoluene	ND	9.5	ug/L	1.9

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PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-005 Work Order #...: MJ0701AF Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2,6-Dinitrotoluene	ND	9.5	ug/L	1.9
Fluoranthene	ND	9.5	ug/L	0.62
Fluorene	ND	9.5	ug/L	0.88
Hexachlorobenzene	ND	9.5	ug/L	1.3
Hexachlorobutadiene	ND	24	ug/L	1.2
Hexachlorocyclopenta-diene	ND	48	ug/L	4.8
Hexachloroethane	ND	9.5	ug/L	1.3
Indeno(1,2,3-cd)pyrene	ND	9.5	ug/L	3.2
Isophorone	ND	24	ug/L	0.95
2-Methylnaphthalene	ND	9.5	ug/L	1.4
2-Methylphenol	ND	9.5	ug/L	0.88
4-Methylphenol	ND	9.5	ug/L	3.3
Naphthalene	ND	9.5	ug/L	1.2
2-Nitroaniline	ND	48	ug/L	1.9
3-Nitroaniline	ND	48	ug/L	1.3
4-Nitroaniline	ND	48	ug/L	1.4
Nitrobenzene	ND	9.5	ug/L	1.5
2-Nitrophenol	ND	9.5	ug/L	1.8
4-Nitrophenol	ND	48	ug/L	5.8
N-Nitrosodi-n-propyl-amine	ND	9.5	ug/L	1.3
N-Nitrosodiphenylamine	ND	9.5	ug/L	0.51
Pentachlorophenol	ND	9.5	ug/L	1.9
Phenanthrene	ND	48	ug/L	0.95
Phenol	ND	9.5	ug/L	1.0
Pyrene	ND	9.5	ug/L	1.3
1,2,4-Trichloro-benzene	ND	9.5	ug/L	1.3
2,4,5-Trichloro-phenol	ND	48	ug/L	1.9
2,4,6-Trichloro-phenol	ND	9.5	ug/L	1.9
Dibenzo(a,h)anthracene	ND	9.5	ug/L	1.9
Carbazole	ND	9.5	ug/L	1.1
2,2'-oxybis (1-Chloropropane)	ND	19	ug/L	1.2

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorobiphenyl	70	(50 - 150)
2-Fluorophenol	48 *	(50 - 150)
Nitrobenzene-d5	78	(50 - 150)
Phenol-d5	30 *	(50 - 150)
Terphenyl-d14	98	(50 - 150)
2,4,6-Tribromophenol	80	(50 - 150)

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PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-005 Work Order #...: MJ0701AF Matrix.....: WATER

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

GC Semivolatiles

Lot-Sample #...: G1F030473-005 Work Order #...: MJ0701A8 Matrix.....: WATER
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/07/11 Analysis Date..: 06/22/11
Prep Batch #...: 1158058
Dilution Factor: 0.97 Method.....: SW846 8081A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
alpha-BHC	ND	0.048	ug/L	0.0057
gamma-BHC (Lindane)	ND	0.048	ug/L	0.0048
Heptachlor	ND	0.048	ug/L	0.0055
Aldrin	ND	0.048	ug/L	0.0048
beta-BHC	ND	0.048	ug/L	0.0046
delta-BHC	ND	0.048	ug/L	0.0028
Heptachlor epoxide	ND	0.048	ug/L	0.0020
Endosulfan I	ND	0.048	ug/L	0.0042
gamma-Chlordane	ND	0.048	ug/L	0.0027
alpha-Chlordane	ND	0.048	ug/L	0.0026
4,4'-DDE	ND	0.097	ug/L	0.0059
Dieldrin	ND	0.097	ug/L	0.0049
Endrin	ND	0.097	ug/L	0.0052
4,4'-DDD	ND	0.097	ug/L	0.0039
Endosulfan II	ND	0.097	ug/L	0.0030
4,4'-DDT	ND	0.097	ug/L	0.0049
Endrin aldehyde	ND	0.097	ug/L	0.0041
Methoxychlor	ND	1.9	ug/L	0.026
Endosulfan sulfate	ND	0.097	ug/L	0.0041
Endrin ketone	ND	0.097	ug/L	0.0031
Toxaphene	ND	1.9	ug/L	0.49

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Decachlorobiphenyl	66	(50 - 150)
Tetrachloro-m-xylene	77	(50 - 150)

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-ER

GC Semivolatiles

Lot-Sample #...: G1F030473-005 Work Order #...: MJ0701AG Matrix.....: WATER
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/07/11 Analysis Date..: 06/12/11
Prep Batch #...: 1158061
Dilution Factor: 0.97 Method.....: SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Aroclor 1016	ND	0.97	ug/L	0.26
Aroclor 1221	ND	1.9	ug/L	0.34
Aroclor 1232	ND	0.97	ug/L	0.13
Aroclor 1242	ND	0.97	ug/L	0.19
Aroclor 1248	ND	0.97	ug/L	0.11
Aroclor 1254	ND	0.97	ug/L	0.31
Aroclor 1260	ND	0.97	ug/L	0.24

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Decachlorobiphenyl	66	(65 - 135)
Tetrachloro-m-xylene	87	(65 - 135)

PIKA International, Inc.

Client Sample ID: PCTss-003M-0001-SO

HPLC

Lot-Sample #...:	G1F030473-006	Work Order #...:	MJ0711AF	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159133				
Dilution Factor:	0.99				
% Moisture.....:		Method.....:	SW846 8330		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroglycerin	ND	0.50	mg/kg	0.13

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(78 - 108)

PIKA International, Inc.

Client Sample ID: PCTss-003M-0001-SO

HPLC

Lot-Sample #...:	G1F030473-006	Work Order #...:	MJ0711AE	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159146				
Dilution Factor:	1.02				
% Moisture.....:		Method.....:	SW846 8330 (Modif		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroguanidine	0.17 J	0.26	mg/kg	0.020

NOTE(S):

J Estimated result. Result is less than RL.

PIKA International, Inc.

Client Sample ID: PCTss-003M-0001-SO

General Chemistry

Lot-Sample #...: G1F030473-006 Work Order #...: MJ071 Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
% Moisture.....:

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrocellulose	ND	5.0	mg/kg	TAL-SOP WS-WC-005	06/15-06/16/11	1166054

Dilution Factor: 1 MDL.....: 0.78

Client: TestAmerica Laboratories, Inc.

Job Number: 280-16702-1
Sdg Number: G1F030473

Client Sample ID: **PCTSS-003M-0001-SO**

Lab Sample ID: 280-16702-5
Client Matrix: Solid

Date Sampled: 05/26/2011 1305
Date Received: 06/08/2011 0930

6860 Perchlorate by IC/MS or IC/MS/MS

Analysis Method:	6860	Analysis Batch:	280-72023	Instrument ID:	LC_LCMS1
Prep Method:	6860	Prep Batch:	280-71229	Lab File ID:	IC11F15029.d
Dilution:	1.0			Initial Weight/Volume:	10.70 g
Analysis Date:	06/15/2011 2119			Final Weight/Volume:	100 mL
Prep Date:	06/09/2011 1658			Injection Volume:	250 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Perchlorate		0.093	J	0.037	0.47

PIKA International, Inc.

Client Sample ID: TRIP BLANK

GC/MS Volatiles

Lot-Sample #...: G1F030473-007 Work Order #...: MJ0731AA Matrix.....: WATER
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/08/11 Analysis Date..: 06/08/11
Prep Batch #...: 1160070
Dilution Factor: 1 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Toluene	ND	1.0	ug/L	0.25
1,1,1-Trichloroethane	ND	1.0	ug/L	0.19
1,1,2-Trichloroethane	ND	1.0	ug/L	0.31
Trichloroethene	ND	1.0	ug/L	0.13
Vinyl chloride	ND	1.0	ug/L	0.22
Xylenes (total)	ND	1.0	ug/L	0.18
Acetone	ND	10	ug/L	2.1
Benzene	ND	1.0	ug/L	0.13
Bromodichloromethane	ND	1.0	ug/L	0.14
Bromoform	ND	1.0	ug/L	0.10
Bromomethane	ND	1.0	ug/L	0.29
2-Butanone (MEK)	ND	10	ug/L	0.35
Carbon disulfide	ND	2.0	ug/L	0.16
Carbon tetrachloride	ND	1.0	ug/L	0.15
Chlorobenzene	ND	1.0	ug/L	0.12
Dibromochloromethane	ND	1.0	ug/L	0.13
Chloroethane	ND	2.0	ug/L	0.34
Chloroform	ND	1.0	ug/L	0.12
Chloromethane	ND	2.0	ug/L	0.25
1,1-Dichloroethane	ND	3.0	ug/L	0.10
1,2-Dichloroethane	ND	1.0	ug/L	0.22
1,1-Dichloroethene	ND	1.0	ug/L	0.14
1,2-Dichloroethene (total)	ND	1.0	ug/L	0.20
1,2-Dichloropropane	ND	1.0	ug/L	0.15
cis-1,3-Dichloropropene	ND	1.0	ug/L	0.22
trans-1,3-Dichloropropene	ND	1.0	ug/L	0.080
Ethylbenzene	ND	1.0	ug/L	0.10
2-Hexanone	ND	10	ug/L	0.17
Methylene chloride	ND	2.0	ug/L	0.35
4-Methyl-2-pentanone (MIBK)	ND	10	ug/L	0.18
Styrene	ND	1.0	ug/L	0.15
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	0.090
Tetrachloroethene	ND	1.0	ug/L	0.10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	95	(65 - 135)
1,2-Dichloroethane-d4	98	(65 - 135)
Toluene-d8	107	(65 - 135)

G1F030473

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Test America
4101 Shuffel Drive NW
North Canton, OH 44721
330-497-9396
Fax 1-330-497-0772

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Lab Lot #

Report To:		Bill To:	
Contact:	Brian Stockwell	Contact	Brian Stockwell
Company:	PIKA International, Inc.	Company.	PIKA International, Inc.
Address:	8451 ST RT 5	Address	8451 ST RT 5
	Ravenna, OH 44266		Ravenna, OH 44266
Phone:	(330)358-7135	Phone:	(330)358-7135
Fax:	(330)358-2924	Fax.	(330)358-2924
Email:		PO #.	
		Quote #.	

Sampler Signature:
Project: CC-RVAAP-80 Group 2 Propellant Can Tops
Project # 10-08-130

Lab PM: Ken Kuzior

Package Sealed: Yes / No — Samples Sealed: Yes / No
Received on Ice: Yes / No — Samples Intact: Yes / No
Temperature C of Cooler:
Within Hold Time: Yes / No
Preserv Indicated: Yes / No / N/A
pH Check OK: Yes / No / N/A
Res Cl2 Check OK: Yes / No / N/A
Sample Labels and COC Agree: Yes / No / COC not present

Date Required	31-May-11
Hard Copy	7-Jun-11
Fax/Email	

Refrg #
/ Cont
Volume
Preserv: HCl | 4°C | 4°C | 4°C | 4°C | 4°C | 4°C | 4°C | 4°C | HNO3 | HNO3 | NaOH

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	VOCs (8260B)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	Explosives (8330)	Nitrocellulose (353.2)	Nitroguanidine 8330 Modified	Nitroglycerine 8330	Perchlorate 6860	TAL Metals 60 (10)	Mercury (747A)	Cyanide (9012A)	Solids (160.3)	
		PCTss-001M-0001-SO	5/26/11	1025	S	MI						X	X	X	X					1 x 32 oz GB / 1 x 16 oz GB
		PCTss-001M-0001-DUP	5/26/11	1025	S	MI						X	X	X	X					Duplicate of previous sample
	X	PCTss-002D-0001-SO	5/26/11	1115	S	G	X													2 x 2oz GB
	X	PCTss-002M-0001-SO	5/26/11	1120	S	MI		X	X	X	X	X	X	X	X	X	X	X	X	2 x 32 oz GB / 1 x 16 oz GB
		PCTss-002M-0001-ER	5/26/11	0840	W	G		X	X	X	X	X	X	X	X	X	X	X		10 x Liter GB / 1 x 500 ml Poly / 2 x 250 ml Poly
		PCTss-003M-0001-SO	5/26/11	1305	S	MI						X	X	X	X					1 x 32 oz GB / 1 x 16 oz GB
		Trip Blank			W	G	X													3 x 40 ml GB

	Company:	Date:	Time:		Company:	Date:	Time:
Relinquished by:	PIKA International	5/26/11	1530	Received By:	TAL-NC	5/26/11	1530
Relinquished by	Company: TAL -	Date. 5/26/11	Time. 1631	Received By:	Company:	Date. 5-26-11	Time. 1631

Matrix Key
W - Water, WW - Wastewater, DL - Drum Liquid, A Air
S - Soil, SE - Sediment, DS - Drum Solid, OL - Oil
SL - Sludge, L - Leachate, W - Wipe, O
SO - Solid, M - Miscellaneous

Comments.

Date Received
Courier:
Hand Delivered:
Bill of Lading:

Relinquished By Kuzior TAL-NC 6/2/11 1715

Received By R. [illegible] 6-3-11 1330

TestAmerica West Sacramento (916) 373-5600

2289 of 2467

Appendix F

Water Removal Approval

You forwarded this message on 5/18/2010 7:48 AM.

Brian Stockwell

From: Eileen Mohr [eileen.mohr@epa.state.oh.us] **Sent:** Thu 4/15/2010 3:40 PM
To: Brian Stockwell
Cc: Eileen Mohr; Todd Fisher; mark.c.patterson@us.army.mil; Derek.S.Kinder@usace.army.mil; Glen.Beckham@usace.army.mil; Nathaniel.Peters.II@usace.army.mil
Subject: DB-802/Load Line 2
Attachments:

Brian

I have reviewed the data obtained from the URS sampling at the above area and the write-up prepared by USACE/URS. I also compared the sediment data that was obtained with the clean-up numbers presented in the approved Load Lines 1-4 ROD. In addition, I looked at the chromium data with respect to the 1:6 ratio that we have been using. With respect to arsenic in the surface water I looked at it from the perspective of the arsenic levels that at times are observed in the installation wells and local residential wells; coupled with the fact that the surface water samples were probably not filtered in the field. THe addition of acid as a presevative to a turbid sample could have increased metals concentrations.

All of that being said, approval is granted to discharge the surface water to the ground surface in the vicinity of DB-802 subject to the discharge conditions that have been established for RVAAP. As we discussed in the field today, I do not have an obection to a "sock fiilter" device over the end of the hose to ensure that solid particulates are not discharged. This device was used by another contractor on a different project at RVAAP.

Previously approvals have been granted with respect to the areas at Load Lines 2 and 3 that can be re-graded and the materials that can be used. All that is left is for the final selection of the water discharge location. As we discussed in the field, the area to the west of DB-802 may work out fine. Let me know when you want me to have a look at the area that is ultimately selected by PIKA.

That's it. Looks like you are good to go.

Thanks and have a good weekend.

Eileen

Eileen T. Mohr
Project Manager
Division of Emergency and Remedial Response
2110 East Aurora Road
Twinsburg, OH 44087
330-963-1221
330-487-0769 (FAX)
email: Eileen.Mohr@epa.state.oh.us

Appendix G

Data Validation

Data Validation Report For PIKA International, Inc.

Date: 9/16/11
Project: CC-RVAAP-80 Group 2 Propellant Can Tops
Project #: 10-08-130
Laboratory: Test America (Various)

Prepared By:

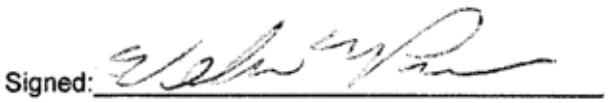
Signed: 
William W. Purves

Table of Contents

1.0 Introduction

This Data Validation Report (DVR) details the assessment and validation for samples collected by PIKA International and analytical data generated during field activities at the Ravenna Army Ammunition Plant, Ravenna Ohio, PIKA Project # 10-08-130. The laboratories subcontracted for the chemical analysis of the soil and water samples were Test America Sacramento, CA, North Canton, OH and Denver CO. The laboratories are United States Corps of engineers (USACE) approved to perform hazardous waste analysis.

This report is the accumulation of all of the laboratory reports/project numbers into one document. The samples evaluated in this report were sampled on May 26, 2011. The samples were taken by PIKA International personnel and picked up by Test America North Canton personnel on May 26, 2011. The samples were then distributed to Sacramento and Denver laboratories for analysis by North Canton. The Test America facilities that performed the tests are ELAP accredited facilities. The data validation is for methods listed below. Percent Solids was evaluated for completeness only. Analytical results of the samples are provided in tabular format in Appendix A that includes all qualifiers used and changed by the data validator. Appendix B contains all of the check lists that were used in the validation effort. The analysis performed included the following:

Volatile Organic Compounds via USEPA Method 8260B
Semi-Volatile Organic Compounds via USEPA Method 8270C
Pesticides via USEPA Method 8081A
Poly Chlorinated Biphenols via USEPA Method 8082
Explosives via USEPA Method 8330
Nitroglycerine via USEPA Method 8330
Nitroguanidine (propellant) via USEPA Method 8330 Modified
Perchlorate via USEPA Method 6860
Metals excluding Mercury via USEPA Methods 6010B and 6010B (trace)
Mercury by USEPA Methods 7470A (water) and 7471A (soil)
Nitrocellulose (propellant) via USEPA Methods 353.2
Cyanide via USEPA Method 9012A
Percent Solids via USEPA Method 160.3

Data validation of all sample results was performed by Purves Environmental. A review of 100% of the data was conducted. Ten percent (10%) of all QA/QC, 10% of the compounds in any particular list were evaluated and 10% of the sample data was reconstructed to verify data quality. The soils were checked separately from the equipment rinse.

Sample Distribution and Analysis Table

Laboratory	Project #	Sample Field IDs	Lab IDs	Analysis
Sacramento, Ca	G1F030473	PCTss-001M-0001-SO	MJ07E	Nitroglycerine Method 8330, Nitroquanidine Method 8330 Modified
Sacramento, Ca	G1F030473	PCTss-001M-0001-DUP	MJO7K	Nitroglycerine Method 8330, Nitroquanidine Method 8330 Modified
Sacramento, Ca	G1F030473	PCTss-002D-0001-SO	MJ07L	VOC Method 8260
Sacramento, Ca	G1F030473	PCTss-002M-0001-SO	MJ07R	Nitroglycerine Method 8330, Nitroquanidine Method 8330 Modified, Method 8270 SVOC, Method 8330 Explosives, Method 8081A Pesticides, Method 8082 PCBs, Method 6010B TAL Metals, Method 7471A Mercury
Sacramento, Ca	G1F030473	PCTss-002M-0001-ER	MJ070	Nitroglycerine Method 8330, Nitroquanidine Method 8330 Modified, Method 8270 SVOC, Method 8330 Explosives, Method 8081A Pesticides, Method 8082 PCBs, Method 6010B TAL Metals, Method 7470A Mercury
Sacramento, Ca	G1F030473	PCTss-003M-0001-SO	MJ071	Nitroglycerine Method 8330, Nitroquanidine Method 8330 Modified Nitrocellulose 353.2
Sacramento, Ca	G1F030473	Trip Blank	MJ073	VOC Method 8260
Denver, Co	G1F030473	PCTss-001M-0001-SO	280-16702-1	Method 6860 Perchlorate
Denver	G1F030473	PCTss-001M-0001-DUP	280-16702-2FD	Method 6860 Perchlorate
Denver	G1F030473	PCTss-003M-0001-SO	280-16702-5	Method 6860 Perchlorate
Denver	G1F030473	PCTss-002M-0001-SO	280-16702-3	Method 6860 Perchlorate
Denver	G1F030473	PCTss-002M-0001-ER	280-16702-4	Method 6860 Perchlorate
North Canton, Oh	G1F030473	PCTss-001M-0001-SO	G1F030473-001 Work Order MJ07E	Nitrocellulose 353.2
North Canton, Oh	G1F030473	PCTss-001M-0001-DUP	G1F030473-002 Work Order MJ07K	Nitrocellulose 353.2
North Canton, Oh	G1F030473	PCTss-003M-0001-SO	G1F030473-006 Work Order MJ07K	Nitrocellulose 353.2
North Canton, Oh	G1F030473	PCTss-002M-0001-SO	G1F030473-004 Work Order MJ07R	Nitrocellulose 353.2 Method 9012A Cyanide Method 160.3 % Solids
North Canton, Oh	G1F030473	PCTss-002M-0001-ER	G1F030473-005 Work Order MJ070	Nitrocellulose 353.2 Method 9012A Cyanide

1.1 Sample Data Selection Criteria

All of the QA/QC data was reviewed for the samples in all project numbers based upon the following criteria.

Flagging Criteria: All samples that had R, J, E, and B flags were checked.

All Samples were 100% verified. As the QA/QC data was reviewed, all samples that were affected by any QA/QC outlier was isolated and further reviewed. Ten Percent (10%) of the samples were then fully reviewed including 10% of the data was recalculated and checked.

The data was validated in accordance with the analytical methods and the documents entitled:

- The DoD Quality System Manual (QSM) is the primary reference for QC acceptance criteria. Where not addressed by the DoD QSM the other guidelines will be used.
- USEPA Test Methods for evaluating Solid Waste SW-846
- National Functional Guidelines for Data Validation
- The US Army Corp Louisville Chemistry Guideline, Version 5.0

All data is computer generated and has been consistent. The data package used by Test America is an industry standard and re-calculation consistently demonstrates that there were no issues with the data in terms of accuracy of the calculations. Calculations that may be generated by hand were checked. However, the computer data generation systems used by Test America are 100% accurate based upon the input. **The only time that data validation issues arise is when the calibration, QA or QC does not meet established criteria and sample data is generated and reported within the outlying criteria.**

The results of the data validation are presented in the following subsections.

Section 2.0 Quality Control Results
Section 3.0 QC Summary
Section 4.0 References
Appendix A, B

2.0 Quality Control Results

This section provides a summary of the laboratory QC results, which were used to meet the project data quality objectives (DQOs) for the investigation. The section below outlines what parts of each method were checked and a brief statement is provided where issues may occur. However a tabular summary is provided in the Appendix A.

2.1 All organic data utilizes the same validation flagging letters.
B= Blank Contamination in the method blank
J= Estimated Value (used primarily when the result is below the reporting limit (RL) but above the detection limit (DL)), otherwise, when QA/QCs are out of range but the sample result is above the reporting limit.
R= Rejected (used when calibrations and QA/QCs fail) often used per analyte when multiple compounds or elements are analyzed by the same method.

2.1.1 Metals Data Soils ICP Method 6010B and 6010B (trace) Soil, and Water.

Test America uses a B Flag as and estimated value for blank results that are greater than the Method Detection Limit (MDL) and below the Reporting Limit (RL) or Method Reporting Limit (MRL). This flag is not recognized by the National Functional Guidelines but is useful when determining the validity of data. In accordance with the DoD QSM document, data reported between the MDL and the RL was reported and flagged with a J as estimated.

The J flag is also used for data that is considered estimated for other quality control reasons as well. All data that was J flagged was reviewed by the data validator and an evaluation provided in the summary as well as a table with the data. All changes in flags by the data validator are fully explained.

No B Flags were changed in this set of data as no issues as stated above existed.

2.2 Method 8260B Volatile Organic Compounds (Water)
The validation reviewed only those compounds of concern. All other compounds in the total 8260B list were not validated.

2.2.1 Initial Calibration
All method requirements were met for all data generated.

2.2.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits. The LCS/LCS Dup also substituted for the sample dup and all Relative Percent Differences passed.

2.2.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.2.4 Matrix Spike and Matrix Spike Duplicate Analysis
Not enough sample was provided for a MS/MSD analysis.

2.2.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.2.6 Method Blank
All of the blanks were below the reporting limit for water. Acetone was detected in the method blank but well below the reporting limit. Acetone is a common contaminant in the organic laboratory.

2.2.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.2.8 Surrogates
All surrogates met method and USACE Louisville Guidelines

2.2.9 Internal Standards
All Internal Standards met method guidelines.

2.2.10 Tuning
Tuning requirements for the method were met.

2.2.11 SPCC Check
The SPCC Check met all method requirements.

2.2.12 Manual Integration
The laboratory followed all proper protocols for manual integration. Other multi peak compounds such as total Xylenes also followed proper protocol.

2.2.13 Holding Time
The holding time for this sample was met.

2.2.14 Relative Retention Times
All relative retention times and retention time windows met method requirements.

2.3 Method 8260B Volatile Organic Compounds (Soil)

2.3.1 Initial Calibration
All method requirements were met for all data generated.

2.3.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits. The LCS/LCS Dup also substituted for the sample dup and all Relative Percent Differences passed.

2.3.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.3.4 Matrix Spike and Matrix Spike Duplicate Analysis
Not enough sample was provided for a MS/MSD analysis.

2.3.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.3.6 Method Blank
All of the blanks were below the reporting limit for water. Acetone was detected in the method blank but well below the reporting limit. Acetone is a common contaminant in the organic laboratory.

2.3.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.3.8 Surrogates
All surrogates met method and USACE Louisville Guidelines

2.3.9 Internal Standards
All Internal Standards met method guidelines.

2.3.10 Tuning
Tuning requirements for the method were met.

2.3.11 SPCC Check
The SPCC Check met all method requirements.

2.3.12 Manual Integration
The laboratory followed all proper protocols for manual integration. Other multi peak compounds such as total Xylenes also followed proper protocol.

2.3.13 Holding Time
The holding time for this sample was met.

2.3.14 Relative Retention Times
All relative retention times and retention time windows met method requirements.

2.4 Method 8270C Semi-Volatile Organic Compounds (Water)
The validation reviewed only those compounds of concern. All other compounds in the total 8270C list were not validated.

2.4.1 Initial Calibration
All method requirements were met for all data generated.

2.4.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits. The LCS/LCS Dup also substituted for the sample dup and all Relative Percent Differences passed.

2.4.3 Continuing Calibration Checks. (CCCs)

All method requirements were met. All CCCs recovered within the guideline limits.

2.4.4 Matrix Spike and Matrix Spike Duplicate Analysis
Not enough sample was provided for a MS/MSD analysis.

2.4.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.4.6 Method Blank
All of the blanks were below the reporting limit for water.

2.4.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.4.8 Surrogates
All surrogates met method and USACE Louisville Guidelines except for Phenol-d5 and 2-Fluorophenol in the method blank. However the internal standard met method guidelines. Due to the holding time and lack of sample, no further action can be taken. It is the professional judgment of data validator that the surrogate recoveries did not affect the data. The same issue was true with the LCS.

2.4.9 Internal Standards
All Internal Standards met method guidelines.

2.4.10 Tuning
Tuning requirements for the method were met.

2.4.11 SPCC Check
The SPCC Check met all method requirements.

2.4.12 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.4.13 Holding Time
The associated soil sample had no detectable compounds and was analyzed within holding times.

2.4.14 Relative Retention Times
All relative retention times and retention time windows met method requirements.

2.5 Method 8270C Semi-Volatile Organic Compounds (Soil)

The validation reviewed only those compounds of concern. All other compounds in the total 8270C list were not validated.

2.5.1 Initial Calibration
All method requirements were met for all data generated.

2.5.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered within the guideline limits. The LCS Dup was also within guideline limits. The LCS/LCS Dup also substituted for the sample dup and all Relative Percent Differences passed.

2.5.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.5.4 Matrix Spike and Matrix Spike Duplicate Analysis
All compounds met method recovery requirements except of 3,3-Dichlorobenzidene which recovered biased low. No additional measures were taken to verify the reason for the low recovery thus the MS/MSD recovery issue for the single compound is not significant and does not affect the overall data, thus all sample data is valid.

2.5.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.5.6 Method Blank
All of the blanks were below the reporting limit for water.

2.5.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.5.8 Surrogates
All surrogates met method and USACE Louisville Guidelines.

2.5.9 Internal Standards
All Internal Standards met method guidelines.

2.5.10 Tuning
Tuning requirements for the method were met.

2.5.11 SPCC Check
The SPCC Check met all method requirements.

2.5.12 Manual Integration

The laboratory followed all proper protocols for manual integration.

2.5.13 Holding Time
The holding time for this sample was met.

2.5.14 Relative Retention Times
All relative retention times and retention time windows met method requirements.

2.6 Method 8081A Pesticides (Water)
The validation reviewed only those compounds of concern.

2.6.1 Initial Calibration
All method requirements were met for all data generated.

2.6.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits and all Relative Percent Differences passed.

2.6.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.6.4 Matrix Spike and Matrix Spike Duplicate Analysis
Not enough sample was provided for a MS/MSD analysis.

2.6.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met for most compounds. Beta-BHC and Heptachlor had slightly high recoveries. Since those same compounds were not detected in the sample the positive bias has no affect on the sample data.

2.6.6 Method Blank
All of the blanks were below the reporting limit for water.

2.6.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.6.8 Surrogates
All surrogates met method and QSM guidelines except the LCS and LCS Dup Surrogate Decachlorobiphenyl recovered low. However all of the compounds recovered within their respective limits. Since two surrogates were present, and the second surrogate was within guideline criteria, all LCS data is valid.

2.6.9 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.6.10 Holding Time
The associated soil sample had no detectable compounds and was analyzed within holding times.

2.6.11 Endrin and 4,4'-DDT Breakdown
All breakdown analysis passed method requirements.

2.6.12 Retention Times
All retention times and retention time windows met method requirements.

2.6.13 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.7 Method 8081A Pesticides (Soil)
The validation reviewed only those compounds of concern.

2.7.1 Initial Calibration
All method requirements were met for all data generated.

2.7.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits and all Relative Percent Differences passed.

2.7.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.7.4 Matrix Spike and Matrix Spike Duplicate Analysis
All method requirements were met. All Matrix Spike compounds recovered with in the guideline limits. The Matrix Spike Duplicate was also within guideline limits and all Relative Percent Differences passed.

2.7.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met for most compounds. Beta-BHC and Heptachlor had slightly high recoveries. Since those same compounds were not detected in the sample the positive bias has no affect on the sample data.

2.7.6 Method Blank
All of the blanks were below the reporting limit for water.

2.7.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.7.8 Surrogates
All surrogates met method and USACE Louisville Guidelines.

2.7.9 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.7.10 Holding Time
There was no holding time issue with the sample.

2.7.11 Endrin and 4,4'-DDT Breakdown
All breakdown analysis passed method requirements.

2.7.12 Retention Times
All retention times and retention time windows met method requirements.

2.7.13 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.8 Method 8082 Polychlorinated Biphenyl (PCBs) (Water)
The validation reviewed only those compounds of concern.

2.8.1 Initial Calibration
All method requirements were met for all data generated.

2.8.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits and all Relative Percent Differences passed.

2.8.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.8.3 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
There was not sufficient sample provided to perform a MS/MSD.

2.8.4 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis

All method requirements were met.

2.8.5 Method Blank
All of the blanks were below the reporting limit for water.

2.8.6 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.8.7 Surrogates
All surrogates met method and USACE Louisville Guidelines.

2.8.8 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.8.9 Holding Time
There was no holding time issue with the sample.

2.8.10 Retention Times
All retention times and retention time windows met method requirements.

2.8.11 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.9 Method 8082 Polychlorinated Biphenyl (PCBs) (Soil)
The validation reviewed only those compounds of concern.

2.9.1 Initial Calibration
All method requirements were met for all data generated.

2.9.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits and all Relative Percent Differences passed.

2.9.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.9.4 Matrix Spike and Matrix Spike Duplicate Analysis
All method requirements were met. All Matrix Spike compounds recovered with in the guideline limits. The Matrix Spike Duplicate was also within guideline limits and all Relative Percent Differences passed.

2.9.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.9.6 Method Blank
All of the blanks were below the reporting limit for water.

2.9.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.9.8 Surrogates
All surrogates met method and USACE Louisville Guidelines.

2.9.9 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.9.10 Holding Time
There was no holding time issue with the sample.

2.9.11 Retention Times
All retention times and retention time windows met method requirements.

2.9.12 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.10 Method 8330 Explosives (Water)
The validation reviewed only those compounds of concern.

2.10.1 Initial Calibration
All method requirements were met for all data generated.

2.10.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits and all Relative Percent Differences passed.

2.10.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.10.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
All method requirements were met. All Matrix Spike compounds recovered with in the guideline limits. The Matrix Spike Duplicate

was also within guideline limits and all Relative Percent Differences passed.

2.10.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.10.5 Method Blank
All of the blanks were below the reporting limit for water.

2.10.6 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.10.7 Surrogates
All surrogates met method and USACE Louisville Guidelines.

2.10.8 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.10.9 Holding Time
There was no holding time issue with the sample.

2.10.10 Retention Times
All retention times and retention time windows met method requirements.

2.10.11 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.11 Method 8330 Explosives (Soil)
The validation reviewed only those compounds of concern.

2.11.1 Initial Calibration
All method requirements were met for all data generated.

2.11.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. All LCS compounds recovered with in the guideline limits. The LCS Dup was also within guideline limits and all Relative Percent Differences passed.

2.11.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.11.4 Matrix Spike and Matrix Spike Duplicate Analysis

All method requirements were met. All Matrix Spike compounds recovered with in the guideline limits. The Matrix Spike Duplicate was also within guideline limits and all Relative Percent Differences passed.

2.11.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.11.6 Method Blank
All of the blanks were below the reporting limit for water.

2.11.7 Field Duplicate (Sample Duplicate) Analysis
The field duplicate was non-detect as well as the original sample. No percent difference can be calculated. (Nitroglycerine only).

2.11.8 Surrogates
All surrogates met method and USACE Louisville Guidelines.

2.11.9 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.11.10 Holding Time
There was no holding time issue with the sample.

2.11.11 Retention Times
All retention times and retention time windows met method requirements.

2.11.12 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.12 Method 8330 Modified Nitorguanidine (Water)
The validation reviewed only the compound of concern.

2.12.1 Initial Calibration
All method requirements were met for all data generated.

2.12.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. The LCS ands LCS Dup compound recovered with in the guideline limits and the Relative Percent Difference passed.

2.12.3 Continuing Calibration Checks. (CCCs)

All method requirements were met. The CCCs recovered within the guideline limits.

2.12.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
All method requirements were met. The Matrix Spike and Matrix Spike Duplicate compound recovered within the guideline limits and the Relative Percent Difference passed.
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2.12.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.12.6 Method Blank
All of the blanks were below the reporting limit for water.

2.12.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.12.8 Surrogates
No surrogate is used in this method.

2.12.9 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.12.10 Holding Time
There was no holding time issue with the sample.

2.12.11 Retention Times
All retention times and retention time windows met method requirements.

2.12.12 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.13 Method 8330 Modified Nitroguanidine (Soil)
The validation reviewed only the compound of concern.

2.13.1 Initial Calibration
All method requirements were met for all data generated.

2.13.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. The LCS and LCS Dup compound recovered within the guideline limits and the Relative Percent Difference passed.

2.13.3 Continuing Calibration Checks. (CCCs)
All method requirements were met. All CCCs recovered within the guideline limits.

2.13.4 Matrix Spike and Matrix Spike Duplicate Analysis
All method requirements were met. The Matrix Spike and Matrix Spike Duplicate compound recovered within the guideline limits and the Relative Percent Difference passed.

2.13.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.13.6 Method Blank
All of the blanks were below the reporting limit for water.

2.13.7 Field Duplicate (Sample Duplicate) Analysis
The field duplicate was non-detect as well as the original sample. No percent difference can be calculated.

2.13.8 Surrogates
No surrogate is used in this method.

2.13.9 Manual Integration
The laboratory followed all proper protocols for manual integration.

2.13.10 Holding Time
There was no holding time issue with the sample.

2.13.11 Retention Times
All retention times and retention time windows met method requirements.

2.13.12 Second Column Confirmation
Second column confirmation was not required as no compounds were detected.

2.14 Method 6860 Perchlorate by ICMS (Water)
The validation reviewed only the compound of concern.

2.14.1 Initial Calibration
All method requirements were met.

2.14.2 Laboratory Control Sample (LCS) (Second Source Compounds)

All method requirements were met. The LCS ands LCS Dup compound recovered with in the guideline limits and the Relative Percent Difference passed.

2.14.3 LC Interference Check Standard
The LC Interference Check Standard recovered within the guideline limits.

2.14.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike and Matrix Spike Duplicate was run on another sample that was not part of the client's sample batch and has no affect on the sample in this report.

2.14.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.14.6 Method Blank, Initial Calibration Blank
All of the blanks were below the reporting limit for water.

2.14.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.14.8 Holding Time
There was no holding time issue with the sample.

2.14.9 Retention Times
All retention times and retention time windows met method requirements.

2.15 Method 6860 Perchlorate by ICMS (Soil)
The validation reviewed only the compound of concern.

2.15.1 Initial Calibration
All method requirements were met for all data generated.

2.15.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met. The LCS and LCS Dup compound recovered within the guideline limits and the Relative Percent Difference passed.

2.15.3 LC Interference Check Standard
The LC Interference Check Standard recovered within the guideline limits

2.15.4 Matrix Spike and Matrix Spike Duplicate Analysis

The Matrix Spike and Matrix Spike Duplicate compound recovered biased high and the Relative Percent Difference passed. The high bias has no affect on the non-detected value in the sample. The reported data is valid.

2.15.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.15.6 Method Blank
All of the blanks were below the reporting limit for water.

2.15.7 Field Duplicate (Sample Duplicate) Analysis
The field duplicate was non-detect as well as the original sample. No percent difference can be calculated.

2.15.8 Holding Time
There was no holding time issue with the sample.

2.15.9 Retention Times, Relative Retention Time
All retention times and retention time windows met method requirements.

2.16 Method 353.2 Nitrocellulose General Chemistry (Water)
The validation reviewed only the compound of concern.

2.16.1 Initial Calibration
All method requirements were met.

2.16.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.16.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.16.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike and Matrix Spike Duplicate was run on another sample that was not part of the client's sample batch and has no affect on the sample in this report.

2.16.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.16.6 Method Blank, Initial Calibration Blank, Continuing Calibration Blank
All of the blanks were below the reporting limit for water.

2.16.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.16.8 Holding Time
There was no holding time issue with the sample.

2.17 Method 353.2 Nitrocellulose General Chemistry (Soil)
The validation reviewed only the compound of concern.

2.17.1 Initial Calibration
All method requirements were met.

2.17.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.17.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.17.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike and Matrix Spike Duplicate passed as well as the RPD.

2.17.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.17.6 Method Blank, Initial Calibration Blank, Continuing Calibration Blank
All of the blanks were below the reporting limit for water.

2.17.7 Field Duplicate (Sample Duplicate) Analysis
The field duplicate was non-detect as well as the original sample. No percent difference can be calculated.

2.17.8 Holding Time
There was no holding time issue with the sample.

2.18 Method 9012A Cyanide General Chemistry (Water)
The validation reviewed only the compound of concern.

2.18.1 Initial Calibration
All method requirements were met.

2.18.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.18.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.18.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike passed and the Matrix Spike Duplicate failed low. The RPD failed as well. The sample was non-detect for the compound. It is the professional judgment of the data validator that the MS/MSD does not affect the sample data.

2.18.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.18.5 Method Blank, Initial Calibration Blank, Continuing Calibration Blank
All of the blanks were below the reporting limit for water.

2.18.6 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.18.7 Holding Time
There was no holding time issue with the sample.

2.19 Method 9012A Cyanide General Chemistry (Soil)
The validation reviewed only the compound of concern.

2.19.1 Initial Calibration
All method requirements were met.

2.19.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.19.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.19.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike and Matrix Spike Duplicate passed as well as the RPD.

2.19.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis

All method requirements were met.

2.19.6 Method Blank, Initial Calibration Blank, Continuing Calibration Blank
All of the blanks were below the reporting limit.

2.19.7 Field Duplicate (Sample Duplicate) Analysis
The field duplicate was non-detect as well as the original sample. No percent difference can be calculated.

2.19.8 Holding Time
There was no holding time issue with the sample.

2.20 Method 7470A Mercury (Water)
The validation reviewed only the element of concern.

2.20.1 Initial Calibration
All method requirements were met.

2.20.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.20.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.20.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike and the Matrix Spike Duplicate passed and the RPD was within method limits.

2.20.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.20.6 Method Blank, Initial Calibration Blank, Continuing Calibration Blank
All of the blanks were below the reporting limit for water.

2.20.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was available.

2.20.8 Holding Time
There was no holding time issue with the sample.

2.21 Method 7471A Mercury (Soil)
The validation reviewed only the element of concern.

2.21.1 Initial Calibration
All method requirements were met.

2.21.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.21.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.21.4 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike and Matrix Spike Duplicate passed as well as the RPD.

2.21.5 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.21.6 Method Blank, Initial Calibration Blank, Continuing Calibration Blank
All of the blanks were below the reporting limit.

2.21.7 Field Duplicate (Sample Duplicate) Analysis
No field duplicate was provided.

2.21.8 Holding Time
There was no holding time issue with the sample.

2.22 Method 6010B and 6010B trace Metals (Water)
The validation reviewed only the elements of concern.

2.22.1 Initial Calibration
All method requirements were met.

2.22.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.22.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.22.4 Method Blank, Preparation Blank, Initial Calibration Blank (ICB), and the Continuing Calibration Blank (CCB) Analysis
All of the blanks were below the reporting limit.

2.22.5 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)

The Matrix Spike and Matrix Spike Duplicate passed as well as the RPD for many elements.

2.22.6 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.22.7 The Inter-element Correction Standard A & B (ICSAB)
The ICSAB recoveries all were within the 80-120% recovery range required by the method for all project numbers.

2.22.8 ICP Serial Dilution
No serial dilution as no elements were detected 4 time higher than the reporting limit.

2.22.9 Field Duplicate (Sample Duplicate) Analysis
No field duplicate provided.

2.23 Method 6010B and 6010B trace Metals (Soil)
The validation reviewed only the elements of concern.

2.23.1 Initial Calibration
All method requirements were met.

2.23.2 Laboratory Control Sample (LCS) (Second Source Compounds)
All method requirements were met.

2.23.3 Continuing Calibration Verification
All Continuing Calibration Verifications passed method requirements.

2.23.4 Method Blank, Preparation Blank, Initial Calibration Blank (ICB), and the Continuing Calibration Blank (CCB) Analysis
All of the blanks were below the reporting limit.

2.23.5 Matrix Spike and Matrix Spike Duplicate Analysis (MS/MSD)
The Matrix Spike and Matrix Spike Duplicate passed as well as the RPD for many elements. The elements that had concentration that were more than 4 times greater than the spike concentration are not valid and do not have any affect on data (Aluminum, Iron, Manganese). The MS for lead met method requirements while the MSD for lead was slightly low (68% recovery vs a lower limit of 75%). This indicates that the sample matrix (homogeneity) may be the issue. Unless Methods of Standard Additions or sample duplicate is performed, interference is assumed and not verified, thus it is the professional judgment of the data validator that the data is valid.

Antimony in soil very rarely recovers well. The antimony recovery for both the Matrix Spike and Matrix Spike Duplicate were less than 10%. This recovery level is very common. There is a strong indication that the digestion procedure is the problem and not the sample. Antimony is not a common element in soil, thus it is the professional judgment of the data validator that the data for Antimony is valid.

2.23.6 Contract Required Detection Limit Standard and Reporting Limit Standard Analysis
All method requirements were met.

2.23.7 The Inter-element Correction Standard A & B (ICSAB)
The ICSAB recoveries all were within the 80-120% recovery range required by the method for all project numbers.

2.23.8 ICP Serial Dilution
The serial dilution passed for all elements that qualified. Elements that were not at least 10 time the reporting limit would not qualify.

2.23.9 Field Duplicate (Sample Duplicate) Analysis
No field duplicate provided.

3.0 QC Summary

3.1 Executive Summary

3.3.1 All Methods
All of the system quality controls were met. There is no indication that any instrument quality control did not meet method or National Functional Guideline criteria. In all cases if the data validator removes or changes a flag, a full explanation is provided. There were no reasons to change any flags in this report.

3.3.2 Data Validator Narrative
For each issue the data validator provided an explanation for each issue that would have affected data. There were no issues in any sample or method that would have adversely affected any data. All data is valid and useful.

3.3.3 Holding Times
The issue regarding the holding time for the Equipment Rinse water was minor and it is the professional judgment of the data validator that the Equipment Rinse data is valid and useful.

3.4 Usability and Comparability

Usability of data was evaluate by assuring that all of the analytical requests were met, samples were received in the proper condition, and all analysis were performed within the appropriate holding times. Additionally, all quality control and quality assurance measures were taken to assure accurate and useable data. All samples that are J flagged are flagged because the reported value is below the Reporting Limit. No sample in any batch is J flagged for any other reason. The use of the data that is below the Reporting Limit should be considered estimated. **All sample data above the Report Limit is valid and usable.**

An overview of the validation findings are presented in tabular form in Appendix A. Appendix B contains the check sheets and any additional comments are found in those sheets. The suggested data validation flags are listed below and are defined as follows:

R Quality Control (QC) indicated the data is not usable.

J Indicates an estimated value.

E The Serial Dilution exceeded the maximum 10% limit.

U Indicates the compound or analyte was analyzed for, but not detected at or above the stated limit.

B The compound was also detected in the method blank.

The above flags are incorporated in the data table where they apply based upon the National Functional guidelines. Any flags generated by the laboratory utilizing the laboratory's internal QC program are not presented in the data tables.

All Data for all of the project number in this report are usable and valid.

4.0 References
National Functional Guidelines
USACE Guidelines Version 5 June 2002.
DoD Quality System Manual (QSM)

Glossary of Terms

°C	degrees Celsius
CCB	Continuing Calibration Blank (used in Metals analysis)
CCV	Continuing Calibration Verification (used in all methods to verify system calibration)
CLP	Contract Laboratory Program (used in Superfund program)
COC	Chain of Custody
%D	Percent Difference
DQO	Data Quality Objectives
DS	Down Stream
FB	Field Blank
FD	Field Duplicate
ICB	Initial Calibration Blank (used primarily in metals analysis)
ICP	Inductively Coupled Plasma
ICPMS	Inductively Coupled Plasma Mass Spectrometer
ICV	Initial Calibration Verification (second source standard used to initially verify the calibration curve.
ICS	Interference Check Solution (used in ICP and ICPMS only)
ICSA	Interference Check Solution A
ICSAB	Interference Check Solution A&B combined
IS	Internal Standard
LCG	Louisville Chemistry Guideline Version 5
LCS	Laboratory Control Sample
MRL	Method Reporting Limit (MRL)
MDL	Method Detection Limit (MDL)
MD	Matrix Duplicate (often referred to as the sample duplicate)
MSA	Method of Standard Additions
MS/MSD	Matrix Spike (MS)/Matrix Spike Duplicate (MSD)
PARCC	Precision, Accuracy, Represenativeness, Completeness, Comparability
PD	Post Digested Spike (also PDS)
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SAP	Sampling and Analysis Plan
SD	Standard Deviation
SDG	Sample Delivery Group
SOP	Standard Operating Procedure (SOPs is plural)
TB	Trip Blank
TCLP	Toxic Compound Leaching Procedure
TERC	Total Environmental Restoration Contract
USACE or ACE	United States Army Corps of Engineers Army Corps of Engneers
USEPA	United States Environmental Protection Agency
%R	Percent Recovery

Appendix A
All Sample Data and Flagging

Purves Environmental
Data Validation Specialists

Table MA-1 Summary of Analytical Results **Soil and Water Matrix** **TAL Including Mercury**

Field Sample ID:	PCTss-002M-0001-SO			PCTss-002M-0001-ER		
Laboratory ID:	G1F030473 MJ07R			G1F030473 MJ070		
Date Sampled:	5/26/11			5/26/11		
Date Received:	6/3/11			6/3/11		
Date Prepared:	6/10/11			6/9/11		
Date Analyzed:	6/14/11			6/9/11		
Holding Time	15 days			14 days		
Required Hold Time	180 days			180 days		
Metals		Lab	VF		Lab	VF
Method 6010B	Result	Flag	Flag	Result	Flag	Flag
Aluminum	10600			U		
Arsenic	8.4			U		
Barium	81.7			U		
Beryllium	0.45			U		
Calcium	954			U		
Cadmium	0.13	B	J	U		
Cobalt	7.7			U		
Chromium	14.5			U		
Copper	12.1			U		
Iron	17600			U		
Potassium	654			U		
Magnesium	1770			U		
Manganese	833			U		
Sodium	35.6	B	J	U		
Nickel	18.5			U		
Lead	34.1			U		
Antimony	U			U		
Selenium	U			20.6	B	J
Thallium	U			U		
Vandium	24.4			U		
Zinc	62.4			U		
Silver	U			U		
	mg/Kg			mg/L		
Method 7471A						
Date Sampled:	5/26/11			5/26/11		
Date Received:	6/3/11			6/3/11		
Date Prepared:	6/14/11			6/15/11		
Date Analyzed:	6/14/11			6/16/11		
Holding Time	19 days			20 days		
Required Hold Time	180 days			28 days		
Mercury	0.049			U		
	mg/Kg			mg/L		

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)
The RESULT IS ESTIMATED
J = RESULT IS ESTIMATED
U = Result is below the MDL or ND = Not Detected
VF= Validator Flag

7484 Woospring Ln, Hudson, OH 44236

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Table SS-1 Sample Summary and Analysis Table Soils

PIKA Field Sample ID:	PCTss-001M-0001-SO	PCTss-001M-0001-DUP	PCTss-002D-0001-SO	PCTss-002M-0001-SO	PCTss-003M-0001-SO
Date Sampled:	5/26/11 10:25AM	5/26/11 10:25AM	5/26/11 11:15AM	5/26/11 11:20AM	5/26/11 1:05PM
Scacramento Laboratory ID:	G1F030473 MJ07E	G1F030473 MJ07K	G1F030473 MJ07L	G1F030473 MJ07R	G1F030473 MJ071
Date Received:	6/3/11 09:10AM	6/3/11 09:10AM	6/3/11 09:10AM	6/3/11 09:10AM	6/3/11 09:10AM
Analysis Performed					
8260B VOCs			X		
8270C SVOCs				X	
8081A Pesticides				X	
8082 PCBs				X	
8330 Explosives	X	X		X	X
8330 Mod Nitroguanidine				X	
6010B TAL Metals				X	
Denver Laboratory ID:	280-16702-1	280-16702-2FD		280-16702-3	280-16702-5
Date Received:	6/8/11 0930	6/8/11 0930		6/8/11 0930	6/8/11 0930
Analysis Performed					
6860 Perchlorate	X	X		X	X
Samples Picked up by North Canton Facility and distributed from that facility					
North Canton Laboratory ID:	G1F030473-001 MJ07E	G1F030473-001 MJ07E	11/7/08	G1F030473-001 MJ07E	G1F030473-001 MJ07E
Date Received:	5/26/11 1530	5/26/11 1530	5/26/11 1530	5/26/11 1530	5/26/11 1530
Analysis Performed					
9012A Cyanide				X	
353.2 Nitrocellulose	X	X		X	X
% Solids 160.3				X	

Table SS-1 Sample Summary and Analysis Table (Waters)

PIKA Field Sample ID:	PCTss-002M-0001-ER	Trip Blank
Date Sampled:	5/26/11 08:40AM	
Scacramento Laboratory ID:	G1F030473 MJ070	G1F030473 MJ073
Date Received:	6/3/11 09:10AM	6/3/11 09:10AM
Analysis Performed		
8260B VOCs		X
8270C SVOCs	X	
8081A Pesticides	X	
8082 PCBs	X	
8330 Explosives	X	
8330 Mod Nitroguanidine	X	
6010B TAL Metals	X	
Denver Laboratory ID:	280-16702-1	280-16702-2FD
Date Received:	6/8/11 0930	6/8/11 0930
Analysis Performed		
6860 Perchlorate	X	
Samples Picked up by North Canton Facility and distributed from that facility		
North Canton Laboratory ID:	G1F030473-001 MJ07E	G1F030473-001 MJ07E
Date Received:	5/26/11 1530	5/26/11 1530
Analysis Performed		
9012A Cyanide	X	
353.2 Nitrocellulose	X	
% Solids 160.3		

Table VOC-1 Summary of Analytical Results Volatile Organic Compounds (VOCs) **Soil & Water**

Field Sample ID:	PCTss-002D-0001-SO			Trip Blank		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ073		
Date Sampled:	5/26/11 11:15AM					
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM		
Date Analyzed:	6/7/11			6/8/11		
Holding Time	12 days			13 days		
Required Hold Time	14 Days			14 days		
VOCs		Lab	VF		Lab	VF
Method 8260B	Result	Flag	Flag	Result	Flag	Flag
Methylene Chloride	U			U		
4-Methyl-2-pentanone	U			U		
Styrene	U			U		
1,1,2,2-Tetrachloroethane	U			U		
Tetrachloroethene	U			U		
Toluene	U			U		
1,1,1-Trichloroethane	U			U		
1,1,2-Trichloroethane	U			U		
Trichloroethene	U			U		
Vinyl Chloride	U			U		
Xylenes (Total)	U			U		
Acetone	5.3	J,B	J,B	U		
Benzene	U			U		
Bromodichloromethane	U			U		
Bromoform	U			U		
Bromomethane	U			U		
2-Butanone	U			U		
Carbon Disulfide	U			U		
Carbon Tetrachloride	U			U		
Chlorobenzene	U			U		
Dibromochloromethane	U			U		
Chloroethane	U			U		
1,1-Dichloroethane	U			U		
1,2-Dichloroethane	U			U		
1,1-Dichloroethene	U			U		
1,2-Dichloroethene (Total)	U			U		
1,2-Dichloropropane	U			U		
cis-1,3-Dichloropropene	U			U		
trans-1,3-Dichloropropene	U			U		
Ethylbenzene	U			U		
2-Hexanone	U			U		
	ug/Kg			ug/L		

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)
J = RESULT IS ESTIMATED
U = Result is below the MDL or ND = Not Detected
VF= Validator Flag

Table SVOC-1 Summary of Analytical Results Semi-Volatile Organic Compounds (SVOCs) (cont)

Soil & Water

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ070		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/7/2011			6/9/2011		
Date Analyzed:	6/20/11			6/20/11		
Holding Time	14 days			12 days		
Required Hold Time (prep)	14 Days			14 days		
SVOCs		Lab	VF		Lab	VF
Method 8270C	Result	Flag	Flag	Result	Flag	Flag
Acenaphthene	U			U		
Acenaphthylene	U			U		
Benzo(a)anthracene	U			U		
Benzo(b)fluoranthene	U			U		
Benzo(k)fluoranthene	U			U		
Benzo(ghi)perylene	U			U		
Benzo(a)pyrene	U			U		
bis(2-chloroethoxy) methane	U			U		
bis(2-Ethylhexyl)phthalate	U			U		
4-Bromophenyl phenyl ether	U			U		
Butyl benzyl phthalate	U			U		
Carbazole	U			U		
4-Chloroaniline	U			U		
4-Chloro-3-methylphenol	U			U		
2-Chloronaphthalene	U			U		
4-Chlorophenyl phenyl ether	U			U		
Chrysens	U			U		
Dibenzo(a,h)anthracene	U			U		
Dibenzofuran	U			U		
Di-n-butyl phthalate	U			U		
1,2-Dichlorobenzene	U			U		
1,3-Dichlorobenzene	U			U		
1,4-Dichlorobenzene	U			U		
3,3'-Dichlorobenzidine	U			U		
2,4-Dichlorophenol	U			U		
Diethyl phthalate	U			U		
2,4-Dimethylphenol	U			U		
Dimethyl phthalate	U			U		
4,6-Dinitro-2-methylphenol	0.14	J	J	U		
2,4-Dinitrophenol	U			U		
	ug/Kg			ug/L		

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)

J = RESULT IS ESTIMATED

U = Result is below the MDL or ND = Not Detected

VF= Validator Flag

Table PEST-1 Summary of Analytical Results Pesticides Compounds (8081A) Soil & Water

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ070		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/9/2011			6/7/2011		
Date Analyzed:	6/22/11			6/22/11		
Holding Time	14 days			12 days		
Required Hold Time (prep)	14 Days			14 days		
Pesticides		Lab	VF		Lab	VF
Method 8081A	Result	Flag	Flag	Result	Flag	Flag
alpha-BHC	U			U		
gamma-BHC	U			U		
Heptachlor	U			U		
Aldrin	U			U		
beta-BHC	U			U		
delta-BHC	U			U		
Heptachlor epoxide	U			U		
Endosulfan I	U			U		
gamma-Chlordane	U			U		
alpha-Chlordane	U			U		
4,4'-DDE	0.73*	J	J	U		
Dieldrin	U			U		
endrin	U			U		
4,4'-DDT	U			U		
Endrin aldehyde	U			U		
Methoxychlor	U			U		
Endosulfan Sulfate	U			U		
Endrin Ketone	U			U		
Toxaphene	U			U		
	ug/Kg			ug/L		

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)
J = RESULT IS ESTIMATED
U = Result is below the MDL or ND = Not Detected
VF= Validator Flag

A confirmation analysis was performed, however to concentration is below the reporting limit and is estimated at best. No further evaluation is required.

Table PCB-1 Summary of Analytical Results 8082 Polychlorinated Biphenols (PCBs) **Soil & Water**

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ070		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/9/2011			6/7/2011		
Date Analyzed:	6/15/11			6/12/11		
Holding Time	14 days			12 days		
Required Hold Time (prep)	14 Days			14 days		
PCBs		Lab	VF		Lab	VF
Method 8082	Result	Flag	Flag	Result	Flag	Flag
Arochlor 1016	U			U		
Arochlor 1221	U			U		
Arochlor 1232	U			U		
Arochlor 1242	U			U		
Arochlor 1248	U			U		
Arochlor 1254	U			U		
Arochlor 1260	U			U		
	ug/Kg			ug/L		

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)- RESULT IS ESTIMATED
J = RESULT IS ESTIMATED
U = Result is below the MDL or ND = Not Detected
VF=Validator flag

Table EA-1 Summary of Analytical Results Explosives 8330 **Soils & Water**

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER			PCTss-001M-0001-SO			PCTss-001M-0001-DUP			PCTss-003M-0001-SO		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ070			G1F030473 MJ07E			G1F030473 MJ07K			G1F030473 MJ071		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM			5/26/11 11:15AM			5/26/11 11:15AM			5/26/11 11:15AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/8/2011			6/6/2011			6/8/2011			6/8/2011			6/8/2011		
Date Analyzed:	6/13/11			6/9/11			6/13/11			6/13/11			6/13/11		
Holding Time	13 days			11 days			13 days			13 days			13 days		
Required Hold Time	14 Days			14 days			14 days			14 days			14 days		
8330 Compound	Result	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF
PETN	U			U											
Nitroglycerin	U			U											
2-Amino-4,6-Dintrotoluene	U			U											
4-Amino-2,6-Dinitrotoluene	U			U											
1,3-Dinitrobenzene	U			U											
2,4-Dinitrotoluene	U			U											
2,6-Dinitrotoluene	U			U											
HMX	U			U											
Nitrobenzene	U			U											
2-Nitrotoluene	U			U											
4-Nitrotoluene	U			U											
3-Nitrotoluene	U			U											
RDX	U			U											
Tetryl	U			U											
1,3,5-Trinitrobenzene	U			U											
2,4,6-Trinitrotoluene	U			U											
Nitroglycerin	U			U			U			U			U		
	mg/Kg			ug/L			mg/Kg			mg/Kg			mg/Kg		

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)- RESULT IS ESTIMATED
J = RESULT IS ESTIMATED
U = Result is below the MDL or ND = Not Detected
VF=Validator flag

Table PROP-1 Summary of Analytical Results Propellants **Soils & Water**

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER			PCTss-001M-0001-SO			PCTss-001M-0001-DUP			PCTss-003M-0001-SO		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ070			G1F030473 MJ07E			G1F030473 MJ07K			G1F030473 MJ071		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM			5/26/11 11:15AM			5/26/11 11:15AM			5/26/11 11:15AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/8/2011			6/6/2011			6/8/2011			6/8/2011			6/8/2011		
Date Analyzed:	6/13/11			6/9/11			6/13/11			6/13/11			6/13/11		
Holding Time	13 days			11 days			13 days			13 days			13 days		
Required Hold Time	14 Days			14 days			14 days			14 days			14 days		
8330 Modified	Result	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF
Nitroguanidine	U			U			0.063	J	J	0.12	J	J	0.17	J	J
	mg/Kg			ug/L			mg/Kg			mg/Kg			mg/Kg		

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER			PCTss-001M-0001-SO			PCTss-001M-0001-DUP			PCTss-003M-0001-SO		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ070			G1F030473 MJ07E			G1F030473 MJ07K			G1F030473 MJ071		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM			5/26/11 11:15AM			5/26/11 11:15AM			5/26/11 11:15AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/15/11			6/9/11			6/15/11			6/15/11			6/15/11		
Date Analyzed:	6/16/11			6/10/11			6/16/11			6/16/11			6/16/11		
Holding Time	20 days			20 days			20 days			20 days			20 days		
Required Hold Time	28 Days			28 days			28 days			28 days			28 days		
353.2 Nitrocellulose	Result	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF
Nitrocellulose	U			U			1.1	B	J	0.82	B	J			
	mg/Kg			ug/L			mg/Kg			mg/Kg			mg/Kg		

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER			PCTss-001M-0001-SO			PCTss-001M-0001-DUP			PCTss-003M-0001-SO		
Laboratory ID:	280-16702-3			280-16702-3			280-16702-3			280-16702-3			280-16702-3		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM			5/26/11 11:15AM			5/26/11 11:15AM			5/26/11 11:15AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/9/11						6/9/11			6/9/11			6/9/11		
Date Analyzed:	6/15/11			6/15/11			6/15/11			6/15/11			6/15/11		
Holding Time	20 days			20 days			20 days			20 days			20 days		
Required Hold Time	28 Days			28 days			28 days			28 days			28 days		
6860 Perchlorate	Result	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF	Results	LF	VF
Perchlorate	U			U			0.093*	J	J	0.11*	J	J	0.093*	J	J
	mg/Kg			ug/L			mg/Kg			mg/Kg			mg/Kg		

*Value is less than the reporting limit but greater than the detection limit.

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)- RESULT IS ESTIMATED

J = RESULT IS ESTIMATED

U = Result is below the MDL or ND = Not Detected

VF=Validator flag

Table CN-1 Summary of Analytical Results Cyanide

Soil & Water

Field Sample ID:	PCTss-002D-0001-SO			PCTss-002M-0001-ER		
Laboratory ID:	G1F030473 MJ07L			G1F030473 MJ070		
Date Sampled:	5/26/11 11:15AM			5/26/11 08:40AM		
Date Received:	6/3/11 09:10AM			6/3/11 09:10AM		
Date Prepared:	6/8/2011			6/6/2011		
Date Analyzed:	6/13/11			6/9/11		
Holding Time	13 days			11 days		
Required Hold Time	14 Days			14 days		
Method 9012A	Result	LF	VF	Results	LF	VF
Cyanide	0.19	B	J	U		
	mg/Kg			ug/L		

B = Result is above the Method Detection Limit (MDL) but below the Reporting Limit (RL)- RESULT IS ESTIMATED

J = RESULT IS ESTIMATED

U = Result is below the MDL or ND = Not Detected

VF=Validator flag

Appendix B
Check Lists

Purves Environmental

ICP Metals Analysis (6010) Check List Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

		Yes	No
Holding Time:	Samples were analyzed within holding time (6-Months)	Yes	
Initial Calibration	One calibration standard and blank		No
	Two calibration standard and blank		No
	Three calibration standard and blank	Yes	
	R > 0.995	Yes	

Comment

QC Method Detection Limit (MDL)

	MDL Check	Yes	

QC Method Reporting Limit (MRL)

	MRL Check at the beginning	Yes	
	MRL Check every 12 hours	Yes	

Intital Calibration Verification (ICV)

	%Recovery 90-110%	Yes	

Initial Calibration Blank (ICB)

	Blank Analytes <1/2 MRL	Yes	

Interelement Check Standard

	ICS-A run at the beginning	Yes	
	ICS-AB results within 80-120% recovery	Yes	

Continuing Calibration Blank (CCB)

	CCB every ten samples	Yes	
	CCB at end or run	Yes	
	CCB analytes < 1/2 MRL	Yes	

Continuing Calibration Verification (CCV)

	CCV every ten samples	Yes	
	CCV at end of run	Yes	
	CCV 90-110% Recovery	Yes	

Sample Analysis

	Samples greater than linear range diluted	Yes	

Sample QC

	Method Blank <1/2 MRL	Yes	
	LCS recoveries within required limits	Yes	
	MS/MSD recoveries within required limits		No
	MD RPD within control limits	Yes	

Comments

Method, Initial Calibration and Continuing Calibration Blanks

All were not detected.

Matrix Spike/Matrix Spike Dilution

Lead had a low recovery for the MSD (66% vs 75%) No real issue Data valid May be homogenety
that in the case of matrix spike and matrix spike duplicates, each analyte should be evaluated carefully. Additionally, the martix that is being spiked represents only the sample being spiked and not the entire sampling batch. Though soils in the same sampling group are being evaluated, each soil is unique. The data in this MS/MSD evaluation should be used as a guidance regarding possible matrix interference but should not have a direct affect on data.
The Method of Standard Additions should be used as a possible verification of a matrix affect.

Serial Dilution

	Serial Dilution (1:4) conducted as required.	Yes	
	Was there agreement between diluted and undiluted results? <10% recovery?	Yes	

Purves Environmental

ICP Metals Analysis (6010) Check List (continued pg 2) Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

Method of Standard Additions (MSA)

Was it performed as needed on samples of suspected matrix affects?		No
Was R > 0.995		

Comments:

Signed: _____
William W. Purves

Mercury Analysis (7471A/7470A) Check List Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

		Yes	No
Holding Time:	Samples were analyzed within holding time (6-Months)	Yes	
Initial Calibration	Five calibration standard and blank	Yes	
	R > 0.995	Yes	
QC Method Detection Limit (MDL)			
	MDL Check	Yes	
Intital Calibration Verification (ICV)			
	%Recovery 90-110%	Yes	
Initial Calibration Blank (ICB)			
	Blank Analytes <1/2 MRL	Yes	
Continuing Calibration Verification (CCV)			
	CCV every ten samples	Yes	
	CCV at end of run	Yes	
	CCV 90-110% Recovery	Yes	
Continuing Calibration Blank (CCB)			
	CCB every ten samples	Yes	
	CCB at end or run	Yes	
	CCB analytes < 1/2 MRL	Yes	
Sample Analysis			
	Samples greater than linear range diluted	n/a	
Sample QC			
	Method Blank <1/2 MRL	Yes	
	LCS recoveries within required limits	Yes	
	MS recoveries within required limits	Yes	
	MD RPD within control limits	Yes	
Method of Standard Additions (MSA)			
	Was it performed as needed on samples of suspected matrix affects?		No
	Was R > 0.995		

Comments
No issues found in this analysis.

Signed: _____
William W. Purves

Purves Environmental

Nitroaromatic & Nitramine Data Analysis (Explosive Residues) Checklist Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

		Yes	No
Holding Time:	Were Samples extracted within holding times?	Yes	
	Were Samples analyzed within holding times?	Yes	
Initial Calibration	Five calibration standard minimum	Yes	
Manual Integration			
	Was manual integration "M" performed?		No
QCMDL	Was MDL check performed?	Yes	
QCMRL			
	Was QCMRL run at the beginning and end of every daily sequence or every 12 hours?	Yes	
	Was the % "D" <30%	Yes	
Intital Calibration Verification (ICV)			
	Is the mid level (2nd source) recovery within 85-115%	Yes	
Continuing Calibration Verification (CCV)			
	Was CCV run at the beginning of the day or run every 12 hours?	Yes	
	Was the midpoint sample (CCV) conducted every ten samples or every 12 hours?	Yes	
	Was the midpoint sample (CCV) conducted at the end of the day/run.	Yes	
	Did the CCV meet the minimum requirements (D<15% with a maximum D < 20% for a specific compound.	Yes	
Sample Analysis			
	Was the RT of an identified componet within the required retention time window.	Yes	
	Were all identified hits, above the initial calibration curve diluted and reanalyzed	Yes	
	Were all identified compounds confirmed on a second column	Yes	
	Was all RPD of target analyte confirmation <40%	Yes	
	Was there a shoulder on the 2,4,6-TNT peak?		No
Sample Quality Control			
Method Blank	Were Target analytes < 1/2 the MRL for the Method Blank	Yes	
LCS	Were the % recoveries for the LCS within the limits?		No
MS/MSD	Were percent recovries within control limits?	Yes	
	Were RPD within control limits?	Yes	

Purves Environmental

Nitroaromatic & Nitramine Data Analysis (Explosive Residues) Checklist (cont pg 2) Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

Comments

Surrogates

Are surrogate recoveries within QC limits	Yes	

Signed: _____
William W. Purves

Purves Environmental

Propellants Nitrocellulose Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America North Canton
Sample Delivery Group: G1F030473

		Yes	No
Holding Time:	Were Samples analyzed within holding times?	Yes	
Initial Calibration	Was the calibration a minimum of 1 standard and blank?	Yes	
	Was the R^2 >0.995 ?	Yes	
Intital Calibration Verification (ICV)			
	Is the mid level (2nd source) recovery within 90-110%	Yes	
Continuing Calibration Verification (CCV)			
	CCV every ten samples	Yes	
	CCV at end of run	Yes	
	CCV 90-110% Recovery	Yes	
	Was the midpoint sample (CCV) conducted at the end of the run?	Yes	
Continuing Calibration Blank (CCB)			
	CCB every ten samples	Yes	
	CCB at end or run	Yes	
	CCB analytes < 1/2 MRL	Yes	
Sample Analysis			
	Were samples greater than linear range diluted	N/A	
Sample QC			
	Method Blank <1/2 MRL	Yes	
	LCS recoveries within required limits	Yes	
MS/MSD Analysis			
	MS recoveries within required limits	Yes	
	MD RPD within control limits	Yes	

Comments

Signed: _____

William W. Purves

Purves Environmental

General Chemistry Cyanide Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America North Canton
Sample Delivery Group: G1F030473

		Yes	No
Holding Time:	Were Samples analyzed within holding times?	Yes	
Initial Calibration	Was the calibration a minimum of 1 standard and blank?	Yes	
	Was the R^2 >0.995 ?	Yes	
Intital Calibration Verification (ICV)			
	Is the mid level (2nd source) recovery within 90-110%	Yes	
Continuing Calibration Verification (CCV)			
	CCV every ten samples	Yes	
	CCV at end of run	Yes	
	CCV 90-110% Recovery	Yes	
	Was the midpoint sample (CCV) conducted at the end of the run?	Yes	
Continuing Calibration Blank (CCB)			
	CCB every ten samples	Yes	
	CCB at end or run	Yes	
	CCB analytes < 1/2 MRL	Yes	
Sample Analysis			
	Were samples greater than linear range diluted	N/A	
Sample QC			
	Method Blank <1/2 MRL	Yes	
	LCS recoveries within required limits	Yes	
MS/MSD Analysis			
	MS recoveries within required limits	Yes	
	MD RPD within control limits	Yes	

Comments

Signed: _____

William W. Purves

8330 Modified Propellants Nitroguanidine Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

		Yes	No
Holding Time:	Were Samples extracted within holding times?	Yes	
	Were Samples analyzed within holding times?	Yes	
Initial Calibration	Five calibration standard minimum	Yes	
Manual Integration	Was manual integration "M" performed?		No
QCMDL	Was MDL check performed?	Yes	
QCMRL	Was QCMRL run at the beginning and end of every daily sequence or every 12 hours?	Yes	
	Was the % "D" <30%	Yes	
Intital Calibration Verification (ICV)	Is the mid level (2nd source) recovery within 85-115%	Yes	
Continuing Calibration Verification (CCV)	Was CCV run at the beginning of the day or run every 12 hours?	Yes	
	Was the midpoint sample (CCV) conducted every ten samples or every 12 hours?	Yes	
	Was the midpoint sample (CCV) conducted at the end of the day/run.	Yes	
	Did the CCV meet the minimum requirements (D<15% with a maximum D < 20% for a specific compound.	Yes	
Sample Analysis	Was the RT of an identified componet within the required retention time window.	Yes	
	Were all identified hits, above the initial calibration curve diluted and reanalyzed	Yes	
	Were all identified compounds confirmed on a second column	Yes	
	Was all RPD of target analyte confirmation <40%	Yes	
Sample Quality Control			
Method Blank	Were Target analytes < 1/2 the MRL for the Method Blank	Yes	

Purves Environmental

8330 Modified Propellants Nitroguanidine Soil & Water

Project Name: CC-RVAAP-80

Project #: 10-08-130

Laboratory: Test America Sacremento

Sample Delivery Group: G1F030473

LCS	Were the % recoveries for the LCS within the limits?	Yes	
MS/MSD	Were percent recovries within control limits?	Yes	
	Were RPD within control limits?	Yes	

Comments

Water sample was not extracted witin holding time, however the water was an equipment rinse and not a natural water.

There was not enough water to run a MS/MSD sample run.

Signed: _____

William W. Purves

Purves Environmental

8081A PESTICIEDS Soil & Water

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

		Yes	No
Holding Time:	Were Samples extracted within holding times?	Yes	
	Were Samples analyzed within holding times?	Yes	
Initial Calibration	Five calibration standard minimum	Yes	
Manual Integration	Was manual integration "M" performed?	YES	
QCMDL	Was MDL check performed?	Yes	
QCMRL	Was QCMRL run at the beginning and end of every daily sequence or every 12 hours?	Yes	
	Was the % "D" <30%	Yes	
Intital Calibration Verification (ICV)	Is the mid level (2nd source) recovery within 85-115%	Yes	
Continuing Calibration Verification (CCV)	Was CCV run at the beginning of the day or run every 12 hours?	Yes	
	Was the midpoint sample (CCV) conducted every ten samples or every 12 hours?	Yes	
	Was the midpoint sample (CCV) conducted at the end of the day/run.	Yes	
	Did the CCV meet the minimum requirements (D<15% with a maximum D < 20% for a specific compound.	Yes	
Degradation	Did the Degradation check pass	Yes	
Sample Analysis	Was the RT of an identified componet within the required retention time window.	Yes	
	Were all identified hits, above the initial calibration curve diluted and reanalyzed	n/a	
	Were all identified compounds confirmed on a second column	Yes	
	Was all RPD of target analyte confirmation <40%	Yes	

Sample Quality Control

8081A PESTICIEDS (cont)

Project Name: CC-RVAAP-80
Project #: 10-08-130
Laboratory: Test America Sacremento
Sample Delivery Group: G1F030473

Method Blank	Were Target analytes < 1/2 the MRL for the Method Blank	Yes	
LCS	Were the % recoveries for the LCS within the limits?	YES	
MS/MSD	Were percent recovries within control limits?	Yes	
	Were RPD within control limits?	Yes	
Surrogates			
	Are surrogate recoveries within QC limits	Yes	

Soil & Water

Water sample was not extracted witin holding time, however the water was an equipment rinse and not a natural water. There was not enough water to run a MS/MSD sample run.

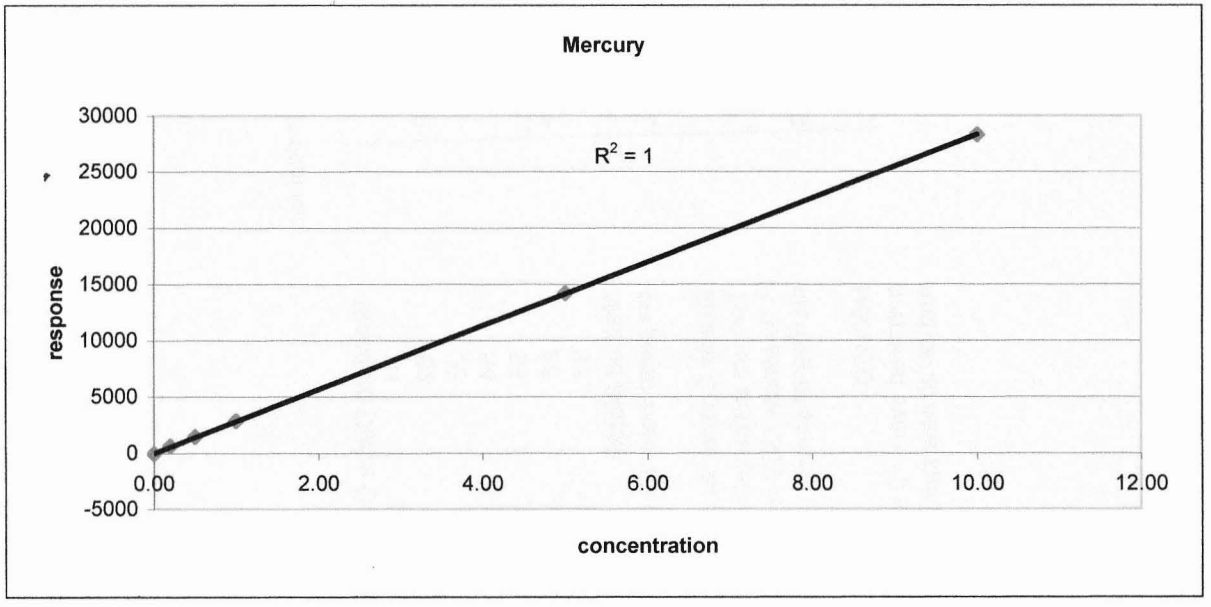
Signed: _____

William W. Purves

Standard Calibration Check Tables

Table HG-1 Mercury Calibration Check

Metals Method 7471A	Concentration	
Standard	Known	Measured
S1	0.00	-48
S2	0.20	652
S3	0.50	1477
S4	1.00	2854
S5	5.00	14217
S6	10.00	28306



Mercury Sample Calculation Check

Laboratory Sample ID: MJ07R
Sample Counts

1451
0.049 Recalculated sample Concentration
0.049 Reported value

Table QCHg-1 7174A Mercury Quality Control Check Table 10% of Compounds Reported

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

Cyanide Method 9012A					
	Known	Measured	%	Recovery	RPD
	Conc	Conc	Recovered	Range	<25%
Method Blank	ND	ND	<1/2RL		
ICV	0.100	0.952	95.2	90-110%	
CCV	1.00	0.09038	90.38	90-110%	
LCS	19.600	22	112.00%	86-114	
MS	0.275	0.244	89	86-114	5.00
MSD	0.262	0.219	84	86-114	

Table CALVER-8260 8260 Calibration Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

April 6, 2011 cal date Water

VOCs Method 8260	Acetone		**VOCs Method 8260**	Carbon Disulfide		Benzene	
Standard	Known	Measured	Standard	Known	Measured	Known	Measured
	Conc	Area		Conc	CF	Conc	CF
S1	0.25		S1	0.25	0.65807	0.25	1.11158
S2	0.50	18264	S2	0.50	0.67573	0.50	1.15239
S3	1.00	23509	S3	1.00	0.62175	1.00	1.0167
S4	4.00	44033	S4	4.00	0.68303	4.00	1.04588
S5	20.00	172319	S5	20.00	0.69784	20.00	1.00052
S6	40.00	323872	S6	40.00	0.70002	40.00	0.95515
S7	60.00	521242	S7	60.00	0.7178	60.00	0.99846
S8	80.00	738217	S8	80.00	0.71099	80.00	0.98669
Recal Correl Coef Linear	0.99501		Average RE-CF		0.6831538		1.0334213
Recal Correl Coef Quad	0.99970		Average LAB-CF		0.68315		1.03342
Lab Correl Coef Quad*	0.99828		%RSD	4.606	4.606%	6.472	6.472%

Though the recalculation did not match the Lab correlation, the correlation must be greater than 0.995 to pass.

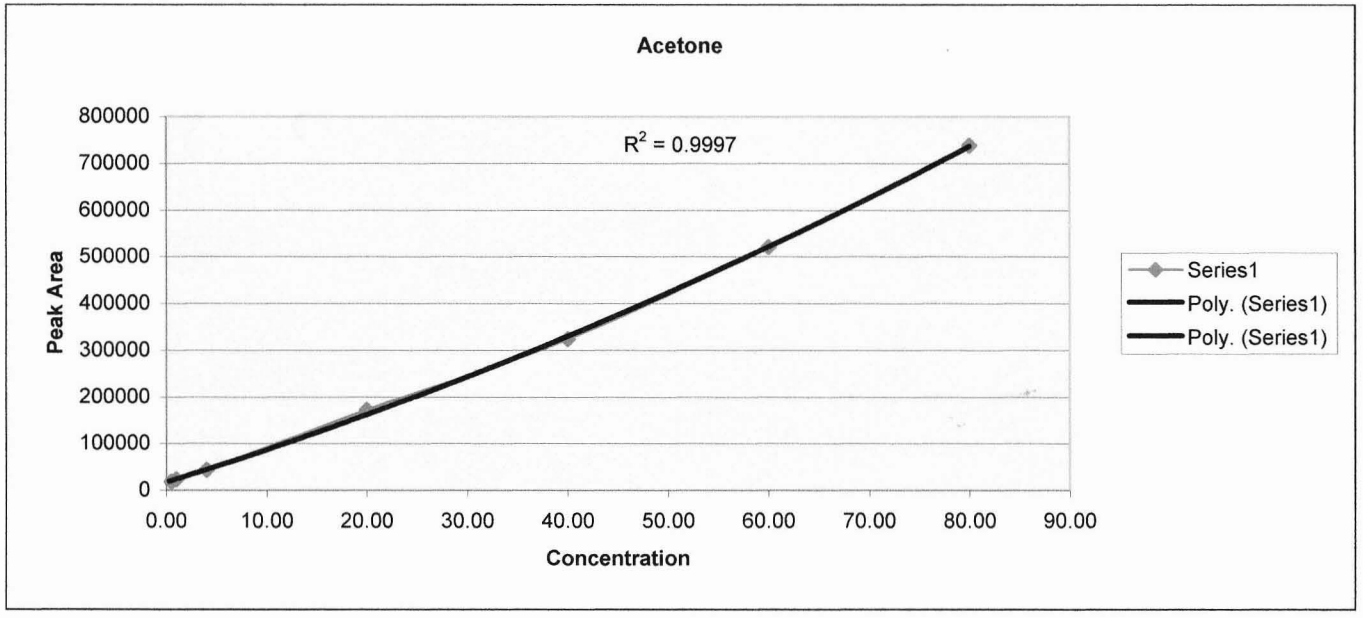


Table CALVER-8260 8260 Calibration Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

June 6, 2011 cal date

VOCs Method 8260	Acetone		**VOCs Method 8260**	Carbon Disulfide		Benzene			
Standard	Known	Measured	Standard	Known	Measured	Known	Measured	Peak	Calculated
	Conc	Area		Conc	CF	Conc	CF	Area	CF
S1	1.00		S1	1.00	1.24565	1.00	1.61536	22388	1.6153634
S2	2.50	9875	S2	2.50	1.05854	2.50	1.45978	50705	1.45978
S3	5.00	13317	S3	5.00	1.13901	5.00	1.58679	106063	1.58679
S4	10.00	19503	S4	10.00	1.1902	10.00	1.57557	222626	1.57557
S5	20.00	31986	S5	20.00	1.30901	20.00	1.6331	460930	1.6331
S6	40.00	59041	S6	40.00	1.34588	40.00	1.73046	1000759	1.73046
S7	100.00	138807	S7	100.00	1.32838	100.00	1.6764	2550069	1.6764
Sb	200.00	292604		200.00	1.22563	200.00	1.69036	5762841	1.69036
S9	400.00	580415		400.00	1.22877	400.00	1.75863	12668105	1.75863
Recal Correl Coef Linear	0.99965		Average RE-CF		1.2301189		1.6362722		
Recal Correl Coef Quad	0.99970		Average LAB-CF		1.23012		1.63627		
Lab Correl Coef Quad*	0.99970		%RSD	7.543	7.543%	5.556	5.556%		

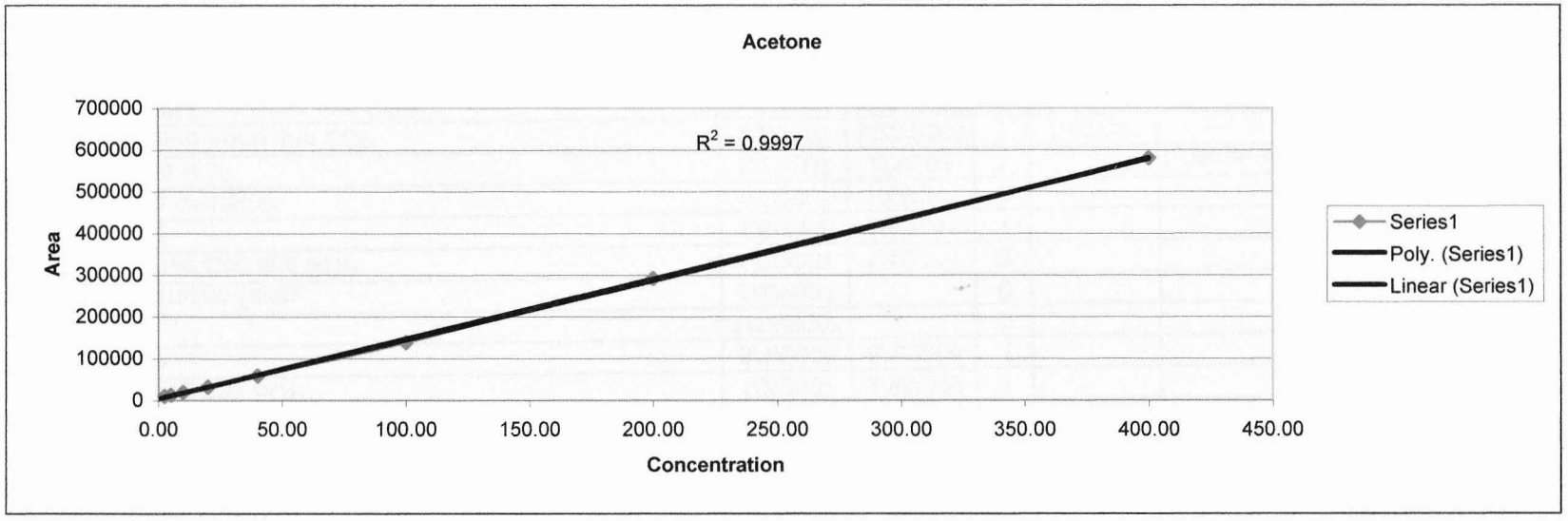


Table QC-8260 8260 Quality Control Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

VOCs Method 8260	Acetone				Carbon Disulfide				Benzene			
Standard	Known	Measured	Recovery	% Diff	Known	Measured	Recovery	%Diff	Known	Measured	Recovery	%Diff
	Conc	Conc	Range	Max	RRF	RRF	Range	Max	RRF	RRF	Range	Max
ICV	40.00	38.60856	24-56	*40	1.2688	1.23012	0.76-1.776	40	1.7625	1.63627	1.06-2.47	40
CCC	40.00	38.73623	24-56	40	1.2688	1.21916	0.76-1.776	40	1.7625	1.66664	1.06-2.47	40
ICB	ND	ND	<10		ND	ND	<1/2RL		ND	ND	<1/2RL	
CCB	ND	ND	<1/2RL		ND	ND	<1/2RL		ND	ND	<1/2RL	
	Known	Measured	Recovery	RPD	Known	Measured	Recovery	RPD	Known	Measured	Recovery	RPD
	Conc	Conc	Range	<20	Conc	Conc	Range	<20	Conc	Conc	Range	<20
LCS	40.00	40.2	20-60		40	41.9	25.6-49.2		40	40.3	30-50.4	
Method Blank	ND	3.8	<10		ND	ND	<1/2RL		ND	ND	<1/2RL	
MS	40.00	35	20-60	32.00	40.00	39.6	25.6-49.2	7.70	40.00	38.2	30-50.4	9.80
MSD	40.00	80*	20-60		40.00	42.7	25.6-49.2		40.00	42.1	30-50.4	

* Biased High no affect on non-detect data or data below the Reporting Limit

Table CALVER-8270 8270 Calibration Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary.
This has been proven in the past by the data validator.
June 6, 2011 cal date

SVOCs Method 8270	Acenaphthene		bis(2-Ethylhexyl) phthalate		2,4-Dimethylphenol		Hexachlorobenzene		Nitrobenzene		Phenol	
Standard	Known	Measured	Known	Measured	Known	Measured	Known	Measured	Peak	Calculated	Peak	Calculated
	Conc	CF	Conc	CF	Conc	CF	Conc	CF	Area	CF	Area	CF
S1	1.00	1.32488	1.00	1.03632	1.00	0.34193	1.00	0.80877	22388	0.40175	22388	2.28874
S2	5.00	1.26564	5.00	0.83547	2.50	0.35128	2.50	0.6716	50705	0.37137	50705	1.9726
S3	10.00	1.23613	10.00	0.83524	5.00	0.34059	5.00	0.66053	106063	0.37655	106063	2.06083
S4	20.00	1.2864	20.00	0.82335	10.00	0.36556	10.00	0.68721	222626	0.37264	222626	2.07634
S5	50.00	1.25044	50.00	0.8771	20.00	0.35574	20.00	0.69681	460930	0.37701	460930	2.0775
S6	80.00	1.24496	80.00	0.908	40.00	0.35566	40.00	0.69662	1000759	0.37099	1000759	2.08455
S7	120.00	1.25873	120.00	0.90942	100.00	0.36413	100.00	0.70336	2550069	0.38297	2550069	2.11519
Sb	160.00	1.20367	160.00	0.92409	200.00	0.35729	200.00	0.69763	5762841	0.37067	5762841	2.07903
Average RE-CF		1.2588563		0.8936238		0.3540225		0.7028163		0.3779938		2.0943475
Average LAB-CF		1.25886		0.89362		0.35402		0.70282		0.37799		2.09435
%RSD	2.847	2.847%	7.77	7.770%	2.584	2.584%	6.439	6.439%	2.77	2.770%	4.237	4.237%

Table QC-8270 8270 Quality Control Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

SVOCs Method 8270	Acenaphthene				bis(2-Ethylhexyl) phthalate				2,4-Dimethylphenol			
Standard	Known	Measured	Recovery	% Diff	Known	Measured	Recovery	%Diff	Known	Measured	Recovery	%Diff
	Conc	Conc	Range	Max	RRF	RRF	Range	Max	RRF	RRF	Range	Max
ICV	1.23688	1.25886	0.64-1.91	50	0.88979	0.89362	0.46-1.37	50	0.37755	0.35402	0.18-0.54	50
CCC	1.27142	1.25886	0.64-1.91	50	0.91265	0.89362	0.46-1.37	50	0.36229	0.35402	0.18-0.54	50
ICB	ND	ND	<1/2RL		ND	ND	<1/2RL		ND	ND	<1/2RL	
CCB	ND	ND	<1/2RL		ND	ND	<1/2RL		ND	ND	<1/2RL	
	Known	Measured	Recovery	RPD	Known	Measured	Recovery	RPD	Known	Measured	Recovery	RPD
	Conc	Conc	Range	<20	Conc	Conc	Range	<20	Conc	Conc	Range	<20
Method Blank	ND	ND	<1/2RL		ND	ND	<1/2RL		ND	ND	<1/2RL	
LCS	3.33	2.79	1-4.5		3.33	2.93	1.13-4.96		3.33	2.54	1.1-3.96	
MS	3.34	2.37	1-4.5	6.60	3.34	2.48	1.13-4.96	8.10	3.34	2.14	1.1-3.96	2.40
MSD	3.37	2.53	1-4.5		3.37	2.7	1.13-4.96		3.37	2.19	1.1-3.96	

* Biased High no affect on non-detect data or data below the Reporting Limit

SVOCs Method 8270	Hexachlorobenzene				Nitrobenzene				Phenol			
Standard	Known	Measured	Recovery	% Diff	Known	Measured	Recovery	%Diff	Known	Measured	Recovery	%Diff
	Conc	Conc	Range	Max	RRF	RRF	Range	Max	RRF	RRF	Range	Max
ICV	0.26988	0.2552	0.13-0.39	50	0.38925	0.37799	0.19-0.57	50	2.04921	2.09977	1.64-2.46	20
CCC	0.26149	0.2552	0.13-0.39	50	0.38274	0.37799	0.19-0.57	50	2.04921	2.09435	1.64-2.46	20
ICB	ND	ND	<1/2RL		ND	ND	<1/2RL		ND	ND	<1/2RL	
CCB	ND	ND	<1/2RL		ND	ND	<1/2RL		ND	ND	<1/2RL	
	Known	Measured	Recovery	RPD	Known	Measured	Recovery	RPD	Known	Measured	Recovery	RPD
	Conc	Conc	Range	<20	Conc	Conc	Range	<20	Conc	Conc	Range	<20
Method Blank	ND	ND	<1/2RL		ND	ND	<1/2RL		ND	ND	<1/2RL	
LCS	3.33	2.94	1.07-4.23		3.33	2.5	1-3.83		3.33	2.3	1-4	
MS	3.34	2.45	1.07-4.23	5.30	3.34	2.02	1-3.83	5.70	3.34	2.44	1-4	5.90
MSD	3.37	2.58	1.07-4.23		3.37	2.14	1-3.83		3.37	42.1	1-4	

Table CALVER-8081A 8081A Calibration Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

April 6, 2011 cal date Water

Pesticieds Method 8081A	Heptachlor		4,4'-DDT	
Standard	Known	Measured	Known	Measured
	Conc	CF	Conc	CF
S1	1.25		1.25	865565
S2	2.50	1214804	2.50	771508
S3	5.00	1196509	5.00	820535
S4	10.00	1195439	10.00	784719
S5	20.00	1084669	20.00	791838
S6	50.00	1105740	50.00	755519
S7	100.00	1139231	100.00	754613
S8	250.00	1062684	250.00	754303
Average RE-CF		1142725.1		787325
Average LAB-CF		1142725		787325
%RSD	5.302	5.302%	4.960	4.960%

Table QC-8081A 8081A Quality Control Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

Pesticieds Method 8081A	Heptchlor				4,4'-DDT			
	Known	Measured	Recovery	RPD	Known	Measured	Recovery	RPD
	Conc	Conc	Range	<20	Conc	Conc	Range	<20
Method Blank	ND	ND	<1/2RL		ND	ND	<1/2RL	
LCS	8.33	8.22	6.66-10		16.7	14	13.34-20	
MS	8.39	8.54	6.66-10	5.60	16.80	13.5	13.34-20	7.10
MSD	8.48	9.03	6.66-10		17.00	14.5	13.34-20	

Table CALVER-8082 8082 Calibration Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary.
This has been proven in the past by the data validator.
April 6, 2011 cal date Water

PCBs Method 8082	Arochlor 1016	Peak 1	Peak 2	Peak 3	Peak 4	Peak 5
Standard	Known	Measured	Measured	Measured	Measured	Measured
	Conc	CF	CF	CF	CF	CF
S1	50.00	1160050	560108	847634	618119	884475
S2	100.00	1141187	561399	846733	645262	861814
S3	200.00	1007040	493808	754941	566157	768861
S4	300.00	1013958	497593	763484	582891	771201
S5	500.00	958438	467781	732203	605993	737817
S6	1000.00	946501	468290	741932	581969	742805
S7	2000.00	888210	444014	707006	532752	704229
S8	20.00	1161900	564514	831558	635583	860307
Average RE-CF		1034660.5	507188.38	778186.38	596090.75	791438.63
Average LAB-CF		1034661	787325	778186	596091	791439
%RSD		10.299%	9.530%	7.142%	6.291%	8.559%
Lab %RSD		10.299	9.530	7.142	6.291	8.559

Table QC-8081A 8081A Quality Control Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary.
This has been proven in the past by the data validator.

PCBs Method 8082	Arochlor 1016			
	Known	Measured	%	RPD
	Conc	Conc	Recovered	<20
Method Blank	ND	ND	<1/2RL	
LCS	66.70	65	98	
MS	68.30	63.3	93	8.40
MSD	66.60	68.9	103	

Table CALVER-8330 8330 Calibration Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary.
This has been proven in the past by the data validator.
April 6, 2011 cal date Water

Explosives Method 8330	2-Nitrotoluene		Nitroglycerin	Peak 1
Standard	Known Conc	Measured CF	Known Conc	Measured CF
S1	5.00	66	5.00	
S2	10.00	57.5	10.00	
S3	20.00	50.65	20.00	86.400
S4	50.00	50.72	50.00	77.580
S5	100.00	49.81	100.00	78.760
S6	200.00	48.835	200.00	75.490
S7	500.00	46.446	500.00	72.724
S8	1000.00	42.85	1000.00	68.336
Average RE-CF		51.601375		76.548333
Average LAB-CF		51.60138		76.5483
%RSD		13.856%		7.972%
Lab %RSD		13.856		7.972

Table QC-8330 8330 Quality Control Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary.
This has been proven in the past by the data validator.

Explosives Method 8330	2-Nitrotoluene				Nitroglycerin			
	Known Conc	Measured Conc	% Recovered	RPD <25	Known Conc	Measured Conc	% Recovered	RPD <25
Method Blank	ND	ND	<1/2RL		ND	ND	<1/2RL	
LCS	1.00	0.939	94		5.00	4.84	97	
MS	0.952	0.916	96	0.00	4.76	4.59	96	2.00
MSD	0.990	0.955	96		4.95	4.83	98	

Table CALVER-6860 6860 Calibration Check Table 10% of Compounds Reported Soil

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary.
This has been proven in the past by the data validator.
April 6, 2011 cal date Water

Prechlorate Method 6860	Perchlorate		Nitroglycerin	Peak 1
Standard	Known	Measured	Known	Measured
	Conc	CF	Conc	CF
S1	5.00	66	5.00	
S2	10.00	57.5	10.00	
S3	20.00	50.65	20.00	86.400
S4	50.00	50.72	50.00	77.580
S5	100.00	49.81	100.00	78.760
S6	200.00	48.835	200.00	75.490
S7	500.00	46.446	500.00	72.724
S8	1000.00	42.85	1000.00	68.336
Average RE-CF		51.601375		76.548333
Average LAB-CF		51.60138		76.5483
%RSD		13.856%		7.972%
Lab %RSD		13.856		7.972

Table QC-6860 6860 Quality Control Check Table 10% of Compounds Reported Soil

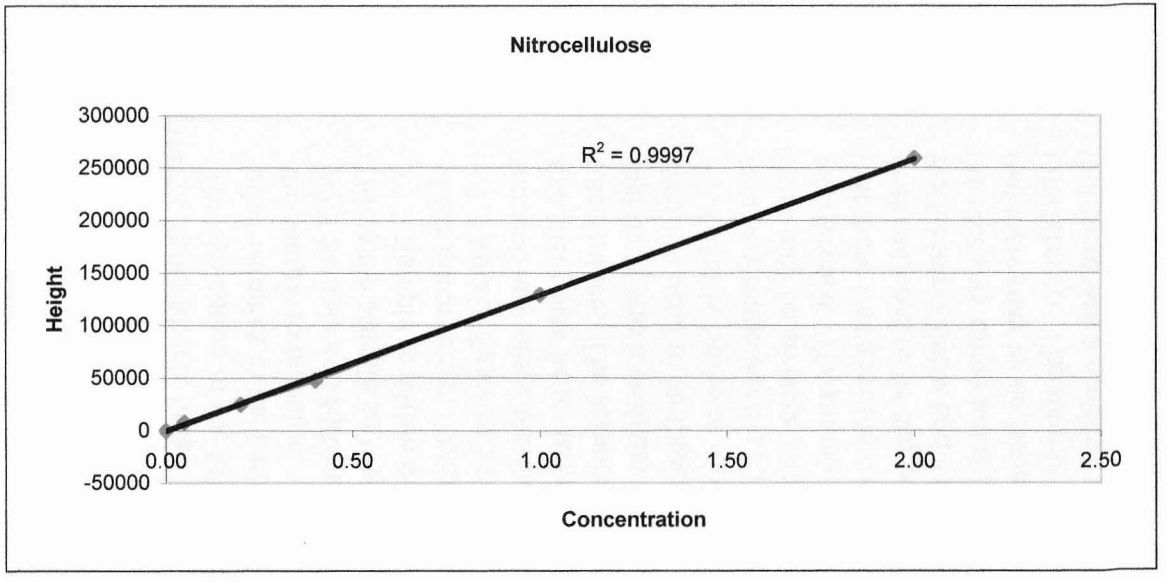
This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary.
This has been proven in the past by the data validator.

Prechlorate Method 6860	Perchlorate				
	Known	Measured	%	Recovery	RPD
	Conc	Conc	Recovered	Range	<25
Method Blank	ND	ND	<1/2RL	70-130	
LCS	0.481	0.536	111		
Interference Check	0.498	0.59	119		
MS	0.486	0.598	123	80-120	5.00
MSD	0.499	0.63	126		

Table Gen Chem-1 Nitrocellulose Calibration Check

Soil

Nitrocellulose Method 353.2	Concentration	
Standard	Known	Measured
S1	0.00	-41
S2	0.05	7909
S3	0.20	25128
S4	0.40	47878
S5	1.00	129162
S6	2.00	259069



Mercury Sample Calculation Check

Laboratory Sample ID: G1F030473-4
Sample Counts 1839
1839
0.64 Recalculated sample Concentration
0.64 Reported value

Table QC-353.2 353.2 Quality Control Check Table 10% of Compounds Reported

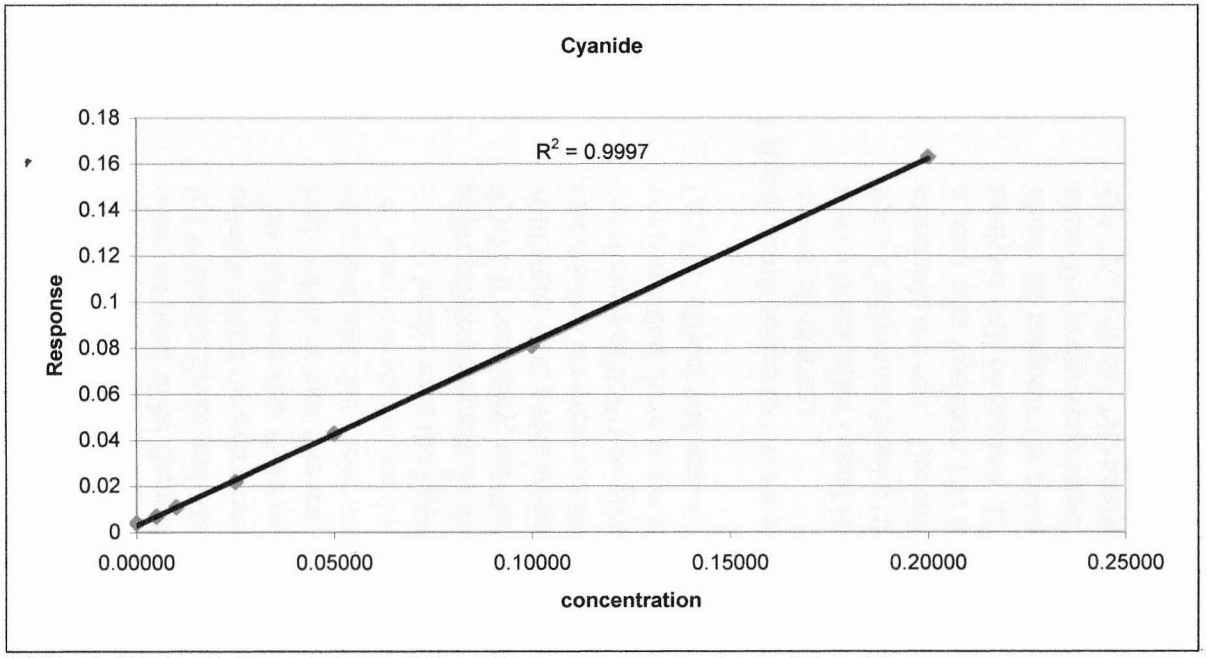
This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

Nitrocellulose Method 353.2					
	Known	Measured	%	Recovery	RPD
	Conc	Conc	Recovered	Range	<25
Method Blank	ND	ND	<1/2RL	50-150	
ICV	1.000	0.952	95.2		
CCV	1.00	1.028	102.80		
LCS	50.700	22.9	45.20%		
MS	50.700	17.9	35.3	50-150	29.59
MSD	50.000	13.1	26.2		

Table Gen Chem-2 Cyanide 9012A Calibration Check

Soil

Cyanide Method 9012A	Concentration	
Standard	Known	Measured
S1	0.00000	0.004
S2	0.005	0.007
S3	0.010	0.011
S4	0.025	0.022
S5	0.050	0.043
S6	0.100	0.081
S7	0.200	0.163



Mercury Sample Calculation Check

Laboratory Sample ID: G1F030473-4
Sample Counts 1839
1839
0.64 Recalculated sample Concentration
0.64 Reported value

Table QC-1 Cyanide 9012A Quality Control Check Table 10% of Compounds Reported

This table recalculates 10% of the reported compounds. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

Cyanide Method 9012A					
	Known	Measured	%	Recovery	RPD
	Conc	Conc	Recovered	Range	<25
Method Blank	ND	ND	<1/2RL	50-150	
ICV	0.100	0.952	95.2		
CCV	1.00	0.09038	90.38		
LCS	19.600	22	112.00%		
MS	2.110	2.26	98*	50-150	13.00
MSD	2.110	1.98	84*		

*The result is minus the sample concentration

Table 6010B Metals-1 6010B Metals Check Table 10% of Elements Reported

This table recalculates 10% of the reported elements. 100% recalculation is not necessary as the computer generated data and these calculation do not vary. This has been proven in the past by the data validator.

Metals Method 6010B	Calcium Concentration		Cobalt Concentration		Lead Concentration	
Standard	Known	Measured	Known	Measured	Known	Measured
S0	0	0.0020953	0	0	0	0
S1	4	3.96	3.622	3.622	0.12454	0.12454
S2	20	19.191				
Recal Correl Coef		0.9999	1.00000		1.00000	
Lab Correl Coef		1.000	1		1	

Calcium Method 6010B					
	Known	Measured	%	Recovery	RPD
	Conc	Conc	Recovered	Range	<25
Method Blank	ND	ND	<1/2RL	90-110%	
ICB	0	0			
ICV	10000	10354	104%	90-110%	
CCB	0	0			
CCV	25000	25991	104%	90-110%	
ICSA&B				80-120%	
LCS	1000	940	94.00%	80-120%	
MS	5120	6396	125%	75-125%	
MSD	5070	4426	87%	75-125%	>25

Cobalt Method 6010B					
	Known	Measured	%	Recovery	RPD
	Conc	Conc	Recovered	Range	<25
Method Bla	ND	ND	<1/2RL	90-110%	
ICB	0	0			
ICV	1000	1046.7	104.70%	90-110%	
CCB	0	0			
CCV	2500	2499.8	100%	90-110%	
ICSA&B	500	485.18	97%	80-120%	
LCS	50	46.6	93%	80-120%	
MS	51.2	45.5	89%	75-125%	2%
MSD	50.7	43.9	87%	75-125%	

Lead Method 6010B					
	Known	Measured	%	Recovery	RPD
	Conc	Conc	Recovered	Range	<25
Method Blank	ND	ND	<1/2RL	90-110%	
ICB	0	0			
ICV	250	262.92	105%	90-110%	
CCB	0	0			
CCV	500	495.13	99%	90-110%	
ICSA&B	50	55.51	111%	80-120%	
LCS	50	50.4	101%	80-120%	
MS	51.2	34.7	68%	75-125%	
MSD	50.7	50.5	100%	75-125%	>25

Appendix H

Anomaly Cluster Photo Log

Picture showing propellant can and top in cluster area 1 (MI Sample Area 3).

Appendix H – Anomaly Cluster Photo Log

Picture showing propellant can and tops present in cluster area 2.

Picture showing propellant cans and tops present in cluster area 3 (MI Sample Area 2).

Visible propellant can and tops in cluster area 4.

Picture showing propellant can tops present in cluster area 5 (MI Sample Area 1).

Individual propellant can located outside the cluster areas along rail bed near the center of the site.

Individual propellant can debris items visible on surface within the southeastern portion of the site.

Appendix I

Cumulative Signed Documentation/Correspondence

PIKA
INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

Fwd: Prelim Draft Investigation Report for CC-RVAAP-80 Propellant Can Top AOC (UNCLASSIFIED)

1 message

Brian Stockwell <bstockwell@pikainc.com> **Mon, Aug 1, 2011 at 11:09 AM**
To: Sue Boles <sboles@pikainc.com>, Shahram Taherinia <staherinia@pikainc.com>

FYI and archive

---------- Forwarded message ----------
From: **Tait, Kathryn S Ms CIV NG OHARNG** <kathryn.s.tait@us.army.mil>
Date: Mon, Aug 1, 2011 at 11:08 AM
Subject: Prelim Draft Investigation Report for CC-RVAAP-80 Propellant Can Top AOC (UNCLASSIFIED)
To: Brian Stockwell <bstockwell@pikainc.com>
Cc: Jay.N.Trumble@usace.army.mil, bguthrie04@comcast.net, "Nichter, Mark W LRL" <Mark.W.Nichter@usace.army.mil>

Classification: UNCLASSIFIED
Caveats: FOUO

Brian:
I have reviewed and above referenced report and do not have any comments.
Good job on the report.

Katie Tait
Environmental Specialist 2
Ohio Army National Guard
(614)336-6136
kathryn.s.tait@us.army.mil

Classification: UNCLASSIFIED
Caveats: FOUO

--
Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
Office - 330-358-7135
Cell - 330-352-6955

PIKA
INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

Fwd: FW: Formatted Document (Mohr) - RVAAP - Group 2 Propellant Can Tops AOC (UNCLASSIFIED)

Brian Stockwell <bstockwell@pikainc.com> **Thu, Oct 27, 2011 at 11:10 AM**
To: Sue Boles <sboles@pikainc.com>

fyi

---------- Forwarded message ----------
From: **Trumble, Jay N LRL** <Jay.N.Trumble@usace.army.mil>
Date: Thu, Oct 27, 2011 at 10:54 AM
Subject: FW: Formatted Document (Mohr) - RVAAP - Group 2 Propellant Can Tops AOC (UNCLASSIFIED)
To: Brian Stockwell <bstockwell@pikainc.com>

Classification: UNCLASSIFIED
Caveats: NONE

Brian,

I just saw something and asked my chemist a question. She is going to look at the disk, but if we do not have the raw data, expect a request for it.

I was starting to put together a brief history to get an Army conversation started on her comment #13. Check on it, but it looks like the average perchlorate in soil is around 0.1 parts per trillion. 1/10,000 of a part per billion.

It looks like this might be off by three zeros. The 2007 hoped for detection (or reporting) limit was 2.0 ppb.

Thank you,
Jay Trumble
Project Engineer, Environmental Engineering
Engineering Division, Louisville District
office: 502-315-6349
fax: 502-315-6309
jay.n.trumble@usace.army.mil

-----Original Message-----
From: Schillo, Kathy [mailto:Kathy.Schillo@epa.state.oh.us]
Sent: Monday, October 24, 2011 3:03 PM
To: Burke, Justin; Eberle, Mike; Fisher, Todd; Beckham, Glen LRL; Trumble, Jay N LRL; 'william.meade1@us.army.mil'; 'kathryn.s.tait@us.army.mil'; 'Kim.Harriz@us.army.mil'; 'christy.esler@us.army.mil'; 'bstockwell@pikainc.com'; 'sboles@pikainc.com'; 'mark.c.patterson@us.army.mil'
Cc: Mohr, Eileen
Subject: Formatted Document (Mohr) - RVAAP - Group 2 Propellant Can Tops AOC

For your records, attached is Eileen Mohr's letter and enclosure to Mr. Mark Patterson with RVAAP, regarding: RAVENNA ARMY AMMUNITION PLANT, GROUP 2 PROPELLANT CAN TOPS AOC, PORTAGE/TRUMBULL COUNTIES, OHIO EPA ID # 267000859160. If you have any questions, please contact Eileen directly. Thank you.

Classification: UNCLASSIFIED
Caveats: NONE

--
Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
Office - 330-358-7135
Cell - 330-352-6955

PIKA
INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

RVAAP Group 2 response to comment

1 message

Brian Stockwell <bstockwell@pikainc.com> **Wed, Nov 2, 2011 at 1:41 PM**
To: Eileen Mohr <eileen.mohr@epa.state.oh.us>
Cc: Eric S LRL Cheng <Eric.S.Cheng@usace.army.mil>, "Esler, Christy L Ms ARMY GUEST USA OSA USA" <christy.esler@us.army.mil>, "Tait, Kathryn S CIV NGOH" <kathryn.s.tait@us.army.mil>, "Trumble, Jay N LRL" <Jay.N.Trumble@usace.army.mil>, "Patterson, Mark C Mr CIV USA OSA" <mark.c.patterson@us.army.mil>, Sue Boles <sboles@pikainc.com>, Shahram Taherinia <staherinia@pikainc.com>, Shahrukh Kanga <skanga@pikainc.com>

Hi Eileen - attached please find the response to comments for the *Draft Investigation Report for the Compliance Restoration site-CC-RVAAP-80-Group 2 Propellant Can Tops and Other Environemtal Services.* If you have any questions or require any clarification, please let me know.

--
Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
Office - 330-358-7135
Cell - 330-352-6955

DraftGroup2Corrbas11-2-11.doc
87K

DOCUMENT: **Draft Investigation Report for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services**
REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**
DATE: **October 24, 2011**

Cmt #	Pg #/ Line #	Comment	Recommendation/ Requirement	Response
1	7/29	Text change.	Change text to read: "The following tasks were..." (The text already indicated that there was one primary objective.)	The text on page 7, line 29 will be changed to read "*The following tasks were achieved during the investigation:*"
2	8/18	Move text.	After the existing text, add: The Camp Ravenna perimeter fence encloses both installations. (The text is being moved from pg. 10/16-19.)	The text on page 10, lines 16-19 which reads "*The Camp Ravenna perimeter fence encloses both installations" will be moved to follow the sentence on page 8, line 18.*"
3	10/1	Text change.	Change to: "Demilitarization of various other...."	The noted text on page 10, line 1 will be changed to read "*Demilitarization of various other munitions was conducted from October 1982 through 1992.*"
4	10/11-17	Text deletion.	Delete this paragraph, as it is basically a duplication of information found on page 8.	The noted text on page 10, line 11-17 will be deleted.
5	11/23	Text change.	Change to: "A map showing...."	The text on page 10, line 23 will be changed to read "*A map showing the location of the Building DB-802 within LL2 is presented in Appendix B, Figure 4.*"
6	18/6-7	Text change.	Change text to read: "...activities, 100-foot by 100-foot grids were surveyed and marked across the site...."	The noted sentence on page 18, will be changed to read "*Prior to initiating the geophysical activities, 100-foot by 100-foot grids were*

				surveyed and marked across the site to facilitate the investigation."
7	19/1-2	Clarification requested.	Clarify whether or not the assertion that there was/is no disturbance of the sub-surface lithology is based upon the GPR or some other observation. Add to the text.	To clarify, the noted text on page 19, lines 1-2 will be revised to read *"Additionally, based upon the GPR data results there were no signs of disturbance within the subsurface lithology (i.e., signs of excavation and dumping)."*
8	19/24	Text change.	Revise text to read: "... representatives from the Ohio EPA to evaluate..." (The assumption would be that PIKA would be present.)	The noted text on page 19, line 24 will be revised to read *"Prior to collecting the sample, a site walk was conducted on 25 May 2011 with representatives from the Ohio EPA to evaluate each of the anomaly cluster areas for selecting the three (3) MI sample areas."*
9	21/17	Text change.	Change to: "...above the RSL and/or RVAAP- specific Surface Soil..."	The noted text on page 21, line 17 will be changed to read *"The RVAAP full suite sample (MI sample Area 2, Sample PCTss-002M-0001) did show detectable concentrations for five (5) metal analytes (arsenic, lead, mercury, vanadium, zinc) that are slightly above the RSL and/or RVAAP-specific Surface Soil Background Criteria."*

10	21/29-32	Text change.	Revise to read: "... each of the MI samples were sent to the laboratory. Subsequent to lab analyses, excess soils were disposed of by the laboratory. As such, no IDW was generated that required disposal by PIKA."	The noted text on page 21, lines 29-32 will be revised to read "*Additionally, all the soils generated from the 30 aliquots at each of the MI samples were sent to the laboratory. Subsequent to lab analyses, excess soils were disposed of by the laboratory. As such, no IDW was generated that required disposal by PIKA.*
11	25/16	Text change.	Change to: "...above the RSL and/or RVAAP- specific Surface Soil..."	The noted text on page 25, line 16 will be revised to read "T*he RVAAP full suite sample (MI sample Area 2, Sample PCTss-002M-0001) did show detectable concentrations for five (5) metal analytes (arsenic, lead, mercury, vanadium, zinc) that are slightly above the RSL and/or RVAAP-specific Surface Soil Background Criteria.*"
12	25/20	Text change.	Change to: "...estimated, i.e., below the reporting limit." (The screening levels have nothing to do with the flagging.)	The noted text on page 25, line 20 will be changed to read "*Both perchlorate and propellants were reported at MI Sample Area 1 (sample PCTss-001M-0001-SO); including the associated duplicate sample, and also at MI Sample Area 3 (sample PCTss-003M-0001-SO), however each result was*

				flagged as estimated, i.e., below the reporting limit."
13	25	Notes to Army.	1. Subsurface samples need to be taken. 2. The other 2 clusters need to have sampling conducted. 3. What are the plans for investigating the individual anomalies? 4. What are the plans for AOC clean-up?	Acknowledged.
14	App A	Point of information.	Did not review the SOW.	Acknowledged.
15	App B/ Fig 1	Map change.	Need to add AOC boundaries to the key, or remove from the lower map.	Appendix B, Figure 1 will be revised to include the AOC boundaries in the key.
16	App B/ Fig 2	Map changes.	a. Need to add AOC boundaries to the key, or remove from the map. b. Need to add igloos (etc.) to the key. c. There are a number of rectangular areas that appear on this map. Unclear as to what these are. If these are artifacts, please remove. d. Check all roads (ex. there are 2 Demolition Roads at the bottom of the map on the SW.)	Appendix B, Figure 2 will be revised as noted in the listed changes a through d.

17	App B/ Fig 3	Map clarification.	Clarify whether or not any of the depicted streams/tribs should be intermittent.	Appendix B, Figure 3 will be revised to depict which streams/tributaries are intermittent and a new symbol for intermittent streams will be added to the key.
18	App B/ Fig 4	Map change.	Add AOC boundary to the legend.	The AOC boundary will be added to Appendix B, Figure 4.
19	App B/ Fig 5	Map changes.	a. Add the source of this information to the figure. b. The key is not legible, please re-do.	Appendix B, Figure 5 will be revised as noted in the listed changes a and b.
20	App B/ Fig 6	Map changes.	a. Add a key. b. The anomaly designations are not legible. Please re-do so, that the figure can be read.	Appendix B, Figure 6 will be revised as noted in the listed changes a and b.
21	App B/ Fig 7	Map changes.	a. Add a scale. b. Add a key.	Appendix B, Figure 7 will be revised as noted in the listed changes a and b.
22	App B/ Fig 8	Map change.	In the small "Site Location" box, the site is marked as a small dot on the SE side of a larger red area. It is unclear as to what the red area depicts. Please clarify.	The large red area is the fenced in area comprised of the RVAAP Group 2, Area 1, and Area 2.
23	App D/ Pg 13/ Fig 1	Map changes.	a. Add a scale. b. Add a key. c. Add a north arrow.	Figure 1 on page 13 of Appendix D will be revised as noted in the listed changes a through c.
24	App D/ Pg 14/ Fig 2	Map changes.	a. The map is very difficult to read. Please make this more legible. b. Add a scale. c. Add a key.	Figure 2 on page 14 of Appendix D will be revised as noted in the listed changes a through c.
25	App D/	Map change.	a. Add a scale.	A scale will be added to Figure 3

	Pg 15/ Fig 3			on page 15 of Appendix D.
26	App D/ Pg 16/ Fig 4	The map depicts the GPR processed data.	However, the text does not have a corresponding good explanation of this figure or for the GPR data as a whole. This should be added to the text.	For explanation, additional text will be added to Figure 4, Appendix D to point out that the GPR data images are showing consistent soil lithology (i.e.,. undisturbed) at each of the cluster areas.
27	App D/ Pg 17/ Fig 5	Map changes.	a. Add a scale. b. Add a key. c. Add a north arrow.	Figure 5 on page 17 of Appendix D will be revised as noted in the listed changes a through c.
28	App D/ Pg 18	Text clarification.	What is meant by "project size anomalies?"	For clarification the noted text on page 18 of Appendix D will be revised to read "
29	App D/ Pg 18	The text indicates that all the anomalies were surveyed and the GPS coordinates are on an attached spreadsheet.	No spreadsheet was included. Please include.	The coordinates have been added to Figure 2. For clarification the noted text will be changed to read "*All anomalies have been surveyed and the coordinates are included on Figure 2.*"
30	App D/ Pg 19	Disagree with the statement that the goal of the project was to identify the areas of the Propellant Can Tops.	The goals and objectives were as stated on pages 7 and 8 of the main text. Revise accordingly.	The noted text on page 19 of Appendix D will be revised to read "*The data collection achieved the overall defined objectives for the project by delineating the boundaries of the propellant can top areas in order confirm the presence or absence of releases of propellants and/or other MC to the surface soils at the Group 2 Propellant Cans Tops site.*"

31	App E	No chain of custody form is included in the document.	Add the COC to the revised document.	The missing COC noted in Appendix E will be included in the revised document.
32	App E	Revision of the tables needed.	The tables should have the RLs listed, not just that the analytical results were <RL. Please revise.	The summary tables in Appendix E will be revised to list the RLs as noted.
33	App E	Addition of footnotes.	Add to the revised tables what is meant by ER and SO.	The following information will be added to the footnotes for the tables in Appendix E: "*ER = Equipment Rinse* *SO = Soil*"
34	App G	a. pg 3/2nd para. b. pg 5/2nd sentence. c. pg 6/section 2.2 d. pg 8/section 2.4 e. pg 10/section 2.5 f. pg 10/section 2.5.4 g. pg 11/section 2.6 h. pg 12/section 2.7 i. pg 13/section 2.8 j. pg 14/section 2.9 k. pg 15/section 2.10 l. pg 16/section 2.11 m. pg 23/section 2.18.4 n. pg 26/section 2.23 o. pg 26/section 2.23.5 p. pg 27/section 2.23.5 q. pg 27/section 3.3.3	a. The text indicates that the samples were picked up by North Canton personnel, then went to Denver and Sacramento, and then back to North Canton. As this doesn't make a lot of sense, please clarify. b. Please clarify the sentence that begins: "Ten Percent..." c. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. d. The text indicates that the validation reviewed only those compounds of concern. How were these determined	a. Based upon the chain of custodies, the samples were picked up by North Canton, There is no further evidence that as to how the samples were distributed by the laboratory narrative. I can only state what labs received what. Based upon the reports generated, North Canton picked up the samples on 5/26/11. They state in their general chemistry report for Nitrocellulose that the samples were received 6/3/11. Based upon that information, what you said in point a may be true. They did send the samples to Sacramento and then back to North Canton.

		r. pg 28/section 3.4/top of the page s. pg 8 of the App B checklists t. pg 10 of the App B checklists	and by whom? Explain. All compounds analyzed within a particular method are of concern. e. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. f. Because something is not investigated further the recovery issue is not significant, and the data is valid? Please explain this reasoning. g. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. h. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. i. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern.	b. In a level IV review only 10% of the data is completely reviewed. The remaining data is verified if an issue is found in the initial review. Common comment for c, d, e, f, g, h, i, j, k, l, n. That is a boiler plate comment. In some reviews certain compounds are of concern and others are not. For example PAHs are run by 8270 and that was the only part of the list that was of concern. Additionally, the method list contains numbers of compounds or elements that are not part of the standard reporting list but are included in the raw data. Those compounds or elements that are analyzed but not reported are not analytes of concern and are not reviewed. It can be removed but is typically required. f. The laboratory uses that statement as a means to terminate their review. If nothing is done to further verify the supposed issue then there is no confirmation that an issue exists or that the problem may have been laboratory error

			j. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of ~~con~~cern. k. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. l. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. m. The matrix spike passed and the matrix spike duplicate and RPD failed. The validator indicated that the MS/MSD did not impact the sample data based upon professional judgment. Can additional explanation be given? (Trying to understand the reasoning, not questioning the validator's professional judgment.) n. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All	and not necessarily a true matrix problem. Therefore if the laboratory does not further investigate, then the issue cannot be verified. MS/MSD is more of a validation of digestion than true matrix interference. A true matrix interference would be resolved by use of Method of Standard Additions as required for CLP work. Additionally, the MS/MSD only affects the sample tested and does not affect the entire batch. m. This comment is in regard to the Lead MS/MSD recoveries. The issue with lead in many of these munitions and firing ranges is that the lead source above normal soil lead levels is often metallic. Metallic Lead does not go through the mixing, grinding, and sieving process well because it is malleable. Often it does not break up into a finer particle but into slivers or pieces that get through the process and are still not uniformly distributed throughout the soil. Most soil lead is a compound and not the lead metal by nature. Based upon my experience in

			compounds analyzed within a particular method are of concern. o. The text in this section indicates that sample homogeneity may have been an issue. It is unclear as to how this could have been an issue, given that the samples were to be dried, sieved, and ground. Please explain further. p. The text indicates that antimony is not a common element in soil. Please provide further clarification, sources, etc., for this statement. While it may be a trace element compared to others, it is quite frequently found in soil samples obtained from RVAAP. q. The text references a holding time issue with the equipment rinsate sample. Provide additional information. r. Change text to read: "... in the proper condition, and all soil analyses were performed within the proper holding time." (Section 3.3.3 indicated that there were holding time issues with the equipment rinsate.) s. The first row/last column indicates that the samples were extracted within the holding time. Yet the comments on pg. 9 state the opposite. Rectify the disconnect. t. The first row/last column indicates that	these types of facilities this is a common problem. At firing ranges it also includes copper as well. o. This comment relates to the MS/MSD comment. It comes back to the grinding part. Lead does not like to grind up so the metallic lead will not distribute evenly throughout the sample. p. This comes from experience in the CLP program. Antimony in water digests well and recoveries are often very good. Antimony in soil is a different situation. Since I have been doing this (1987), Antimony spike recoveries in soil were poor at best. In the CLP program we ignored the spikes because the problem was so common. This is due to using a digestion process that does not work for Antimony in the soil. The digestion for soil is the same as for water. The digestion has to be changed for soil but such modifications are not under the laboratory's control, thus this problem will continue. Basically I can change the value to either

			the samples were extracted within the holding time. Yet, the comments on pg. 11 state the opposite. Rectify the disconnect.	estimated or outright reject it. Though Antimony is found in the soil at that site is it high enough to be an issue or would it suffice to just flag the MS/MSD data and J flag the Antimony data. I can do that. It will happen on every soil taken there. Historically that is the trend. q and r. To clarify, this issue was discussed with the USACE Louisville Chemist who also felt that the holding time issue was not one since the sample was a rinsate and not a real site sample. As such, the text as it reads was agreed upon during review of the pre-draft iteration. s. and t. That can be changed to read as stated by the commenter in item r.

PIKA
INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

RVAAP Group 2 response to comment

Mohr, Eileen <eileen.mohr@epa.state.oh.us> **Fri, Nov 4, 2011 at 2:16 PM**
To: Brian Stockwell <bstockwell@pikainc.com>
Cc: Eric S LRL Cheng <Eric.S.Cheng@usace.army.mil>, "Esler, Christy L Ms ARMY GUEST USA OSA USA" <christy.esler@us.army.mil>, "Tait, Kathryn S CIV NGOH" <kathryn.s.tait@us.army.mil>, "Trumble, Jay N LRL" <Jay.N.Trumble@usace.army.mil>, "Patterson, Mark C Mr CIV USA OSA" <mark.c.patterson@us.army.mil>, Sue Boles <sboles@pikainc.com>, Shahram Taherinia <staherinia@pikainc.com>, Shahrukh Kanga <skanga@pikainc.com>, "Mohr, Eileen" <eileen.mohr@epa.state.oh.us>, "Fisher, Todd" <todd.fisher@epa.state.oh.us>

Hi Brian:

I had a look at the RTCs and have a couple comments:

1. Please complete the response to comment #28.

2. Comment #34 related to the data validation process. Many of the responses to me seemed to present circular arguments and didn't really answer the questions I had: specifically 34 c, d, e,f, g, h, i, j, k, l, n, s, t. Given the fact that additional sampling efforts will be needed at this AOC, I am willing to let the responses to #34 stand, if I can get an email from the USACE chemist indicating that these issues have no impact on the data and the results are valid.

Thanks. Have a great weekend.

Eileen

From: Brian Stockwell [bstockwell@pikainc.com]
Sent: Wednesday, November 02, 2011 1:41 PM
To: Mohr, Eileen
Cc: Eric S LRL Cheng; Esler, Christy L Ms ARMY GUEST USA OSA USA; Tait, Kathryn S CIV NGOH; Trumble, Jay N LRL; Patterson, Mark C Mr CIV USA OSA; Sue Boles; Shahram Taherinia; Shahrukh Kanga
Subject: RVAAP Group 2 response to comment

[Quoted text hidden]

PIKA
INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

RVAAP Group 2 response to comment

Brian Stockwell <bstockwell@pikainc.com> **Fri, Nov 4, 2011 at 3:30 PM**
To: "Mohr, Eileen" <eileen.mohr@epa.state.oh.us>
Cc: Eric S LRL Cheng <Eric.S.Cheng@usace.army.mil>, "Esler, Christy L Ms ARMY GUEST USA OSA USA" <christy.esler@us.army.mil>, "Tait, Kathryn S CIV NGOH" <kathryn.s.tait@us.army.mil>, "Trumble, Jay N LRL" <Jay.N.Trumble@usace.army.mil>, "Patterson, Mark C Mr CIV USA OSA" <mark.c.patterson@us.army.mil>, Sue Boles <sboles@pikainc.com>, Shahram Taherinia <staherinia@pikainc.com>, Shahrukh Kanga <skanga@pikainc.com>, "Fisher, Todd" <todd.fisher@epa.state.oh.us>

got it - thanks Eileen

Brian

[Quoted text hidden]

PIKA INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

Fwd: RVAAP Group 2 response to comment (UNCLASSIFIED)

Brian Stockwell <bstockwell@pikainc.com> **Mon, Nov 7, 2011 at 3:28 PM**
To: Sue Boles <sboles@pikainc.com>, Shahram Taherinia <staherinia@pikainc.com>

fyi

---------- Forwarded message ----------
From: **Trumble, Jay N LRL** <Jay.N.Trumble@usace.army.mil>
Date: Mon, Nov 7, 2011 at 3:18 PM
Subject: RE: RVAAP Group 2 response to comment (UNCLASSIFIED)
To: Brian Stockwell <bstockwell@pikainc.com>

Classification: UNCLASSIFIED
Caveats: NONE

Brian,

Yes.

Jay Trumble
Project Engineer, Environmental Engineering
Engineering Division, Louisville District
office: 502-315-6349
fax: 502-315-6309
jay.n.trumble@usace.army.mil

-----Original Message-----
From: Brian Stockwell [mailto:bstockwell@pikainc.com]
Sent: Monday, November 07, 2011 2:36 PM
To: Trumble, Jay N LRL
Subject: Fwd: RVAAP Group 2 response to comment

Hi Jay - will Kathy be looking at the Data Validation responses per below ? Thanks

---------- Forwarded message ----------
From: Mohr, Eileen <eileen.mohr@epa.state.oh.us>
Date: Fri, Nov 4, 2011 at 2:16 PM
Subject: RE: RVAAP Group 2 response to comment
To: Brian Stockwell <bstockwell@pikainc.com>
Cc: Eric S LRL Cheng <Eric.S.Cheng@usace.army.mil>, "Esler, Christy L Ms ARMY GUEST USA OSA USA" <christy.esler@us.army.mil>, "Tait, Kathryn S CIV NGOH" <kathryn.s.tait@us.army.mil>, "Trumble, Jay N LRL" <Jay.N.Trumble@usace.army.mil>, "Patterson, Mark C Mr CIV USA OSA" <mark.c.patterson@us.army.mil>, Sue Boles <sboles@pikainc.com>, Shahram Taherinia <staherinia@pikainc.com>, Shahrukh Kanga <skanga@pikainc.com>, "Mohr, Eileen" <eileen.mohr@epa.state.oh.us>, "Fisher, Todd" <todd.fisher@epa.state.oh.us>

Hi Brian:

I had a look at the RTCs and have a couple comments:

1. Please complete the response to comment #28.

2. Comment #34 related to the data validation process. Many of the responses to me seemed to present circular arguments and didn't really answer the questions I had: specifically 34 c, d, e,f, g, h, i, j, k, l, n, s, t. Given the fact that additional sampling efforts will be needed at this AOC, I am willing to let the responses to #34 stand, if I can get an email from the USACE chemist indicating that these issues have no impact on the data and the results are valid.

Thanks. Have a great weekend.

Eileen

From: Brian Stockwell [bstockwell@pikainc.com]
Sent: Wednesday, November 02, 2011 1:41 PM
To: Mohr, Eileen
Cc: Eric S LRL Cheng; Esler, Christy L Ms ARMY GUEST USA OSA USA; Tait, Kathryn S CIV NGOH; Trumble, Jay N LRL; Patterson, Mark C Mr CIV USA OSA; Sue Boles; Shahram Taherinia; Shahrukh Kanga
Subject: RVAAP Group 2 response to comment

Hi Eileen - attached please find the response to comments for the Draft Investigation Report for the Compliance Restoration site-CC-RVAAP-80-Group 2 Propellant Can Tops and Other Environemtal Services. If you have any questions or require any clarification, please let me know.

--

Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
Office - 330-358-7135
Cell - 330-352-6955

--

Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
Office - 330-358-7135
Cell - 330-352-6955

Classification: UNCLASSIFIED
Caveats: NONE

--
Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
Office - 330-358-7135
Cell - 330-352-6955

PIKA
INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

FW: Ravenna Propellant Can Tops (UNCLASSIFIED)

2 messages

Trumble, Jay N LRL <Jay.N.Trumble@usace.army.mil> **Mon, Jan 23, 2012 at 10:51 AM**
To: Sue Boles <sboles@pikainc.com>
Cc: Brian Stockwell <bstockwell@pikainc.com>, "Krantz, Kathy J LRL" <Kathy.J.Krantz@usace.army.mil>, "Beckham, Glen LRL" <Glen.Beckham@usace.army.mil>

Classification: UNCLASSIFIED
Caveats: NONE

Sue,

Please see below.

Thank you,
Jay Trumble
Project Engineer, Environmental Engineering
Engineering Division, Louisville District
office: 502-315-6349
fax: 502-315-6309
jay.n.trumble@usace.army.mil

-----Original Message-----
From: Mohr, Eileen [mailto:eileen.mohr@epa.state.oh.us]
Sent: Monday, January 23, 2012 8:32 AM
To: Trumble, Jay N LRL
Cc: Beckham, Glen LRL; Krantz, Kathy J LRL; Mohr, Eileen
Subject: RE: Ravenna Propellant Can Tops (UNCLASSIFIED)

That's good. Thanks Jay.

-----Original Message-----
From: Trumble, Jay N LRL [mailto:Jay.N.Trumble@usace.army.mil]
Sent: Thursday, January 19, 2012 4:01 PM
To: Mohr, Eileen
Cc: Beckham, Glen LRL; Krantz, Kathy J LRL
Subject: FW: Ravenna Propellant Can Tops (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Eileen,

Based upon the email you sent to Brian Stockwell on 4 November, Kathy reviewed your comments, the responses, and looked over the report again.

"2. Comment #34 related to the data validation process. Many of the responses to me seemed to present circular arguments and didn't really answer the questions I had: specifically 34 c, d, e,f, g, h, i, j, k, l, n, s, t. Given the fact

that additional sampling efforts will be needed at this AOC, I am willing to let the responses to #34 stand, if I can get an email from the USACE chemist indicating that these issues have no impact on the data and the results are valid."

Kathy had the attached independent data validation report completed for the CC-80 chemistry. The data is useable. This document and the DVR will be added to the Pika report.

Please let me know if I need to do anything else.

Thank you,
Jay Trumble
Project Engineer, Environmental Engineering Engineering Division, Louisville District
office: 502-315-6349
fax: 502-315-6309
jay.n.trumble@usace.army.mil

-----Original Message-----
From: Krantz, Kathy J LRL
Sent: Thursday, January 19, 2012 2:47 PM
To: Trumble, Jay N LRL
Subject: FW: Ravenna Propellant Can Tops (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Here it is Jay.

-----Original Message-----
From: Patti Meeks [mailto:patti.meeks@mecx.net]
Sent: Thursday, January 19, 2012 2:13 PM
To: Kinder, Derek S LRL; Krantz, Kathy J LRL
Cc: elizabeth.wessling@mecx.net
Subject: Ravenna Propellant Can Tops

Derek and Kathy,

Attached please find the Final Data Validation Report for the Ravenna Group 2 Propellant Can Tops May 2011 Sampling Event. Hardcopy reports should be sent out tomorrow via UPS. Please let me know if you have any questions regarding this submission.

Thanks, Patti

patti meeks, phd | environmental chemist

<http://www.mecx.net/> mobile 303.332.5761 | fax 720.535.7555 | office 720.535.5502

12269 east vassar drive | aurora, colorado 80014

patti.meeks@mecx.net <mailto:maria.vasquez@mecx.net>

News <http://www.mecx.net/schedule/?page_id=3> | Events <http://www.mecx.net/schedule/> | LinkedIn <http://www.linkedin.com/companies/mecx-lp?trk=co_search_results&goback=%2Ecps_1269545277958_1> | Map <http://maps.google.com/maps/place?cid=7162194622743883038&q=mecx,+lp&hl=en&cd=1&ei=ZLqsS-q1EoG-Mtneua0F&sll=29.7362,-95.42595&sspn=0.0132,0.0193&ie=UTF8&ll=29.749028,-95.445271&spn=0,0&z=15&iwloc=A> | vCard <http://www.mecx.net/VCARDS/PattiMeeks.zip>

Classification: UNCLASSIFIED
Caveats: NONE

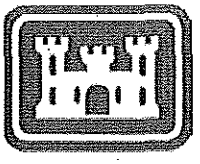
Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Sue Boles <sboles@pikainc.com> **Mon, Jan 23, 2012 at 10:58 AM**
To: "Trumble, Jay N LRL" <Jay.N.Trumble@usace.army.mil>

Thank You Jay.
[Quoted text hidden]
--

Sue Boles
PIKA International Inc
8451 ST RT 5
Ravenna OH 44266
Phone # 330-358-7135
Fax # 330-358-2924
Cell # 281-667-5769
Building a Clean and Secure Future



U.S. Army Corps of Engineers
Louisville District

Ravenna Army Ammunition Plant
Group 2 Propellant Can Tops
May 2011 Sampling
Ravenna, Ohio

Final Data Validation Report
Sample Delivery Groups:
G1F030473

January 2012

Prepared for:
U.S. Army Corps of Engineers
Louisville District
Contract No. W912QR-08-D-0001
Delivery Order 0033

Prepared by:
MEC^X, LP
12269 East Vassar Drive
Aurora, Colorado 80014

CONTRACTOR STATEMENT OF INDEPENDANT TECHNICAL REVIEW

MEC^X, LP (MEC^X) has completed the Data Validation Report for one sample delivery group from the Ravenna Army Ammunition Plant Group 2 Propellant Can Tops, May 2011 Sampling. Notice is hereby given that an independent technical review has been conducted to determine the usability and bias of the analytical data.

Significant concerns and the resolution are as follows:

None

As noted above, all concerns resulting from this independent technical review have been considered.

Elizabeth Wessling
Senior Environmental Chemist
MEC^X Independent Technical Review Team Leader

Patti Meeks, Ph.D.
Senior Environmental Chemist
MEC^X Independent Technical Review Team Member

EXECUTIVE SUMMARY

The overall objective of the project described in this document was to conduct an initial investigation of the Group 2 Propellant Can Tops areas to delineate the boundaries of the propellant can top areas and confirm the presence or absence of releases of propellants and/or other munitions constituents to the surface soils at this area of concern. Data described in this report are comprised of three primary multi-incremental soil samples, one discrete soil sample, one field duplicate sample, one equipment rinsate sample and one trip blank collected by PIKA International, Inc. in May 2011.

This report details the findings of the third party data validation, analysis of field duplicate results, and the determination of data usability performed by MEC^X LP (MEC^X) on the samples described above.

The following analyses were performed by TestAmerica Laboratories, West Sacramento (TA-West Sacramento) located in West Sacramento, California:

- United States Environmental Protection Agency (USEPA) SW-846 Method 6010B for 22 metals on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA SW-846 Method 7470A/7471A for mercury on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA SW-846 Method 8330B for 15 explosives on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA Method 8330B for nitroglycerin and the propellant nitroguanidine on samples PCTss-001M-0001-SO, PCT22-001M-0001-DUP, PCTss-002M-0001-SO, PCTss-002M-0001-ER, and PCTss-003M-0001-SO
- USEPA SW-846 Method 8260B for 33 volatile organic compounds (VOCs) on samples PCT22-002D-0001-SO and TRIP BLANK
- USEPA SW-846 Method 8270C for 64 semivolatile compounds (SVOCs) on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA SW-846 Method 8081 for 21 pesticides on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA SW-846 Method 8082 for 7 polychlorinated biphenyls (PCBs) on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA Method 353.2 for the propellant nitrocellulose on samples PCTss-001M-0001-SO, PCT22-001M-0001-DUP, PCTss-002M-0001-SO, PCTss-002M-0001-ER, and PCTss-003M-0001-SO

TA-West Sacramento subcontracted samples PCTss-002M-0001-SO and PCTss-002M-0001-ER to TA-North Canton, located in North Canton, Ohio, for cyanide analysis by USEPA SW-846 Method 9012A. Samples PCTss-001M-0001-SO, PCT22-001M-0001-DUP, PCTss-002M-0001-SO, PCTss-002M-0001-ER, and PCTss-003M-0001-SO were subcontracted by TA-West

Sacramento to TA-Denver, located in Arvada, Colorado, for perchlorate analysis by USEPA SW-846 Method 6860.

No quality assurance (QA) split samples were required for this field effort.

Specific concerns regarding the data are noted below:

- The laboratory Receipt Checklist noted that sample PTss-001M-0001-DUP was not received. The resolution of this comment was not documented in the data package.
- As noted above, sample PCTss-001M-0001-DUP was not received at the laboratory. Per PIKA direction, the laboratory collected an additional sub-sample of PCTss-001M-001-SO and labeled this volume as PCTss-001M-0001-DUP. This sample is considered a laboratory duplicate and not a valid field duplicate.
- The following reporting limits exceeded the criteria listed in the Facility-Wide Quality Assurance Project Plan (FWQAPP). Unless otherwise noted below, the method detection limits (MDLs) met the criteria, indicating the laboratory's ability to detect these analytes at the concentrations necessary to delineate the site.
    - Antimony selenium, thallium, and silver RLs exceeded the project criteria. The undiluted MDLs for selenium and thallium also exceeded the project criteria
    - Cyanide RL exceeded the project criterion
    - Chloromethane RL exceeded the project criterion
    - A total of 61 SVOC RLs exceeded the project criteria and all polynuclear aromatic hydrocarbon (PAH) RLs exceeded the project criterion
    - PCB-1221 RL exceeded the project criterion
    - Dieldrin, endrin, 4,4'-DDD, endosulfan II, 4,4'-DDT, endrin aldehyde, endrin ketone, and endosulfan sulfate RLs exceeded the project criteria

No data were rejected. Results with MDLs that exceed project criteria may or may not be usable for their intended purposes; it is dependent on the final data user to make this determination on a case-by-case basis. All remaining results are usable for their intended purposes as qualified by MEC^X.

ACRONYMS AND ABBREVIATIONS

ADR	Automated Data Review
°C	Degrees Celsius
CCB	Continuing Calibration Blank
CCC	Calibration Check Compounds
CCV	Continuing Calibration Verification
CT	CT Laboratories
%D	Percent Difference
DoD	Department of Defense
EDD	Electronic Data Deliverable
FWQAPP	Facility-Wide Quality Assurance Project Plan
GC/MS	Gas Chromatography/Mass Spectrometry
ICSA	Interference Check Sample A
ICSAB	Interference Check Sample AB
ICV	Initial Calibration Verification
ICP	Inductively Coupled Plasma
LCG	Louisville Chemistry Guidance
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MEC^X	MEC^X, LP
MRL	Method Reporting Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MDL	Method Detection Limit
PCB	Polychlorinated Biphenyl
PIKA	PIKA International, Inc.
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RL	Reporting Limit
RPD	Relative Percent Difference
RRF	Relative Response Factor
RSD	Relative Standard Deviation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SDG	Sample Delivery Group
SPCC	System Performance Check Compound
SVOC	Semivolatile Organic Compounds
TA	TestAmerica Laboratories
USACE	United State Army Corps of Engineers
USEPA	United State Environmental Protection Agency

TABLE OF CONTENTS

TABLES

APPENDICES

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The overall objective of the project described in this document was to conduct an initial investigation of the Group 2 Propellant Can Tops areas to delineate the boundaries of the propellant can top areas and confirm the presence or absence of releases of propellants and/or other munitions constituents to the surface soils at this area of concern.

Sampling was conducted by PIKA International, Inc. (PIKA) in May 2011. Three primary multi-incremental soil samples, one discrete soil sample, one field duplicate sample, one equipment rinsate sample, and one trip blank were collected.

The following analyses were performed by TestAmerica Laboratories, West Sacramento (TA-West Sacramento) located in West Sacramento, California:

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- USEPA SW-846 Method 8330B for 15 explosives on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
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- USEPA SW-846 Method 8081 for 21 pesticides on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA SW-846 Method 8082 for 7 polychlorinated biphenyls (PCBs) on samples PCTss-002M-0001-SO and PCTss-002M-0001-ER
- USEPA Method 353.2 for the propellant nitrocellulose on samples PCTss-001M-0001-SO, PCT22-001M-0001-DUP, PCTss-002M-0001-SO, PCTss-002M-0001-ER, and PCTss-003M-0001-SO

TA-West Sacramento subcontracted samples PCTss-002M-0001-SO and PCTss-002M-0001-ER to TA-North Canton, located in North Canton, Ohio, for cyanide analysis by USEPA SW-846 Method 9012A. Samples PCTss-001M-0001-SO, PCT22-001M-0001-DUP, PCTss-002M-0001-SO, PCTss-002M-0001-ER, and PCTss-003M-0001-SO were subcontracted by TA-West Sacramento to TA-Denver, located in Arvada, Colorado, for perchlorate analysis by USEPA SW-846 Method 6860.

No quality assurance (QA) samples were required for this field effort.

This report describes findings of the third party data validation, analysis of field duplicate results, and the determination of data usability performed by MEC^X, LP (MEC^X) on the site samples reported in SDG G1F030473 from TA-West Sacramento.

1.2 PREVIOUS ACTIVITIES AND DATA

The following summary was adapted from the Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio (FWQAPP) prepared by Science Applications International Corporation (SAIC) in March 2001, and supplemental information provided to MEC^X by the United States Army Corps of Engineers (USACE).

Located in northeastern Ohio on approximately 21,000 acres, Ravenna Army Ammunitions Plant (RVAAP) was established in 1940 to load, store, and demilitarize conventional artillery ammunition, bombs, mines, fuses and boosters, primers and percussion elements. Originally RVAAP operated as two separate units, the Portage Ordnance Depot and the Ravenna Ordnance Plant. During World War II, a contractor operated the Ravenna Ordnance Depot and the government operated the Portage Ordnance Depot. Ordnance production and storage for World War II continued until August 1945, at which time the facility was renamed the Ravenna Arsenal, and the government assumed control of all operations. Then, from 1951 to 1999, the entire facility was operated by contractors. Ordnance production at the facility was phased out and sent to Plum Brook Ordnance Works in Sandusky, Ohio and Keystone Ordnance Works in Meadville, Pennsylvania. All production at the facility had ceased by 1957 and the plant was placed on standby. In 1961, the plant was operational for seven months, processing and performing explosive melt-out of bombs. After deactivation late in 1961, the facility was renamed RVAAP. From mid-1968 until 1971, the plant was reactivated to load, assemble, and pack munitions on three load lines and two component lines. Operations ceased at Load Lines 1, 2, 3, and 4 in 1971; however, the Lines were reactivated to perform demilitarization operations for several months in 1973 and 1974. In 1992, RVAAP was again placed on "Inactive" status. Salvage and demolition operations started in 1998 and administrative control of the facility was transferred to the Ohio Army National Guard in 1999.

CC-RVAAP-80 consists of the Group 2 Propellant Can Tops area located at RVAAP. Propellant can lids or "tops" were identified on the ground surface/near surface at the southern end of the former Group 2 Ammunition Storage Area. This site was never used or classified as an operational range and these materials are typically classified as Range-Related Debris (RRD).

The soil samples described in this report were collected in order to conduct an initial investigation of the Group 2 Propellant Can Tops areas to delineate the boundaries of the areas and confirm the presence or absence of releases of propellants and/or other munitions constituents to the surface soils at this area of concern.

2. DESCRIPTION OF WORK PERFORMED

This section describes the data verification and data validation procedures used during the evaluation of the site samples reported in SDG G1F030473 from TA-West Sacramento.

2.1 DATA VALIDATION PROCESS

Three primary multi-incremental soil samples, one discrete soil sample, one multi-incremental field duplicate sample, one equipment rinsate sample and one trip blank were collected in association with the field effort. Level IV validation was performed on PCTss-02D-0001-SO for VOCs and PCTss-02M-0001-SO for all remaining analyses listed in Section 1.1. As noted in Section 3.2 below, sample PCTss-01M-0001-DUP was not a valid field duplicate of sample PCTss-01M-0001-SO; therefore, these samples were assessed as laboratory duplicates.

Data validators assessed results based on the FWQAPP, Department of Defense Quality Systems Manual for Environmental Laboratories Version 4.1 (DoD QSM), the specific EPA methods, the National Functional Guidelines for Organic Data Review (1999), and the National Functional Guidelines for Inorganic Data Review (2004). The following were reviewed for Level IV validation:

- Sample management (collection techniques, sample containers, preservation, handling, transport, chain-of-custody, holding times),
- Calibration data summary forms (initial and continuing),
- Method blank sample results,
- Laboratory control sample (LCS) or LCS/LCS duplicate (LCS/LCSD) recoveries and/or precision,
- Surrogate recoveries (if applicable),
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries and precision,
- Field QA/QC sample results,
- Other QC indicators as applicable,
- Gas Chromatography/Mass Spectrometry (GC/MS) tuning, if a GC/MS is used,
- Internal standards performance,
- Sample results verification,
- Target compound identification,
- Raw data.

2.2 DATA VALIDATION QUALIFIERS

Data qualifiers, as defined below, were applied following the FWQAPP and the DoD QSM:

U Nondetected at the limit of detection
The analyte was analyzed for but not definitively detected.

J Estimated
The identification of the analyte is acceptable but the quality assurance criteria indicate that the quantitative values may be outside the normal expected range of precision. Additionally used to identify detects reported below the reporting limit.

N Identity Presumptive and Tentative
There is presumptive evidence that the analyte is present but it has not been confirmed. There is an indication that the reported analyte is present; however, all quality control requirements necessary for confirmation were not met.

R Rejected
Data are considered to be rejected and shall not be used for environmental decisions.

2.3 DATA VALIDATION FLAGGING CODES

The qualification codes in the following table may have been used to flag the data described in this document: Sample qualifications are shown on the hand-marked sample summary forms in Appendix A.

Table 1. Qualification code reference table

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	The sequence or number of standards used for the calibration was incorrect.
C	Calibration %RSD or %D was noncompliant.	Correlation coefficient was noncompliant.
R	Calibration RRF was noncompliant.	%R for calibration is not within control limits.
B	Presumed contamination as indicated by the preparation (method) blank results.	Presumed contamination as indicated by the preparation (method) or calibration blank results.
L	Laboratory Blank Spike/Blank Spike Duplicate %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
Q	MS/MSD recovery was poor or RPD high.	MS recovery was poor.
E	Not applicable	Duplicates showed poor agreement.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
A	Not applicable.	ICP Serial Dilution %D were not within control limits.
M	Tuning (BFB or DFTPP) was noncompliant.	ICPMS tuning was noncompliant
T	Presumed contamination as indicated by the trip blank results.	Not applicable.
+	False positive – reported compound was not present.	False positive – reported compound was not present.
-	False negative – compound was present but	False negative – compound was present but

Qualifier	Organics	Inorganics
	not reported.	not reported.
F	Presumed contamination as indicated by the FB or ER results.	Presumed contamination as indicated by the FB or ER results.
$	Reported result or other information was incorrect.	Reported result or other information was incorrect.
?	TIC identity or reported retention time has been changed.	Not applicable.
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Post Digestion Spike recovery was not within control limits.
*II, *III	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).

3. DATA ACQUISITION ACTIVITIES

3.1 SAMPLE COLLECTION

Soil samples were collected in May 2011. The samples were submitted under chain of custody to the primary laboratory, TA-West Sacramento.

Unless otherwise noted below, the chains of custody associated with the samples validated at Level IV were appropriately signed by both field and/or laboratory personnel with all samples and analyses accounted for, cooler custody seals intact, and within the temperature limits of 4±2°C. All documentation regarding sample handling as presented in the case narratives, chains of custody, correspondence, and sample condition upon receipt forms was evaluated with the following remaining deficiencies listed in the table below. No further requests were made to the primary contractor or the laboratories, and no data were qualified.

Chain-of-custody issues
There was a discrepancy between the collection time on the chain of custody and the collection time on the sample containers for PCTss-002M-0001-ER. The time listed on the chain of custody was used by the laboratory.
The container for sample PCTss-002D-0001-SO was labeled PCTss-002-0001-SO. The identification listed on the chain of custody was used by the laboratory.
The laboratory receipt checklist noted that sample PCTss-001M-0001-DUP was not received. Per a telephone conversation with the laboratory Project Manager, K. Dahl, it was determined that PIKA directed the laboratory to sub-sample parent sample PCTss-001M-0001-SO to create sample PCTss-001M-0001-DUP. Sample PCTss-001M-0001-DUP is a laboratory duplicate and not a field duplicate.
Samples subcontracted to TA-Denver were received below the temperature limit of 4±2°C, at 0.5°C. As the samples were not noted to be frozen or damaged, no qualifications were required.

3.2 SAMPLE ANALYSIS

TA-West Sacramento, the primary laboratory, analyzed a total of three primary multi-increment soil samples, one multi-increment field duplicate sample, and one equipment rinsate sample by USEPA Method 8330B for nitroglycerin and nitroguanidine by and USEPA Method 353.2 for nitrocellulose. TA-West Sacramento also analyzed one discrete soil sample and one trip blank for USEPA SW-846 Method 8260B for VOCs and one multi-increment soil sample and one equipment rinsate sample for USEPA SW-846 Method 6010B for various metals, USEPA SW-846 Method 7470A/7471A for mercury, USEPA Method 8330B for explosives, USEPA SW-846 Method 8270C for SVOCs, USEPA SW-846 Method 8081 for pesticides, and USEPA SW-846 Method 8082 for PCBs. TA-West Sacramento subcontracted one multi-increment soil sample and one equipment rinsate sample TA-North Canton for cyanide analysis by USEPA SW-846 Method 9012A. Three primary multi-increment soil samples, one multi-increment field duplicate sample, one equipment rinsate sample were subcontracted by TA-West Sacramento to TA-Denver for perchlorate analysis by USEPA SW-846 Method 6860.

3.3 DATA COMPLETENESS

The mercury instrument print-out did not include absorbances for any samples except the initial calibration standards. Data completeness for the remaining methods utilized by this project were found to be generally acceptable as no deliverables were missing.

3.4 METHOD REQUIRMENTS

All method preservation requirements were met.

3.5 HOLDING TIME REQUIREMENTS

The soil extraction and analytical holding times for the analyses reviewed in this document are as follows:

Method	Analysis	Extraction Holding Time	Analysis Holding Time
SW-846 Method 6010B	Metals	N/A	180 days
SW-846 Method 7471A	Mercury	N/A	28 days
SW-846 Method 8260B	VOCs	N/A	14 days
SW-846 Method 8270C	SVOCs	14 days	40 days
SW-846 Method 8081	Pesticides	14 days	40 days
SW-846 Method 8082	PCBs	14 days	40 days
SW-846 Method 8330B	Explosives	14 days	40 days
SW-846 Method 8330	Nitroguanidine	14 days	40 days
Method 353.2	Nitrocellulose*	N/A	28 days
SW-846 Method 9012A	Cyanide	N/A	14 days
SW-846 Method 6860	Perchlorate	N/A	28 days

*The nitrocellulose holding time cited by the Cold Regions Research Laboratory method is seven days. As the method utilized by the laboratory was based on a different procedure, it was the reviewer's professional opinion that the nitrate/nitrite holding time of 28 days should be applied.

3.6 DETECTION LIMIT REQUIREMENTS

The reporting limits for nondetected results in sample PCTss-002M-0001-SO and PCTss-002D-0001-SO were compared to the criteria listed in Table 3-3 of the FWQAPP. Reporting limits (RLs) listed below exceeded these criteria. Unless otherwise noted below, the method detection limits (MDLs) met the FWQAPP criteria, indicating the laboratory was capable of detecting the analyte at concentrations necessary to delineate potential contamination.

- Antimony selenium, thallium, and silver RLs exceeded the project criteria. Undiluted MDLs for selenium and thallium exceeded the project criteria
- Cyanide RL exceeded the project criterion
- Chloromethane RL exceeded the project criterion
- A total of 61 SVOC RLs exceeded the project criteria and all polynuclear aromatic hydrocarbon (PAH) and MDLs exceeded the project criterion

- PCB-1221 RL exceeded the project criterion
- Dieldrin, endrin, 4,4'-DDD, endosulfan II, 4,4'-DDT, endrin aldehyde, endrin ketone, and endosulfan sulfate RLs exceeded the project criterion.

There were no project criteria for 2,2'-oxybis(1-chloropropane).

4. DATA QUALITY EVALUATION

This section summarizes the data quality of validated samples PCTss-002D-0001-SO and PCTss-002M-0001-SO for each analytical method evaluated.

4.1 EXPLOSIVES

One primary multi-increment soil sample and one equipment rinsate sample were analyzed by TA-West Sacramento for explosives by USEPA SW-846 Method 8330B.

- MDL studies were not evaluated as part of this project.
- Calibration: Calibration criteria were met.
    - Initial calibration average percent relative standard deviations (%RSDs) were within the control limits listed in DoD QSM Table F-3 of ≤15%, or the linear regression r values were ≥0.990.
    - The second source initial calibration verification standard (ICV) recoveries for both the primary and confirmation calibrations were within the control limits listed in DoD QSM Table F-3 of 80-120%.
    - The continuing calibration verification (CCV) standard %Ds were within the control limits listed in DoD QSM Table F-3 of ≤20%. Although not required by the DoD QSM, method reporting limit (MRL) standards were analyzed in association with the validated sample. The MRL standard recoveries were within the reasonable control limit of ±30%.
- Blanks: The method blank associated with the validated sample had no target compound detects above the control limits listed in DoD QSM Table F-3 of one-half the reporting limit or one-tenth the amount detected in a sample.
- Blank Spikes and Laboratory Control Samples: Recoveries were within the control limits listed in QSM Tables G-2 (Poor Performers) and G-13.
- Surrogate Recovery: All surrogate recoveries were within the laboratory-established control limits of 79-111%.
- Laboratory Duplicate: As noted in Section 3.2, sample PCTss-001M-0001-DUP was identified as a laboratory duplicate of sample PCTss-0001M-0001-SO. Both samples were analyzed for nitroglycerin only. There were no detects above the MDL for nitroglycerin in either sample.
- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were not performed on the validated sample of this SDG; however, the MS/MSD analysis of sample PCTss-0003M-0001-SO had recoveries within the control limits listed in QSM Tables G-2 (Poor

Performers) and G-13, and RPDs within the control limit listed in QSM Table F-3 of ≤20%.

- Compound Identification: Compound identification was verified for the sample validated at a Level IV. Review of the sample (and associated QC) chromatograms and retention times indicated no problems with target compound identification. The validated sample had no detected target compounds.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at a Level IV. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs.

- Confirmation analysis was performed for the validated sample. The validated sample had no detected target compounds.

- System Performance: Review of the raw data indicated no problems with system performance.

- Some manual integrations were performed for initial calibration standards, CCVs and QC associated with the sample data reviewed at Level IV. All manual integrations were deemed acceptable by the reviewer.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

    - Field Blanks and Equipment Rinsates: The sample validated for this SDG had no associated field blank. One equipment rinsate sample was collected and analyzed for explosives. The equipment rinsate had no detects above the MDL.

    - Field Duplicates: As noted in Section 3.2, there were no valid field duplicate samples collected for this project.

4.2 PROPELLANTS – NITROGUANIDINE AND NITROCELLULOSE

Three primary multi-increment soil samples, one field duplicate sample, and one equipment rinsate sample were analyzed by TA-West Sacramento for nitroguanidine by USEPA SW-846 Method 8330B (Modified) and nitrocellulose by USEPA 353.2.

- MDL studies were not evaluated as part of this project.

- Calibration: Calibration criteria were met.

    - The initial calibration linear regression r values for nitroguanidine and nitrocellulose were within the control limits listed in QSM Table F-3 of ≥0.990 and Table F-11 of ≥0.995, respectively. .

- The second source ICV recoveries were within the control limits listed in QSM Tables F-3 of 80-120% for nitroguanidine and 90-100% for nitrocellulose.

- The CCV standard %Ds were within the control limits listed in QSM Table F-3 of ≤20% for nitroguanidine. The nitrocellulose CCV standard recoveries were within the control limits listed in QSM Table F-11 of 90-100%. Although not required by the QSM, nitroguanidine and nitrocellulose MRL standards were analyzed in association with the validated sample. The MRL standard recoveries were within the reasonable control limit of ±30%.

- Blanks: The method blank associated with the validated sample had no target compound detected above the control limits listed in QSM Tables F-3 and F-11 of one-half the reporting limit or one-tenth the amount detected in a sample.

- Blank Spikes and Laboratory Control Samples: As no LSC recovery criteria were listed in the QSM for nitroguanidine, the recovery was assessed against the laboratory-established control limits of 72-121%.

  The nitrocellulose recovery, 45%, was within the laboratory control limits of 34-115%, but was outside the maximum control limits listed in QSM Table F-11 of 80-120%. Nondetected nitrocellulose in PCTss-002M-0001-SO was qualified as an estimated nondetect, "UJ," and was coded with an "L" qualification code.

- Surrogate Recovery: A surrogate was not used for the analysis of nitroguanidine or nitrocellulose.

- Laboratory Duplicate: As noted in Section 3.2, sample PCTss-001M-0001-DUP was identified as a laboratory duplicate of sample PCTss-0001M-0001-SO. Both samples were analyzed for nitroguanidine and nitrocellulose. Both samples had nitroguanidine detected above the MDL but below the reporting limit at 0.063(J) and 0.12(J) mg/Kg, respectively. Both samples had nitrocellulose detected above the MDL but below the reporting limit at 1.1(J) and 0.82(J) mg/Kg, respectively. In cases where results were <5× the reporting limit, the reasonable control limit of ± the reporting limit was applied. The nitroguanidine and nitrocellulose duplicate results were acceptable.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were not performed on the validated sample of this SDG; however, the nitroguanidine MS/MSD analysis of sample PCTss-0003M-0001-SO had recoveries and RPD within the laboratory-established control limits of 72-121% and ≤20%, respectively.

  Nitrocellulose MS/MSD analyses were performed on nonvalidated sample PCTss-003M-0001-SO. The recoveries were 35% and 26%. The nitrocellulose MS recovery was within the laboratory control limits of 34-115%, but both recoveries were outside the maximum control limits listed in QSM Table F-11 of 80-120%. As per the National Functional Guidelines, all samples in an SDG are qualified for MS/MSD outliers; therefore, nondetected nitrocellulose in PCTss-002M-0001-SO was qualified as an estimated

nondetect, "UJ." The qualified result was coded with a "Q" qualification code. The MS/MSD RPD exceeded the control limit listed in QSM Table F-11 of ≤15%; therefore, nondetected nitrocellulose in PCTss-002M-0001-SO was qualified as an estimated nondetect, "UJ." The qualified result was coded with an "*III" qualification code.

- Compound Identification: Compound identification was verified for the sample validated at Level IV. Review of the sample (and associated QC) chromatograms and retention times indicated no problems with target compound identification.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at a Level IV. The reporting limit was supported by the low point of the initial calibration and the laboratory MDL. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

  The reviewer noted that the laboratory used a nitrate/nitrite to nitrocellulose conversion factor of 0.118. Other laboratories analyzing soil samples for nitrocellulose for other RVAAP field efforts have used a conversion factor of 0.12, which is closer to the 0.126 value cited in the method developed by Cold Regions Research and Engineering Laboratory. As the conversion factor difference resulted in a sample concentration difference for nitrocellulose of approximately 6%, it was the reviewer's professional opinion that the data were not adversely affected.

- Target compound confirmation on a second column was not performed for the modified version of USEPA SW-846 Method 8330B for the analysis of nitroguanidine.

- Manual integrations were not performed for nitroguanidine or nitrocellulose sample data or associated QC reviewed at Level IV.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Rinsates: The sample validated for this SDG had no associated field blank. One equipment rinsate sample was collected and analyzed for nitroguanidine and nitrocellulose. The equipment rinsate had no detects above the MDL.

  - Field Duplicates: As noted in Section 3.2, there were no valid field duplicate samples collected for this project

4.3 POLYCHLORINATED BIPHENYLS (PCBS)

One primary multi-increment soil sample and one equipment rinsate sample were analyzed by TA-West Sacramento for PCBs by USEPA SW-846 Method 8082.

- MDL studies were not evaluated as part of this project.
- Calibration: Calibration criteria were met.
    - Initial calibration average %RSDs were within the control limits listed in DoD QSM Table F-2 of ≤20%, or the linear regression r values were ≥0.990.
    - The second source ICV recoveries were within the control limits listed in DoD QSM Table F-2 of 80-120%.
    - The CCV standard %Ds were within the control limits listed in DoD QSM Table F-2 of ≤20%.
- Blanks: The method blank associated with the sample validated at Level IV had no target compound detects above the control limits listed in the DoD QSM Table F-2, of one-half the reporting limit for target compounds or one-tenth the amount detected in a samples.
- Blank Spikes and Laboratory Control Samples: Recoveries and RPDs for Aroclors 1016 and 1260 were within the control limits listed in QSM Table G-17 of 40-140% and 60-130%, respectively, and the RPDs were within the control limit listed in QSM Table F-2 of ≤30%.
- Surrogate Recovery: Recoveries were within the control limits listed in DoD QSM Table G-3 of 60-125%.
- Laboratory Duplicates: There were no laboratory duplicates analyzed for PCBs.
- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on the validated sample, PCTss-02M-0001-SO. The recoveries and RPDs for Aroclors 1016 and 1260 were within the control limits listed in G-17 of 40-140 and 60-130%, respectively, and the RPDs were within the control limit listed in QSM Table F-2 of ≤30%.
- Compound Identification: Compound identification was verified for the sample validated at Level IV. Review of the sample chromatograms, standards, and retention times indicated no problems with target compound identification.
- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at a Level IV. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."
- The sample was not analyzed on a second analytical column for target compound confirmation; however, no Aroclors were detected in the sample above the MDL on the primary column.
- System Performance: Review of the raw data indicated no problems with system performance.

- Some routine manual integrations were performed for the calibration and QC data associated with the sample data. All manual integrations reviewed at Level IV were deemed appropriate by the reviewer.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

    - Field Blanks and Equipment Rinsates: The sample validated for this SDG had no associated field blank. One equipment rinsate sample was collected and analyzed for PCBs. The equipment rinsate had no detects above the MDL.

    - Field Duplicates: As noted in Section 3.2, there were no valid field duplicate samples were collected for this project.

4.4 PESTICIDES

One primary multi-increment soil sample and one equipment rinsate sample were analyzed by TA-West Sacramento for pesticides by USEPA SW-846 Method 8081.

- MDL studies were not evaluated as part of this project.

- Calibration: Calibration criteria were met.

    - Initial calibration %RSDs for both columns were within the control limits listed in DoD QSM Table F-2 of ≤20%, or the linear regression r values were ≥0.990.

    - The second source ICV recoveries were within the control limits listed in DoD QSM Table F-2 of 80-120%.

    - The DDT/Endrin breakdown standards were within the control limits listed in DoD QSM Table F-2 of ≤15%.

    - The continuing calibration verification (CCV) standard %Ds affecting sample data were within the control limits listed in DoD QSM Table F-2 of ≤20%. Although not required by the DoD QSM, MRL standards were analyzed in association with the validated sample. The MRL standard recoveries were within the reasonable control limit of ±30%.

- Blanks: The method blank associated with the validated sample had no target compound detects above the control limits listed in DoD QSM Table F-2, of one-half the reporting limit or one-tenth the amount detected in a site sample.

- Blank Spikes and Laboratory Control Samples: Recoveries were within the control limits listed in QSM Table G-15 and RPDs were within the control limit listed in QSM Table F-2 of ≤30%.

- Surrogate Recovery: Recoveries were within the control limits listed in DoD QSM Table G-3.

- Laboratory Duplicates: There were no laboratory duplicates analyzed for pesticides.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on the validated sample, PCTss-02M-0001-SO. The recoveries were within the control limits listed in QSM Table G-15 and RPDs were within the control limit listed in QSM Table F-2 of ≤30%.

- Compound Identification: Compound identification was verified for the sample validated at Level IV. Review of the sample chromatograms and retention times indicated no problems with target compound identification.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at Level IV. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

  The sample was analyzed on two analytical columns for target compound confirmation. The intercolumn RPD comparison exceeded 40% for the 4,4'-DDE result in the validated sample, PCTss-02M-0001-SO. The result was qualified as estimated, "J," and was coded with a *III qualification code. The laboratory reported the higher result from the second analytical column; however, the result was changed by the reviewer to the primary column concentration, from 0.73(J) µg/Kg to 0.27(J) µg/Kg to comply with the QSM. The result was coded with a "$" qualification code.

- System Performance: Review of the raw data indicated no problems with system performance.

- Some manual integrations were performed for the sample, and initial calibration standards, CCVs, and QC associated with the sample data reviewed at Level IV. All manual integrations were deemed acceptable by the reviewer.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Rinsates: The sample validated for this SDG had no associated field blank. One equipment rinsate sample was collected and analyzed for pesticides. The equipment rinsate had no detects above the MDL.

  - Field Duplicate Samples: As noted in Section 3.2, there were no valid field duplicate samples were collected for this project.

4.5 SEMIVOLATILE ORGANIC COMPOUNDS (SVOCS)

One primary multi-increment soil sample and one equipment rinsate sample were analyzed by TA-West Sacramento for semivolatile compounds by USEPA Method 8270C.

- MDL studies were not evaluated as part of this project.
- GC/MS Tuning: The DFTPP tunes met the method abundance criteria. The sample was analyzed within 12 hours of the DFTPP injection time.
- Calibration: Calibration criteria were met.
    - Initial calibration average RRFs and ICV and CCV RRFs were within method control limits of ≥0.050 for system performance check compounds (SPCCs). All initial calibration %RSDs were within the method control limits listed in the DoD QSM Table F-4 of ≤30% for calibration check compounds (CCCs) and ≤15% for remaining compounds, or linear regression r values ≥0.995.
    - All second source ICV standard recoveries affecting sample data were within the control limits listed in the DoD QSM Table F-4, of ±20%.
    - Continuing calibration %Ds affecting sample data were within the method control limits of ≤20% listed in DoD QSM Table F-4.
- Blanks: The method blank associated with the sample validated at Level IV had no target compound detects above the control limits listed in DoD QSM Table F-4 of one-half the reporting limit for target compounds or one-tenth the amount detected in any sample, and no common laboratory contaminants.
- Blank Spikes and Laboratory Control Samples: LCS recoveries were within the control limits listed in the DoD QSM Tables G-2 (Poor Performers) and G-7 for recoveries, and the RPDs were within the control limit listed in QSM Table F-4 of ≤30%.
- Surrogate Recovery: Surrogate recoveries were within the control limits listed in the DoD QSM Table G-3.
- Laboratory Duplicates: There were no laboratory duplicates analyzed for SVOCs.
- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on the validated sample, PCTss-02M-0001-SO. The recoveries were within the control limits listed in the DoD QSM Tables G-2 (Poor Performers) and G-7 with the exception of 3,3'-dichlorobenzidine, recovered in both the MS and MSD at 11%. The nondetected parent sample result for 3,3'-dichlorobenzidine was qualified as estimated, "UJ," and coded with a "Q" qualification code. RPDs were within the control limit listed in QSM Table F-4 of ≤30%.

- Internal Standards Performance: The internal standard area counts and retention times were within the DoD QSM Table F-4 control limits established by the midpoint initial calibration standard: ±30 seconds for retention times and -50% / +100% for internal standard areas.

- Compound Identification: Compound identification was verified for the sample validated at Level IV. Review of the sample chromatogram, retention times, and spectra indicated no problems with target compound identification.

  2,4-Dinitrotoluene and 2,6-dinitrotoluene were reported by both Methods 8270C and 8330B. As the reporting limits were lower for the 8330B analyses; the results for both compounds were rejected, "R," in the 8270C analysis in favor of the 8330B results. The rejected analytes were coded with a "D" qualification code.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at Level IV. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J," by the laboratory.

- System Performance: Review of the raw data indicated no problems with system performance.

- Some routine manual integrations were performed for the samples and calibration and QC data associated with the sample data. All manual integrations reviewed at Level IV were deemed appropriate by the reviewer.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Rinsates: The sample validated for this SDG had no associated field blank. One equipment rinsate sample was collected and analyzed for SVOCs. Bis(2-ethylhexyl)phthalate was detected in the equipment rinsate at 1.1(J) µg/L; however, bis(2-ethylhexyl)phthalate was not detected in the associated validated site sample. The equipment rinsate had no other detects above the MDL.

  - Field Duplicate Samples: As noted in Section 3.2, there were no valid field duplicate samples were collected for this project.

4.6 VOLATILE ORGANIC COMPOUNDS (VOCS)

One primary discrete soil sample and one trip blank sample were analyzed by TA-West Sacramento for volatile compounds by USEPA Method 8260B.

- MDL studies were not evaluated as part of this project.

- GC/MS Tuning: The BFB tunes met the method abundance criteria. The sample was analyzed within 12 hours of the BFB injection time.

- Calibration: Calibration criteria were met.

    - Initial calibration average RRFs and ICV and CCV RRFs were within the control limits listed in DoD QSM Table F-4 of ≥0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane, and ≥0.10 for chloromethane and bromoform, and 1,1-dichloroethane. All initial calibration %RSDs were within the method control limits listed in the DoD QSM Table F-4 of ≤30% for calibration check compounds (CCCs) and ≤15% for remaining compounds, or linear regression r values ≥0.990.

    - All second source initial calibration verification standard recoveries were within the control limits listed in DoD QSM Table F-4 of 80-120%.

    - Continuing calibration %Ds affecting validated sample data were within the method control limits of ≤20% listed in DoD QSM Table F-4.

- Blanks: The method blank associated with the validated sample had no target compound detects above the control limits listed in DoD QSM Table F-4 of one-half the reporting limit or one-tenth the amount of any sample detect target compounds, and no common laboratory contaminants detected above the reporting limit. Acetone was detected below the reporting limit in the method blank at 3.8(J) µg/Kg. The sample result below the reporting limit for acetone was qualified as nondetected, "U," at the reporting limit and coded with a "B" qualification code.

- Blank Spikes and Laboratory Control Samples: LCS recoveries were within the control limits listed in the DoD QSM Table G-5.

- Surrogate Recovery: Surrogate recoveries were within the control limits listed in DoD QSM Table G-3.

- Laboratory Duplicates: There were no laboratory duplicates analyzed for VOCs.

- Matrix Spike/Matrix Spike Duplicate: No MS/MSD analyses for volatiles were performed on the validated sample or any other sample in this SDG.

- Internal Standards Performance: The internal standard area counts and retention times were within DoD QSM Table F-4 control limits established by the midpoint initial calibration standard: ±30 seconds for retention times and -50% / +100% for internal standard areas.

- Compound Identification: Compound identification was verified for the sample validated at a Level IV. Review of the sample chromatogram, retention times, and spectra indicated no problems with target compound identification.

- Compound Quantification and Reported Detection Limits: Compound quantification was verified for the sample validated at a Level IV. The reporting limits were supported by the low point of the initial calibration and the laboratory MDLs. Any result reported between the MDL and the reporting limit was qualified as estimated, "J," by the laboratory.

- System Performance: Review of the raw data indicated no problems with system performance.

- Manual integrations were not performed for the sample validated at Level IV, or for associated calibration and QC samples.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

    - Trip Blanks: Sample TRIP BLANK was associated with the validated sample. The trip blank had no target compounds detected above the MDL.

    - Field Blanks and Equipment Rinsates: No field blank or equipment rinsate samples were associated with the validated sample of this SDG.

    - Field Duplicate Samples: As noted in Section 3.2, there were no valid field duplicate samples were collected for this project.

4.7 METALS

One primary multi-increment soil sample and one equipment rinsate sample were analyzed by TA-West Sacramento for various metals by USEPA Methods 6010B and 7471A.

- MDL studies were not evaluated as part of this project.

- Calibration: Except as noted below, calibration criteria were met.

    - Initial calibration: Linear regression r-values were within the control limit listed in the DoD QSM Tables F-7 of ≥0.995.

    - The ICP ICV and CCV recoveries were within the control limits listed in DoD QSM Table F-7 of 90-110%. The mercury ICV and CCV recoveries were within the control limits listed in DoD QSM Table F-7 of 90-110% and 80-120%, respectively.

    - Except for antimony, MRL recoveries were within the control limits listed in DoD QSM Table F-7 of 80-120%. Antimony was recovered at 77%; therefore, nondetected antimony in PCTss-002M-0001-SO was qualified as estimated, "UJ," and coded with a "C" qualification code.

- Blanks: The method blanks and CCBs (Level IV only) had no applicable detects above the control limit listed in DoD QSM Table F-7 of one-half the MRL or one-tenth the amount detected in a sample.

- Interference Check Samples: ICP interference check sample A (ICSA) and AB (ICSAB) recoveries were within the control limits listed in DoD QSM Table F-7 of 80-120%. There were no analytes detected in the ICSA above the control limit listed in DoD QSM Table F-7 of <MDL.

- Blank Spikes and Laboratory Control Samples: The recoveries were within the control limits listed in QSM Table G-19.

- Laboratory Duplicates: No field duplicate samples were analyzed for metals.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on PCTss-002M-0001-SO and PCTss-002M-0001-ER. Although equipment rinsate samples are not valid MS/MSD parent samples, all recoveries were acceptable. Except as noted below, the soil MS/MSD recoveries were within the control limits listed in QSM Table G-19. Matrix spike control limits were not applied when the native sample concentration exceeded the spiked amount by a factor of four or more.

  Results noted in the table below were qualified as estimated, "J," for detects and "UJ," for nondetects in the associated samples; however, nondetected results were not qualified for recoveries above the control limit. All qualified results were coded with a "Q" qualification code. When no other qualifications with conflicting bias were assigned to a result, detected results with low recoveries were assigned a negative bias, "J-," and detected results with high recoveries were assigned a positive bias, "J+."

Samples qualified for MS/MSD recovery outliers			
Parent Sample	**Analyte**	**%Rs**	**Qualified Samples**
PCTss-002M-0001-SO	Antimony	32%, 34%	Antimony in PCTss-002M-0001-SO
	Calcium	- -, 125%	Calcium in PCTss-002M-0001-SO
	Lead	- -, 68%	Lead in PCTss-002M-0001-SO

"- -" indicates and acceptable recovery

  Except as noted below, MS/MSD RPDs were within the control limit listed in QSM Table F-7 of ≤20%. Results noted in the table below were qualified as estimated, "J," for detects. All qualified results were coded with an "*III" qualification code.

Samples qualified for MS/MSD RPD outliers			
Parent Sample	**Analyte**	**RPD**	**Qualified Samples**
PCTss-002M-0001-SO	Calcium	31%	Calcium in PCTss-002M-0001-SO
	Lead	21%	Lead in PCTss-002M-0001-SO

- Serial Dilution: A serial dilution analysis was performed on PCTss-002M-0001-ER. Although equipment rinsate samples are not valid parent samples, all serial dilution

%Ds were within the control limit listed in DoD QSM Table F-7 of ≤10%. The serial dilution control limit is only applicable when the original sample concentration is minimally ≥50× the MDL.

- Internal Standards: These criteria are not applicable to the 6010B or 7471A analyses.

- Sample Result Verification: For Level IV validation, calculations were verified and the sample results reported on the sample result summary were verified against the raw data. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

  The TA-West Sacramento mercury raw data did not list the sample absorbances; therefore, the reviewer was not able to calculate the sample results from the raw data.

- Manual Integrations: No manual integrations were noted in the mercury analyses.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

  - Field Blanks and Equipment Rinsates: The sample validated for this SDG had no associated field blank. One equipment rinsate sample was collected and analyzed for metals and mercury. Selenium was detected in the equipment rinsate but was not detected in PCTss-002M-0001-SO.

  - Field Duplicate Samples: As noted in Section 3.2, there were no valid field duplicate samples were collected for this project.

4.7 GENERAL CHEMISTRY – CYANIDE AND PERCHLORATE

One primary soil sample and one equipment rinsate sample were analyzed by TA-North Canton for cyanide by USEPA Method 9012A, and three primary soil samples, one field duplicate sample and one equipment rinsate sample were subcontracted to TA-Denver for perchlorate by SW-846 Method 6860.

- MDL studies were not evaluated as part of this project.

- Calibration: Calibration criteria were met.

  - Initial calibration: Linear regression r values were within the control limit listed in QSM Tables F-10 and F-12 of ≥0.995.

  - All ICV and CCV recoveries and the cyanide distilled standard recoveries were within the control limits listed in QSM Tables F-10 and F-12 of 85-115%.

- The perchlorate detection limit standard recovery was within the control limit listed in QSM Table F-12 of 70-130%.

- Blanks: Method blanks and CCBs had no applicable detects above the control limit listed in QSM Tables F-10 and F-12 of one-half the MRL or one-tenth the amount detected in a sample.

- Blank Spikes and Laboratory Control Samples: The perchlorate recovery was within the control limits in QSM Table F-12 of 80-120%. As the QSM does not list recovery limits for cyanide, the reasonable laboratory limits of 80-120% were applied. The cyanide recovery was within the control limits.

- Laboratory Duplicates: As noted in Section 3.2, sample PCTss-001M-0001-DUP was identified as a laboratory duplicate of sample PCTss-001M-0001-SO. Perchlorate was detected above the MDL but below the reporting limit in both samples at 0.093(J) and 0.11(J) mg/Kg, respectively. In cases where results were <5× the reporting limit, the reasonable control limit of ± the reporting limit was applied. The perchlorate duplicate result was acceptable. The duplicate samples were not analyzed for cyanide.

- Matrix Spike/Matrix Spike Duplicate: MS/MSD analyses were performed on validated sample PCTss-002M-0001-SO for both perchlorate and cyanide. Both perchlorate recoveries were outside the control limits listed in QSM Table F-12 of 80-120%, at 123% and 126%; however, perchlorate was not detected in parent sample PCTss-002M-0001-SO. The cyanide recoveries were within the control limits listed in QSM Table F-10 of 80-120%. The cyanide and perchlorate RPDs were within the control limits listed in QSM Tables F-10 and F-12 of ≤20% and ≤15%, respectively.

- Sample Result Verification: For Level IV validation, calculations were verified and the sample results reported on the sample result summary were verified against the raw data. Any result reported between the MDL and the reporting limit was qualified as estimated, "J."

- Perchlorate Internal Standard Performance: The internal standard area counts and retention times were within QSM Table F-12 control limits established by the average IS area from the initial calibration of ±50%. The relative retention times were within the control limit listed in QSM Table F-12 of ±2%.

- Perchlorate Isotope Ratios: The chlorine isotope ratios, monitored at parent mass 100.9 amu, were within the limits listed in QSM Table F-12 of 2.3 to 3.8 for all QC and environmental samples.

- Manual Integrations: One manual integration in the perchlorate detection limit standard was noted and deemed acceptable.

- Field QC Samples: Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the

field QC data. Any remaining detects were used to evaluate the associated site samples. Following are findings associated with field QC samples:

- Field Blanks and Equipment Rinsates: The sample validated for this SDG had no associated field blank. One equipment rinsate sample was collected and analyzed for perchlorate and cyanide. There were no detects above the MDL in the equipment rinsate sample.

- Field Duplicate Samples: As noted in Section 3.2, there were no valid field duplicate samples were collected for this project.

5. DATA DEFICIENCIES

5.1 REJECTED DATA

No data were rejected for calibration or other QC criteria outliers. In instances where a data point had multiple results, the reviewer chose the most technically sound result to report and rejected the remaining data points. These rejected data points do not affect data quality or usability and are not included in Table 2.

5.2 DATA USABILITY

No information regarding the number of planned samples was received from PIKA; however, a field duplicate sample is usually collected for this type of project. As no valid field duplicate sample was collected (see Section 3.2), it appears the field completeness was less than 100%.

The completeness was determined for the validated sample only as the remaining samples were not validated or reviewed at any level by MEC^X. The analytical completeness goal for the project that was established in the FWQAPP was 90% for each method. The completeness goal was met for all analyses. Data that exceeded the established reporting limit criteria and data estimated for quality control outliers or for detects between the MDL and the RL were included in Table 2 for informational purposes only.

Table 2. Analytical completeness for primary data

			Number of Results					Percent Complete
Analysis	**Samples Analyzed**	**Analytes per Sample**	**Total**	**Rejected**	**RLs / MDLs & RLs Exceeding Criteria**	**Estimated for QC Outliers**	**Estimated for Detects <RL**	
Explosives	1	16	16	0	0/0	0	0	100%
PCBs	1	7	7	0	1/0	0	0	100%
Pesticides	1	21	21	0	8/0	1	1	100%
SVOCs*	1	62	62	0	61/17	1	1	100%
VOCs	1	33	33	0	1/0	1	0	100%
Metals	1	23	23	0	4/1	3	2	100%
Cyanide	1	1	1	0	1/0	0	1	100%
Nitroguanidine	1	1	1	0	0/0	0	0	100%
Nitrocellulose	1	1	1	0	0/0	1	0	100%
Perchlorate	1	1	1	0	0/0	0	0	100%
		Totals	**166**	**0**	**76/18**	**7**	**5**	**100%**

*The reviewer chose to report 2,4-dinitrotoluene and 2,6-dinitrotoluene from the 8330B analyses and therefore, these two compounds are not included in the analytes count.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 PRIMARY AND FIELD DUPLICATE SAMPLE COMPARISON SUMMARY

As noted in Section 3.2, there were no valid field duplicate samples were collected for this project

6.2 SPECIFIC DATA CONCERNS

Specific concerns regarding the data are noted below:

- The laboratory Receipt Checklist noted that sample PTss-001M-0001-DUP was not received. The resolution of this comment was not documented in the data package.
- As noted above, sample PCTss-001M-0001-DUP was not received at the laboratory. Per PIKA direction, the laboratory collected an additional sub-sample of PCTss-001M-001-SO and labeled this volume as PCTss-001M-0001-DUP. This sample is not a valid field duplicate.
- The following reporting limits exceeded the criteria listed in the Facility-Wide Quality Assurance Project Plan (FWQAPP). Unless otherwise noted below, the method detection limits (MDLs) met the criteria, indicating the laboratory's ability to detect these analytes at the concentrations necessary to delineate the site.
    - Antimony selenium, thallium, and silver RLs exceeded the project criteria. MDLs for selenium and thallium exceeded the project criteria
    - Cyanide RL exceeded the project criterion
    - Chloromethane RL exceeded the project criterion
    - A total of 61 SVOC RLs exceeded the project criteria and all polynuclear aromatic hydrocarbon (PAH) RLs exceeded the project criterion
    - PCB-1221 RL exceeded the project criterion
    - Dieldrin, endrin, 4,4'-DDD, endosulfan II, 4,4'-DDT, endrin aldehyde, endrin ketone, and endosulfan sulfate RLs exceeded the project criterion

In order to avoid repetition of the issues noted above, the following actions should be taken:

- All correspondence regarding issues noted during sample receipt should be documented in the data package.
- The contractor should communicate the project required reporting limits to the laboratory prior to the start of field work. If criteria cannot be met for critical analytes or analyses, a subcontract laboratory should be considered.

7. REFERENCES

Contract Laboratory Program National Functional Guidelines for Organic Data Review. United States Environmental Protection Agency Contract Laboratory Program (CLP). October 1999.

Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. United States Environmental Protection Agency. October 2004.

Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1. DoD Data Quality Workgroup. April 2009.

Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. SAIC. March 2001.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Revision 6. United States Environmental Protection Agency. February 2007.

APPENDIX A

Qualified Sample Result Forms

Qualification Code Reference Table

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	The sequence or number of standards used for the calibration was incorrect.
C	Calibration %RSD or %D was noncompliant.	Correlation coefficient was noncompliant.
R	Calibration RRF was noncompliant.	%R for calibration is not within control limits.
B	Presumed contamination as indicated by the preparation (method) blank results.	Presumed contamination as indicated by the preparation (method) or calibration blank results.
L	Laboratory Blank Spike/Blank Spike Duplicate %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
Q	MS/MSD recovery was poor or RPD high.	MS recovery was poor.
E	Not applicable	Duplicates showed poor agreement.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
A	Not applicable	ICP Serial Dilution %D were not within control limits.
M	Tuning (BFB or DFTPP) was noncompliant.	ICPMS tuning was noncompliant
T	Presumed contamination as indicated by the trip blank results.	Not applicable
+	False positive – reported compound was not present.	False positive – reported compound was not present.
-	False negative – compound was present but not reported.	False negative – compound was present but not reported.
F	Presumed contamination as indicated by the FB or ER results.	Presumed contamination as indicated by the FB or ER results.
$	Reported result or other information was incorrect.	Reported result or other information was incorrect.
?	TIC identity or reported retention time has been changed.	Not applicable.
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Post Digestion Spike recovery was not within control limits.
*II, *III	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).	A deficiency was found that has been described in the "Sample Management," section (*II) or the "Method Analyses" section (*III).

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

HPLC

Lot-Sample #...:	G1F030473-004	Work Order #...:	MJ07R1A9	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159133				
Dilution Factor:	0.95				
% Moisture.....:	5.1	Method.....:	SW846 8330		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,3,5-Trinitrobenzene	ND	0.24	mg/kg	0.019
1,3-Dinitrobenzene	ND	0.24	mg/kg	0.048
2,4,6-Trinitrotoluene	ND	0.24	mg/kg	0.019
2,4-Dinitrotoluene	ND	0.24	mg/kg	0.019
2,6-Dinitrotoluene	ND	0.24	mg/kg	0.028
2-Amino-4,6-dinitrotoluene	ND	0.24	mg/kg	0.095
2-Nitrotoluene	ND	0.24	mg/kg	0.076
3-Nitrotoluene	ND	0.24	mg/kg	0.066
4-Amino-2,6-dinitrotoluene	ND	0.24	mg/kg	0.019
4-Nitrotoluene	ND	0.24	mg/kg	0.076
HMX	ND	0.24	mg/kg	0.028
Nitrobenzene	ND	0.24	mg/kg	0.048
Nitroglycerin	ND	0.48	mg/kg	0.12
PETN	ND	0.48	mg/kg	0.15
RDX	ND	0.24	mg/kg	0.038
Tetryl	ND	0.24	mg/kg	0.048

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	90	(78 - 108)

LEVEL IV

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

HPLC

Lot-Sample #...:	G1F030473-004	Work Order #...:	MJ07R1A8	Matrix.....:	SOLID
Date Sampled...:	05/26/11	Date Received..:	06/03/11		
Prep Date.....:	06/08/11	Analysis Date..:	06/13/11		
Prep Batch #...:	1159146				
Dilution Factor:	1				
% Moisture.....:	5.1	Method.....:	SW846 8330 (Modif		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Nitroguanidine	ND	0.25	mg/kg	0.020

LEVEL IV

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1A5 Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/09/11 Analysis Date..: 06/15/11
Prep Batch #...: 1160138
Dilution Factor: 0.99
% Moisture.....: 5.1 Method.....: SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Aroclor 1016	ND	33	ug/kg	8.2
Aroclor 1221	ND	66	ug/kg	11
Aroclor 1232	ND	33	ug/kg	8.2
Aroclor 1242	ND	33	ug/kg	8.2
Aroclor 1248	ND	33	ug/kg	8.2
Aroclor 1254	ND	33	ug/kg	8.2
Aroclor 1260	ND	33	ug/kg	8.2

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Decachlorobiphenyl	95	(65 - 135)
Tetrachloro-m-xylene	88	(65 - 135)

LEVEL IV

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1CA Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/09/11 Analysis Date..: 06/22/11
Prep Batch #...: 1160137
Dilution Factor: 0.99
% Moisture.....: 5.1 Method.....: SW846 8081A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
alpha-BHC	ND	1.7	ug/kg	0.22
gamma-BHC (Lindane)	ND	1.7	ug/kg	0.17
Heptachlor	ND	1.7	ug/kg	0.19
Aldrin	ND	1.7	ug/kg	0.21
beta-BHC	ND	1.7	ug/kg	0.33
delta-BHC	ND	1.7	ug/kg	0.16
Heptachlor epoxide	ND	1.7	ug/kg	0.12
Endosulfan I	ND	1.7	ug/kg	0.051
gamma-Chlordane	ND	1.7	ug/kg	0.052
alpha-Chlordane	ND	1.7	ug/kg	0.20
4,4'-DDE	0.73 J,PG	3.4	ug/kg	0.22
Dieldrin	ND	3.4	ug/kg	0.090
Endrin	ND	3.4	ug/kg	0.11
4,4'-DDD	ND	3.4	ug/kg	0.26
Endosulfan II	ND	3.4	ug/kg	0.099
4,4'-DDT	ND	3.4	ug/kg	0.40
Endrin aldehyde	ND	3.4	ug/kg	0.11
Methoxychlor	ND	17	ug/kg	1.3
Endosulfan sulfate	ND	3.4	ug/kg	0.091
Endrin ketone	ND	3.4	ug/kg	0.34
Toxaphene	ND	66	ug/kg	20

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Decachlorobiphenyl	85	(50 - 150)
Tetrachloro-m-xylene	85	(50 - 150)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%

MC 12.15.2011

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1A4 Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/09/11 Analysis Date..: 06/20/11
Prep Batch #...: 1160142
Dilution Factor: 0.99
% Moisture.....: 5.1 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Acenaphthene	ND	0.99	mg/kg	0.082
Acenaphthylene	ND	0.99	mg/kg	0.084
Anthracene	ND	0.99	mg/kg	0.085
Benzo(a)anthracene	ND	0.99	mg/kg	0.091
Benzo(b)fluoranthene	ND	0.99	mg/kg	0.094
Benzo(k)fluoranthene	ND	0.99	mg/kg	0.11
Benzo(ghi)perylene	ND	0.99	mg/kg	0.11
Benzo(a)pyrene	ND	0.99	mg/kg	0.093
bis(2-Chloroethoxy) methane	ND	0.99	mg/kg	0.087
bis(2-Chloroethyl)-ether	ND	0.99	mg/kg	0.080
bis(2-Ethylhexyl) phthalate	ND	5.0	mg/kg	0.097
4-Bromophenyl phenyl ether	ND	0.99	mg/kg	0.084
Butyl benzyl phthalate	ND	0.99	mg/kg	0.094
Carbazole	ND	0.99	mg/kg	0.094
4-Chloroaniline	ND	3.3	mg/kg	0.057
4-Chloro-3-methylphenol	ND	0.99	mg/kg	0.091
2-Chloronaphthalene	ND	0.99	mg/kg	0.080
2-Chlorophenol	ND	0.99	mg/kg	0.087
4-Chlorophenyl phenyl ether	ND	0.99	mg/kg	0.092
Chrysene	ND	0.99	mg/kg	0.083
Dibenzo(a,h)anthracene	ND	0.99	mg/kg	0.10
Dibenzofuran	ND	0.99	mg/kg	0.085
Di-n-butyl phthalate	ND	5.0	mg/kg	0.096
1,2-Dichlorobenzene	ND	3.3	mg/kg	0.074
1,3-Dichlorobenzene	ND	3.3	mg/kg	0.077
1,4-Dichlorobenzene	ND	3.3	mg/kg	0.076
3,3'-Dichlorobenzidine	ND	5.0	mg/kg	0.093
2,4-Dichlorophenol	ND	3.3	mg/kg	0.088
Diethyl phthalate	ND	0.99	mg/kg	0.089
2,4-Dimethylphenol	ND	0.99	mg/kg	0.17
Dimethyl phthalate	ND	0.99	mg/kg	0.086
4,6-Dinitro-2-methylphenol	0.14 J	2.0	mg/kg	0.080

(Continued on next page)

LEVEL IV

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1A4 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2,4-Dinitrophenol	ND	16	mg/kg	0.21
2,4-Dinitrotoluene	ND	0.99	mg/kg	0.088
2,6-Dinitrotoluene	ND	3.3	mg/kg	0.098
Di-n-octyl phthalate	ND	0.99	mg/kg	0.096
Fluoranthene	ND	0.99	mg/kg	0.094
Fluorene	ND	0.99	mg/kg	0.091
Hexachlorobenzene	ND	0.99	mg/kg	0.088
Hexachlorobutadiene	ND	5.0	mg/kg	0.081
Hexachlorocyclopenta-diene	ND	16	mg/kg	0.061
Hexachloroethane	ND	3.3	mg/kg	0.080
Indeno(1,2,3-cd)pyrene	ND	0.99	mg/kg	0.095
Isophorone	ND	5.0	mg/kg	0.092
2-Methylnaphthalene	ND	2.0	mg/kg	0.084
2-Methylphenol	ND	2.0	mg/kg	0.057
4-Methylphenol	ND	0.99	mg/kg	0.15
Naphthalene	ND	0.99	mg/kg	0.081
2-Nitroaniline	ND	16	mg/kg	0.083
3-Nitroaniline	ND	16	mg/kg	0.17
4-Nitroaniline	ND	16	mg/kg	0.087
Nitrobenzene	ND	0.99	mg/kg	0.075
2-Nitrophenol	ND	0.99	mg/kg	0.081
4-Nitrophenol	ND	16	mg/kg	0.28
N-Nitrosodiphenylamine	ND	3.3	mg/kg	0.085
N-Nitrosodi-n-propyl-amine	ND	0.99	mg/kg	0.083
2,2'-oxybis (1-Chloropropane)	ND	2.0	mg/kg	0.078
Pentachlorophenol	ND	16	mg/kg	0.050
Phenanthrene	ND	0.99	mg/kg	0.093
Phenol	ND	0.99	mg/kg	0.082
Pyrene	ND	0.99	mg/kg	0.093
1,2,4-Trichloro-benzene	ND	2.0	mg/kg	0.082
2,4,5-Trichloro-phenol	ND	2.0	mg/kg	0.082
2,4,6-Trichloro-phenol	ND	0.99	mg/kg	0.083

(Continued on next page)

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

GC/MS Semivolatiles

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R1A4 Matrix.....: SOLID

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorobiphenyl	72	(65 - 135)
2-Fluorophenol	68	(65 - 135)
Nitrobenzene-d5	62 /	~~(65 - 135)~~ 35-100
Phenol-d5	74	(65 - 135)
Terphenyl-d14	81	(65 - 135)
2,4,6-Tribromophenol	77	(65 - 135)

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

JC 12.12.11

LEVEL IV

PIKA International, Inc.

Client Sample ID: PCTss-002D-0001-SO

GC/MS Volatiles

Lot-Sample #...: G1F030473-003 Work Order #...: MJ07L1AC Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
Prep Date.....: 06/07/11 Analysis Date..: 06/07/11
Prep Batch #...: 1159051
Dilution Factor: 1
% Moisture.....: 24 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Methylene chloride	ND	5.0	ug/kg	0.84
4-Methyl-2-pentanone (MIBK)	ND	10	ug/kg	0.92
Styrene	ND	5.0	ug/kg	0.31
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	0.68
Tetrachloroethene	ND	5.0	ug/kg	0.61
Toluene	ND	5.0	ug/kg	0.61
1,1,1-Trichloroethane	ND	5.0	ug/kg	0.36
1,1,2-Trichloroethane	ND	5.0	ug/kg	0.44
Trichloroethene	ND	5.0	ug/kg	0.60
Vinyl chloride	ND	5.0	ug/kg	0.36
Xylenes (total)	ND	5.0	ug/kg	0.81
Acetone	5.3 J,B	10	ug/kg	1.4
Benzene	ND	5.0	ug/kg	0.26
Bromodichloromethane	ND	5.0	ug/kg	0.53
Bromoform	ND	5.0	ug/kg	0.40
Bromomethane	ND	5.0	ug/kg	0.86
2-Butanone (MEK)	ND	10	ug/kg	1.4
Carbon disulfide	ND	5.0	ug/kg	0.49
Carbon tetrachloride	ND	5.0	ug/kg	0.53
Chlorobenzene	ND	5.0	ug/kg	0.29
Dibromochloromethane	ND	5.0	ug/kg	0.21
Chloroethane	ND	5.0	ug/kg	0.45
Chloroform	ND	5.0	ug/kg	0.26
Chloromethane	ND	10	ug/kg	0.50
1,1-Dichloroethane	ND	5.0	ug/kg	0.29
1,2-Dichloroethane	ND	5.0	ug/kg	0.73
1,1-Dichloroethene	ND	5.0	ug/kg	0.26
1,2-Dichloroethene (total)	ND	5.0	ug/kg	0.64
1,2-Dichloropropane	ND	5.0	ug/kg	0.60
cis-1,3-Dichloropropene	ND	5.0	ug/kg	0.64
trans-1,3-Dichloropropene	ND	5.0	ug/kg	0.75
Ethylbenzene	ND	5.0	ug/kg	0.34
2-Hexanone	ND	10	ug/kg	0.74

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
4-Bromofluorobenzene	92	(65 - 135)
1,2-Dichloroethane-d4	98	(65 - 135)
Toluene-d8	104	(65 - 135)

(Continued on next page)

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

TOTAL Metals

Lot-Sample #...: G1F030473-004 Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
% Moisture.....: 5.1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1161109						
U Silver	ND	0.53 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.095	06/10-06/14/11	MJ07R1AC
Aluminum	10600	22.1 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 5.9	06/10-06/14/11	MJ07R1AD
Arsenic	8.4	2.2 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 1.4	06/10-06/14/11	MJ07R1AE
Barium	81.7	2.1 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.13	06/10-06/14/11	MJ07R1AF
Beryllium	0.45	0.32 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.032	06/10-06/14/11	MJ07R1AG
J+/Q,#III Calcium	954	105 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 4.7	06/10-06/14/11	MJ07R1AH
Cadmium	0.13 B	0.32 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.032	06/10-06/14/11	MJ07R1AJ
Cobalt	7.7	0.63 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.26	06/10-06/14/11	MJ07R1AK
Chromium	14.5	1.3 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.15	06/10-06/14/11	MJ07R1AL
Copper	12.1	2.6 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.23	06/10-06/14/11	MJ07R1AM
Iron	17600	10.5 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 1.2	06/10-06/14/11	MJ07R1AN
Potassium	654	105 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 10.5	06/10-06/14/11	MJ07R1AP
Magnesium	1770	52.7 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 4.7	06/10-06/14/11	MJ07R1AQ
Manganese	833	1.3 Dilution Factor: 1	mg/kg	SW846 6010B MDL.....: 0.26	06/10-06/14/11	MJ07R1AR

(Continued on next page)

LEVEL IV

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

TOTAL Metals

Lot-Sample #...: G1F030473-004 Matrix.....: SOLID

	PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
J	Sodium	35.6 B	527	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AT
			Dilution Factor: 1		MDL.....: 11.6		
	Nickel	18.5	1.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AU
			Dilution Factor: 1		MDL.....: 0.25		
J-/Q,*II	Lead	34.1	2.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AV
			Dilution Factor: 1		MDL.....: 0.27		
UJ/C,Q	Antimony	ND	1.6	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AW
			Dilution Factor: 1		MDL.....: 0.99		
U	Selenium	ND	2.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1AX
			Dilution Factor: 1		MDL.....: 1.5		
U	Thallium	ND	2.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1A0
			Dilution Factor: 1		MDL.....: 0.89		
	Vanadium	24.4	1.1	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1A1
			Dilution Factor: 1		MDL.....: 0.20		
	Zinc	62.4	3.2	mg/kg	SW846 6010B	06/10-06/14/11	MJ07R1A2
			Dilution Factor: 1		MDL.....: 0.20		
	Prep Batch #...: 1165205						
	Mercury	0.049	0.040	mg/kg	SW846 7471A	06/14/11	MJ07R1CC
			Dilution Factor: 1		MDL.....: 0.0086		

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL

LEVEL IV

PIKA International, Inc.

Client Sample ID: PCTss-002M-0001-SO

General Chemistry

Lot-Sample #...: G1F030473-004 Work Order #...: MJ07R Matrix.....: SOLID
Date Sampled...: 05/26/11 Date Received..: 06/03/11
% Moisture.....: 5.1

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
J Cyanide, Total	0.19 B	0.53	mg/kg	SW846 9012A	06/08-06/09/11	1160026
		Dilution Factor: 1		MDL.....: 0.11		
UJ/L,Q,HH Nitrocellulose	ND	5.0	mg/kg	TAL-SOP WS-WC-005	06/15-06/16/11	1166054
		Dilution Factor: 1		MDL.....: 0.78		
*Percent Moisture	5.1	0.10	%	ASTM D 2216-90	06/15-06/16/11	1166183
		Dilution Factor: 1		MDL.....: 0.10		

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

B Estimated result. Result is less than RL.

*Analysis not validated

LEVEL IV

Client: TestAmerica Laboratories, Inc.

Job Number: 280-16702-1
Sdg Number: G1F030473

Client Sample ID: PCTSS-002M-0001-SO

Lab Sample ID: 280-16702-3
Client Matrix: Solid

Date Sampled: 05/26/2011 1120
Date Received: 06/08/2011 0930

6860 Perchlorate by IC/MS or IC/MS/MS

Analysis Method:	6860	Analysis Batch:	280-72023	Instrument ID:	LC_LCMS1
Prep Method:	6860	Prep Batch:	280-71220	Lab File ID:	IC11F15026.d
Dilution:	1.0			Initial Weight/Volume:	10.02 g
Analysis Date:	06/16/2011 1954			Final Weight/Volume:	100 mL
Prep Date:	06/09/2011 1658			Injection Volume:	250 uL

Analyte		DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Perchlorate	U		ND		0.040	0.50

LEVEL IV

APPENDIX B

Validator Checklists

U.S. Army Corps of Engineers Louisville District - LCG

VOLATILE ORGANIC ANALYSIS CHECKLIST

Project Name: Ravenna Group 2 Propellant Can Tops

Laboratory: Test America — West Sacramento

Batch Number(s): 1159051

Sample Delivery Group (SDG): G1F030473

	Yes	No
1. Holding Time:		
(a) Were samples preserved? (FTB only)	[✓]	[✓] (soil)
(b) Were samples analyzed within holding time?	[✓]	[ ]
2. Was the BFB tune performed at the beginning of each 12-hour period during which samples were analyzed?	[✓]	[ ]
3. Was mass assignment based on m/z 95?	[✓]	[ ]
4. Indicate if BFB ions abundance relative to m/z 95 base peak met the ions abundance criteria:		

m/z	Acceptance Criteria		
50	15.0 - 40.0 %	[✓]	[ ]
75	30.0 - 66.0 %	[✓]	[ ]
95	**100%, Base Peak**	[✓]	[ ]
96	5.0 - 9.0%	[✓]	[ ]
173	<2.0% of m/z 174	[✓]	[ ]
174	>50%	[✓]	[ ]
175	5.0 - 9.0% of mass 174	[✓]	[ ]
176	95.0 - 101.0% of m/z 174	[✓]	[ ]
177	5.0 - 9.0% of m/z 176	[✓]	[ ]

The relative ion abundance of m/z 95/96, m/z 174/176, and 176/177 are of critical importance.

The relative ion abundance of m/z 50 and 75 are of lower importance.

	Yes	No
5. Initial Calibration:		
• Did the initial calibration consist of five standards? (nine)	[✓]	[ ]
• Did the System Performance Check Compounds (SPCC) meet the minimum mean response factor (RF)?		
RF		
Chloromethane 0.1	[✓]	[ ]
1,1-Dichloroethane 0.1	[✓]	[ ]
Bromoform 0.1	[✓]	[ ]
Chlorobenzene 0.3	[✓]	[ ]
1,1,2,2-Tetrachloroethane 0.3	[✓]	[ ]
• Did the RSD meet the criteria ≤ 30% for each individual Calibration Check Compound (CCC)?		
1,1-Dichloroethene	[✓]	[ ]
Chloroform	[✓]	[ ]
1,2-Dichloropropane	[✓]	[ ]
Toluene	[✓]	[ ]
Ethylbenzene	[✓]	[ ]
Vinyl chloride	[✓]	[ ]
• Are the RSDs for the remaining target analytes ≤ 15% or r ≥ 0.99 with a mean RSD ≤ 15% with a maximum RSD ≤ 20%?	[✓]	[ ]
If the answer is "No", are the mean RSDs ≤ 15%?	[ ]	[ ]
• Was manual integration "M" performed?	[✓]	[ ]
If the answer is "Yes", check for supporting documents.	[✓]	[ ]
• Was the manual integration necessary?	[✓]	[ ]
If the answer is "No", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
6. QCMDL:	[ ]	[✓]
• Was MDL Check performed?		
7. QCMRL:	[✓]	[ ]

	Yes	No
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours?	[✓]	[ ]
• Was the QC/MRL between 70-130% R	[✓]	[ ]
• For the non-contaminants of concern was the QC/MRL between 60-140% (Sporadic Marginal Failure) N/A	[ ]	[ ]

8. Initial Calibration Verification (ICV): [✓] [ ]

• Is the mid level (2nd source) recovery within 80 - 120% for contaminants of concern ?

• Is the mid level (2nd source) recovery within 60-140% for non-contaminants of concern (Sporadic Marginal Failure)? N/A

9. Continuing Calibration Verification (CCV):

		Yes	No
• Was CCV conducted every 12 hours?		[✓]	[ ]
• Did SPCC meet the RF values?		[✓]	[ ]
RF			
Chloromethane	0.1	[✓]	[ ]
1,1-Dichloroethane	0.1	[✓]	[ ]
Bromoform	0.1	[✓]	[ ]
Chlorobenzene	0.3	[✓]	[ ]
1,1,2,2-Tetrachloroethane	0.3	[✓]	[ ]
• Did the CCC meet the minimum requirements (D ≤ 20%)?		[✓]	[ ]
1,1-Dichloroethene		[✓]	[ ]
Chloroform		[✓]	[ ]
1,2-Dichloropropane		[✓]	[ ]
Toluene		[✓]	[ ]
Ethylbenzene		[✓]	[ ]
Vinyl chloride		[✓]	[ ]
• Primary Evaluation: Was the mean, Drift or D ≤ 20% from the initial calibration?		[✓]	[ ]

• Alternative Evaluation: Maximum allowable Drift/D for

	Yes	No
each target analyte is ≤ 30% when mean D ≤ 20%? N/A	[ ]	[ ]

10. Sample Analysis:

• Was the RRT of an identified component within ± 0.06 RRT units of the RRT of the standard component?	[✓]	[ ]
• Did the abundance of ions in the sample spectra agree within 30% of the major ions (> 10% of the base ion) in the standard spectra?	[✓]	[ ]
• Were the internal standard areas within the QC limits (from -50% to +200%)?	[✓]	[ ]

11. Sample Quality Control:

• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[✓]	[ ]
• MS/MSD: Were the percent recoveries within limits? N/A	[ ]	[ ]
Were the RPD within control limits? ↓	[ ]	[ ]
System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits ~~(50-150%)~~? QSM Table D-3	[✓]	[ ]

12. Comments (attach additional sheets if necessary):

Validated/Reviewed by:
Signature: LA Calvin

Date: 12.08.2011

Name: Lynn S. Calvin

SEMIVOLATILE ORGANIC ANALYSIS CHECKLIST

Project Name: Ravenna Group 2 Propellant Can Tops

Laboratory: TestAmerica – West Sacramento

Batch Number(s): 1160142

Sample Delivery Group: G1F030473

		Yes	No
1.	Sample Holding Time: (not validated)		
	(a) Were samples extracted within holding time? ER	[✓] (soil)	[✓]
	(b) Were samples analyzed within holding time?	[✓]	[ ]
2.	Instrument Tuning:		
	Was the DFTPP tune performed at the beginning of each 12-hour period during which samples were analyzed?	[✓]	[ ]
3.	Ion Mass Assignments:		
	Was mass assignment based on m/z 198?	[✓]	[ ]
4.	Ion Abundance:		
	Indicate if DFTPP ions abundance relative to m/z 198 base peak met the ions abundance criteria:		

m/z	Acceptance Criteria		
51	30.0 - 60.0 %	[✓]	[ ]
68	< 2% of mass 69	[✓]	[ ]
70	< 2% of mass 69	[✓]	[ ]
127	40-60%	[✓]	[ ]
197	< 1%	[✓]	[ ]
198	**100%, Base peak**	[✓]	[ ]
199	5-9%	[✓]	[ ]
275	10 - 30%	[✓]	[ ]
365	> 1%	[✓]	[ ]
441	present but < mass 443	[✓]	[ ]
442	> 40%	[✓]	[ ]
443	17-23% of mass 442	[✓]	[ ]

	Yes	No
5.0 Initial Calibration:		
• Did the initial calibration consist of five or more 5-stds standards? (eight more)	[✓] [✓]	[ ] [ ]
If the calibration curve consists of 5-standards, check validity of the calibration model.		
Was the linear model applied?	[✓]	[ ]
• Did the followings System Performance Check Compounds (SPCC) meet the minimum mean response factor (RF)?		
RF		
N-nitroso-di-n-propylamine 0.05	[✓]	[ ]
Hexachlorocyclopentadiene 0.05	[✓]	[ ]
2,4-dinitrophenol 0.05	[✓]	[ ]
4-nitrophenol 0.05	[✓]	[ ]
• Did the RSD meet the criteria ≤ 30% for the followings each individual Calibration Check Compound (CCC)?		
Base/Neutral Fraction:		
Acenaphthene	[✓]	[ ]
1,4-Dichlorobenzene	[✓]	[ ]
Hexachlorobutadiene	[✓]	[ ]
Diphenylamine	[✓]	[ ]
Di-n-octylphthalate	[✓]	[ ]
Fluoranthene	[✓]	[ ]
Benzo(a)pyrene	[✓]	[ ]
Acid Fraction:		
4-Chloro-3-methylphenol	[✓]	[ ]
2,4-Dichlorophenol	[✓]	[ ]
2-Nitrophenol	[✓]	[ ]
Phenol	[✓]	[ ]
Pentachlorophenol	[✓]	[ ]
2,4,6-Trichlorophenol	[✓]	[ ]
• Are the RSDs for the remaining target analytes ≤ 15%? (one r2)	[✓]	[ ]
• If the answer is "No", are the mean RSDs ≤ 15% or r ≥ 0.99 with a mean RSD ≤ 15% with a maximum RSD ≤ 30%?	[✓]	[ ]

	Yes	No
• Was manual integration "M" performed?	[✓]	[ ]
If the answer is "Yes", check for supporting documents.		
• Was the manual integration necessary?	[✓]	[ ]
If the answer is "No", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
6. QCMDL:		
• Was MDL Check performed?	[ ]	[✓]
7. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours?	[✓]	[ ]
• Was the QC/MRL between 70-130% R	[✓]	[ ]
• For the non-contaminants of concern was the QC/MRL between 50-150% (Sporadic Marginal Failure)? N/A	[ ]	[ ]
8. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within 70-130% for contaminants of concern ?	[✓]	[ ]
• Is the mid level (2nd source) recovery within 50-150% for non-contaminants of concern (Sporadic Marginal Failure)? N/A	[ ]	[ ]
9. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 12 hours?	[✓]	[ ]
• Did any of SPCC meet the minimum RF values?	[✓]	[ ]

		Yes	No
N-nitroso-di-n-propylamine	0.05	[✓]	[ ]
Hexachlorocyclopentadiene	0.05	[✓]	[ ]
2,4-dinitrophenol	0.05	[✓]	[ ]
4-nitrophenol	0.05	[✓]	[ ]

- Did the CCC meet the minimum requirements (D ≤ 20%) for the followings?

Base/Neutral Fraction:

Acenaphthene	[✓]	[ ]
1,4-Dichlorobenzene	[✓]	[ ]
Hexachlorobutadiene	[✓]	[ ]
Diphenylamine	[✓]	[ ]
Di-n-octylphthalate	[✓]	[ ]
Fluoranthene	[✓]	[ ]
Benzo(a)pyrene	[✓]	[ ]

Acid Fraction:

4-Chloro-3-methylphenol	[✓]	[ ]
2,4-Dichlorophenol	[✓]	[ ]
2-Nitrophenol	[✓]	[ ]
Phenol	[✓]	[ ]
Pentachlorophenol	[✓]	[ ]
2,4,6-Trichlorophenol	[✓]	[ ]

- Primary Evaluation: Was Drift or D ≤ 20% calculated from the initial calibration? [✓] [ ]
- Alternative Evaluation: Maximum allowable Drift/D for each target analyte is ≤ 30%. N/A [ ] [ ]

10. Sample Analysis:

- Was the RRT of an identified component within ± 0.06 RRT units of the RRT of the standard component? [✓] [ ]
- Did the abundance of ions in the sample spectra agree within 30% of the major ions (> 10% of the base ion) in the standard spectra? [✓] [ ]
- Were the internal standard areas within the QC limits (from -50% to +200%)? [✓] [ ]

11. Sample Quality Control:

	Yes	No
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[✓]	[ ]
• MS/MSD: Were the percent recoveries within limits? 11% / 3,3' dichlorobenzidine in both MS & MSD	[ ]	[✓]
Were the RPD within control limits?	[✓]	[ ]
• System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits?	[✓]	[ ]

12. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: L A Calvin Date: 12.9.2011

Name: Lynn S. Calvin

POLY CHLORINATED BIPHENYLS (PCB/AROCLORS) CHECKLIST

Project Name: Ravenna Group 2 Propellant Can Tops

Laboratory: TestAmerica – West Sacramento

Batch Number(s): 1160138

Sample Delivery Group: 691F030473

	Yes	No
1. Holding Time:		
(a) Were samples extracted within holding time? (ER)	[✓]	[ ]
(b) Were samples analyzed within holding time?	[✓]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of five standards? (eight)	[✓]	[ ]
• Did Aroclors 1016 and 1260 meet the RSD ≤ 20% or the r ≥ 0.99?	[ ]	[ ]
• Was manual integration "M" performed? If the answer is "Yes", check for supporting documents.	[✓]	[ ]
• Was the manual integration necessary?	[✓]	[ ]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
3. QCMDL:		
• Was MDL Check performed?	[ ]	[✓]
4. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours?? (not required QSM)	[ ]	[✓]
• Was the QC/MRL between 70-130% R N/A	[ ]	[ ]
5. Initial Calibration Verification (ICV):		
Is the mid level (2nd source) recovery within 85 - 115%?	[✓]	[ ]

	Yes	No
6. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 12 hours?	[✓]	[ ]
• Was average Drift or D ≤ 15% from the initial calibration with a maximum %D < 20% for a specific compound?	[✓]	[ ]
7. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires?	[✓]	[ ]
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed? N/A	[ ]	[ ]
• Were identified Aroclors confirmed on a second GC column? N/A - no detects	[ ]	[ ]
• Were individual Aroclor standards used to determine the pattern of the peaks? (Individual Aroclors are 1221, 1232, 1242, 1248, and 1254. Both Aroclor 1016, and 1260 can be used from the mixed calibration standards.)	[✓]	[ ]
• Was RPD of target analyte conformation ≤ 40? N/A	[ ]	[ ]
8. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits? LCS/LCSD RPDs ≤ 30% QSM Table F-2	[✓]	[ ]
• MS/MSD: Were the percent recoveries within limits?	[✓]	[ ]
Were the RPDs within control limits?	[✓]	[ ]
• System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits?	[✓]	[ ]

9. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: L Calvin Date: 12-8-2011

Name: Lynn S. Calvin

VERSION 5
June 2002

U.S. Army Corps of Engineers Louisville District - LCG

ORGANOCHLORINE PESTICIDES ANALYSIS CHECKLIST

Project Name: Ravenna Groups 2 Propellant Can Tops

Laboratory: TestAmerica – West Sacramento

Batch Number(s): 1160137

Sample Delivery Group: CA1F030473

	Yes	No
1. Holding Time:		
(a) Were samples extracted within holding time?	[✓]	[✓] (COR only)
(b) Were samples analyzed within holding time?	[✓]	[ ]
2. DDT/Endrin Breakdown:		
• Was breakdown ≤ 15%?	[✓]	[ ]
3. Initial Calibration:		
• Did the initial calibration consist of five standards? (eight)	[✓]	[ ]
• Did all compounds meet the RSD ≤ 20% or r ≥ 0.99?	[✓]	[ ]
• Was manual integration "M" performed? If the answer is "Yes", check for supporting documents.	[✓]	[ ]
• Was the manual integration necessary?	[✓]	[ ]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
4. QCMDL:		
• Was MDL Check performed?	[ ]	[✓]
5. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[✓]	[ ]
• Was the QC/MRL between 70-130% R	[✓]	[ ]

(recoveries affecting sample results)

	Yes	No
6. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within 85 - 115%?	[✓]	[ ]
7. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 12 hours?	[✓]	[ ]
• Was Drift or D ≤ 15% from the initial calibration with a maximum D ≤ 20% for a specific compound? DDT, methoxychlor	[ ]	[✓]
8. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires?	[✓]	[ ]
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed? N/A	[ ]	[ ]
• Were identified compounds confirmed on a second GC column? changed. lab reported (2nd column) value to primary column concentration	[✓]	[ ]
• Was RPD of target analyte confirmation ≤ 40? 4,4'-DDT 94%	[ ]	[✓]
9. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits? LCS/LCSD RPDs ≤ 30%	[✓]	[ ]
• MS/MSD: Were the percent recoveries within limits?	[✓]	[ ]
Were the RPD within control limits?	[✓]	[ ]
• System Monitoring Compounds (Surrogates): are surrogate recoveries within QC limits?	[✓]	[ ]

10. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: Lynn S. Calvin

Date: 12.08.2011

Name: Lynn S. Calvin

NITROAROMATICS & NITRAMINE DATA ANALYSIS (EXPLOSIVE RESIDUES) CHECKLIST (Nitroguanidine)

Project Name: Ravenna Group 2 Propellant Can Tops

Laboratory: TestAmerica - West Sacramento

Batch Number(s): 1159146

Sample Delivery Group: 691F030423

	Yes	No
1. Holding Time: Were samples analyzed within holding time?	[✓] (soil)	[✓] (CBR only)
2. Initial Calibration:		
• Did the initial calibration consist of five standards? (six)	[✓]	[ ]
• Did the RSD meet the criteria ≤ 20% for each individual Calibration Compound or r ≥ 0.99?	[✓]	[ ]
• Was manual integration "M" performed? If the answer is "Yes", check for supporting documents.	[ ]	[✓]
• Was the manual integration necessary? N/A	[ ]	[ ]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
3. QCMDL:		
• Was MDL Check performed?	[ ]	[✓]
4. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[✓]	[ ]
• Was the percentage "D" for QC/MRL ≤ 30%?	[ ]	[ ]
5. Initial Calibration Verification (ICV):	[✓]	[ ]

	Yes	No
• Was the ICV made of a 2nd source?	[✓]	[ ]
• Was the mid level (2nd source) recovery within 85 - 115%?		
6. Continuing Calibration Verification (CCV): {Daily calibration}		
• Was midpoint calibration standard conducted at the beginning of the day?	[✓]	[ ]
• Was midpoint calibration standard conducted every ten samples or every twelve hours?	[✓]	[ ]
• Was midpoint calibration standard conducted after the last sample of the day?	[✓]	[ ]
• Did the CCV meet the minimum requirements (D ≤ 15% with a maximum D ≤ 20% for a specific compound if the mean D ≤ 15%)?	[✓]	[ ]
7. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires?	[✓]	[ ]
• Were all identified hits, above the initial calibration curve, diluted and reanalyzed? N/A	[ ]	[ ]
• Were all identified hits confirmed on a second column?	[ ]	[✓]
• Was RPD of target analyte confirmation ≤ 40? N/A	[ ]	[ ]
• Was there a shoulder on the 2,4,6-TNT peak? N/A	[ ]	[ ]
If the answer is "Yes", then tetryl decomposition is suspected. Peak height rather than peak area should be used for calculating TNT concentration. If teryl was identified in aqueous samples, was pH adjusted to <3? If the answer is "No", then check for tetryl decomposition, and qualify hits with "J" accordingly.	[ ]	[ ]
8. Sample Quality Control:	[✓]	[ ]
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?		

	Yes	No
• MS/MSD: Were the percent recoveries within limits?	[✓]	[ ]
Were the RPDs within control limits?	[✓]	
• System Monitoring Compounds (Surrogates): Were surrogate recoveries within QC limits?	[✓]	[ ]

9. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: LH Calvin Date: 12-09-2011

Name: Lynn S. Calvin

NITROAROMATICS & NITRAMINE DATA ANALYSIS (EXPLOSIVE RESIDUES) CHECKLIST

Project Name: Ravenna Groups 2 Propellant Can Tops

Laboratory: TestAmerica – West Sacramento

Batch Number(s): 1159446MC 1159133

Sample Delivery Group: C91F030473

	Yes	No
1. Holding Time: Were samples analyzed within holding time?	[✓]	[✓] (ER only)
2. Initial Calibration:		
• Did the initial calibration consist of five standards? (eight)	[✓]	[ ]
• Did the RSD meet the criteria ≤ 20% for each individual Calibration Compound or r ≥ 0.99?	[✓]	[ ]
• Was manual integration "M" performed? If the answer is "Yes", check for supporting documents.	[✓]	[ ]
• Was the manual integration necessary?	[✓]	[ ]
If the answer is "no", contact the laboratory inquiring about the reasons behind the manual integration, and **inform the District Chemist immediately if there were no valid reasons.**		
3. QCMDL:		(no)
• Was MDL Check performed?	[X]	[X] MC
4. QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[✓]	[ ]
• Was the percentage "D" for QC/MRL ≤ 30%? for recoveries affecting sample results	[✓]	[ ]
5. Initial Calibration Verification (ICV):	[✓]	[ ]

	Yes	No
• Was the ICV made of a 2nd source?	[✓]	[ ]
• Was the mid level (2nd source) recovery within 85 - 115%?	[✓]	
6. Continuing Calibration Verification (CCV): {Daily calibration}		
• Was midpoint calibration standard conducted at the beginning of the day?	[✓]	[ ]
• Was midpoint calibration standard conducted every ten samples or every twelve hours?	[✓]	[ ]
• Was midpoint calibration standard conducted after the last sample of the day?	[✓]	[ ]
• Did the CCV meet the minimum requirements (D ≤ 15% with a maximum D ≤ 20% for a specific compound if the mean D ≤ 15%)?	[✓]	[ ]
7. Sample Analysis:		
• Was the RRT of an identified component within the retention time window created as SW-846 requires?	[✓]	[ ]
• Were all identified hits, above the initial calibration curve, diluted and reanalyzed? N/A	[ ]	[ ]
• Were all identified hits confirmed on a second column? 2nd column analyzed – no detects	[✓]	[ ]
• Was RPD of target analyte confirmation ≤ 40? N/A	[ ]	[ ]
• Was there a shoulder on the 2,4,6-TNT peak? N/A	[ ]	[X N/A]
If the answer is "Yes", then tetryl decomposition is suspected. Peak height rather than peak area should be used for calculating TNT concentration. If teryl was identified in aqueous samples, was pH adjusted to <3? If the answer is "No", then check for tetryl decomposition, and qualify hits with "J" accordingly.	[ ]	[ ]
8. Sample Quality Control:	[✓]	[ ]
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?		

	Yes	No
• MS/MSD: Were the percent recoveries within limits?	[✓]	[ ]
Were the RPDs within control limits?	[✓]	
• System Monitoring Compounds (Surrogates): Were surrogate recoveries within QC limits?	[✓]	[ ]

9. Comments (attach additional sheets if necessary):

Validated/Reviewed by:

Signature: LM Calvin Date: 12.9.2011

Name: Lynn S. Calvin

ICP METALS ANALYSIS (6010) & Hg CHECKLIST

Project Name: Ravenna Propellant Cans

Laboratory: TA-West Sacramento

Batch Number(s): _____

Sample Delivery Group: G1F030473

	Yes	No
1. Holding Time:		
• Were samples analyzed within holding time (6-Months)?	[N]	[ ]
2. Initial Calibration:		
• Did the initial calibration consist of		
One calibration standard and a blank?	[ ]	[ ]
three calibration standards and a blank?	[N]	[ ]
• Was R ≥ 0.995	[ ]	[ ]
3. QCMDL:		
• Was MDL Check performed?	[ ]	[N]
QCMRL:		
• Were QC/MRL run at the beginning and end of every daily sequence or every 12 hours??	[N]	[ ]
• Was the QC/MRL between 70-130% R? Common Elements can be between the MRL and 2X MRL level (Fe, Al, Mg and Ca)	[N]	[ ]
4. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within 90 - 110%?	[N]	[ ]
5. Initial Calibration Blank (ICP):		

	Yes	No
• Were analytes in the blank ≤ 1/2 MRL?	N	[ ]
6. Interelement Check Standard:		
• Was ICS-A (interferents only) conducted at the beginning of analytical sequence?	N	[ ]
• Was ICS-AB results within QC limits (80-120)?	N	[ ]
7. Continuing calibration Blank (CCB):		
• Was CCB conducted every 10 samples?	N	[ ]
• Was CCB conducted at end of the analytical sequence?	N	[ ]
• Were analytes ≤ 1/2 MRL?	[ ]	[ ]
8. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 10 samples?	[ ]	[ ]
• Was CCV conducted at end of the analytical sequence?	[ ]	[ ]
• Was the %R between 90-110?	[ ]	[ ]
9. Sample Analysis:		
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed? N/A	[ ]	[ ]
10. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	N	[ ]
• LCS: Were the percent recoveries for LCS within the limits? 80-120	PM OK	[ ]
• MS: Were the percent recoveries within limits? 80-120% + 20% PCT55-0021M-0001 ER + SO	[ ]	N
• MD: Were the RPDs within control limits?	[ ]	N
11. Serial Dilution:		
• Was serial dilution (1:4) conducted when needed?	N	[ ]

	Yes	No
• Was there an agreement between diluted and undiluted results (<10%)?	[N]	[ ]

12. Method of Standard Addition (MSA):

• Was MSA performed on samples suspected of matrix effect (R ≥ 0.995)? N/A	[ ]	[ ]

13. Comments (attach additional sheets if necessary):

MS/D Sb (32, 34), Ca (87, 125) + 31% RPD, Pb (100, 68) + 21 % RPD

CRDL ~~Sb~~ = OK

Hg - no raw absorbances for samples, ICV, CCVs, etc.

ER has Se J but ND in soil

Soil 1.03 g to 100 ml / 0.63 g to 55 ml
94.9 % solids

Hg SD 23%

Validated/Reviewed by:

Signature: Patti Meeks

Date: 12/13/2011

Name: Patti Meeks

ICV ~~17:~~ 6/14 @ 15:43 + 46
CCV 16:35 + 17:05

CYANIDE ANALYSIS CHECKLIST, Nitrocellulose & Perchlorate

Project Name: Ravenna Propellant Can Top

Laboratory: TA-West Sacramento

Batch Number(s): _____

Sample Delivery Group: G1F030473

	Yes	No
1. Holding Time:		
• Were samples analyzed within holding time?	[ ]	N NO_3/NO_2 as N only
2. Initial Calibration:		
• Did the initial calibration consist of		
One calibration standard and a blank?	[ ]	[ ]
Six calibration standards and a blank?	N	[ ]
• Was $R \geq 0.995$	N	[ ]
3. QCMDL:		
• Was MDL Check performed?	N (CN)	[ ]
4. QCMRL:		
• Were QC/MRL run at the beginning of every daily sequence??	N/A [ ]	[ ]
• Was the QC/MRL between 70-130% R?	↓ [ ]	[ ]
5. Initial Calibration Verification (ICV):		
• Is the mid level (2nd source) recovery within 80-120%?	N	[ ]
7. Initial calibration Blank (ICP):		
• Were analytes in the blank ≤ 1/2 MRL?	N	[ ]

	Yes	No
7. Continuing calibration Blank (CCB):	[✓]	[ ]
• Was CCB conducted every 10 samples?	[✓]	[ ]
• Was CCB conducted at end of the analytical sequence?	[✓]	[ ]
• Were analytes ≤ 1/2 MRL?		
8. Continuing Calibration Verification (CCV):		
• Was CCV conducted every 10 samples?	[✓]	[ ]
• Was CCV conducted at end of the analytical sequence?	[✓]	[ ]
• Was the %R between 80-120?	[✓]	[ ]
9. Sample Analysis:		
• Were samples with levels higher than the calibration range (E), diluted and re-analyzed? N/A	[ ]	[ ]
12. Sample Quality Control:		
• Method Blanks: Were target analytes ≤ 1/2 MRL?	[✓]	[ ]
• LCS: Were the percent recoveries for LCS within the limits?	[ ]	[✓]
• MS: Were the percent recoveries within limits?	[ ]	[✓]
• MD: Were the RPDs within control limits?	[✓]	[ ]

13. Comments (attach additional sheets if necessary):

N/N LCS 45% R Collected 5/26 analyzed 6/16
MRL 12.6%
NO_2 & NO_3 ppm %RS w/in 90-110%
using 0.178 factor instead of CRREL 0.126 factor
MS/D on RTSS-003M-0001-SO (35,26%) lab = 34-115% RPD 31 lab 71

CN: MS/MSD RTSS-002M-0001-SO +GP OK analyzed 6/9

ClO_4 received a TM-Den @ 0.6°C
MS/D RTSS-001M-0001-SO (123, 126) but ND lab 80-120% ±5
LCS-OK
ICS - 119%
IS-OK

p 2406

	Yes	No

Validated/Reviewed by:

Signature: Patti Meeks

Date: 12/14/2011

Name: Patti Meeks

Appendix J

Comment Response Table

Draft Investigation Report for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna Ohio
October 24, 2011

Cmt #	Pg #/ Line #	Comment	Recommendation/ Requirement	Response
Ohio EPA NEDO DERR - Eileen T. Mohr				
O-1	7/29	Text change.	Change text to read: "The following tasks were…" (The text already indicated that there was one primary objective.)	The text on page 7, line 29 will be changed to read "*The following tasks were achieved during the investigation:*"
O-2	8/18	Move text.	After the existing text, add: The Camp Ravenna perimeter fence encloses both installations. (The text is being moved from pg. 10/16-19.)	The text on page 10, lines 16-19 which reads "*The Camp Ravenna perimeter fence encloses both installations" will be moved to follow the sentence on page 8, line 18*."
O-3	10/1	Text change.	Change to: "Demilitarization of various other…."	The noted text on page 10, line 1 will be changed to read "*Demilitarization of various other munitions was conducted from October 1982 through 1992*."
O-4	10/11-17	Text deletion.	Delete this paragraph, as it is basically a duplication of information found on page 8.	The noted text on page 10, line 11-17 will be deleted.
O-5	11/23	Text change.	Change to: "A map showing…."	The text on page 10, line 23 will be changed to read "*A map showing the location of the Building DB-802 within LL2 is presented in Appendix B, Figure 4*."
O-6	18/6-7	Text change.	Change text to read: "…activities, 100-foot by 100-foot grids were surveyed and marked across the site…."	The noted sentence on page 18, will be changed to read "*Prior to initiating the geophysical activities,*

				100-foot by 100-foot grids were surveyed and marked across the site to facilitate the investigation."
O-7	19/1-2	Clarification requested.	Clarify whether or not the assertion that there was/is no disturbance of the sub-surface lithology is based upon the GPR or some other observation. Add to the text.	To clarify, the noted text on page 19, lines 1-2 will be revised to read "*Additionally, based upon the GPR data results there were no signs of disturbance within the subsurface lithology (i.e., signs of excavation and dumping).*"
O-8	19/24	Text change.	Revise text to read: "… representatives from the Ohio EPA to evaluate…" (The assumption would be that PIKA would be present.)	The noted text on page 19, line 24 will be revised to read "*Prior to collecting the sample, a site walk was conducted on 25 May 2011 with representatives from the Ohio EPA to evaluate each of the anomaly cluster areas for selecting the three (3) MI sample areas.*"
O-9	21/17	Text change.	Change to: "…above the RSL and/or RVAAP- specific Surface Soil…"	The noted text on page 21, line 17 will be changed to read "*The RVAAP full suite sample (MI sample Area 2, Sample PCTss-002M-0001) did show detectable concentrations for five (5) metal analytes (arsenic, lead, mercury, vanadium, zinc) that are slightly above the RSL and/or RVAAP-specific Surface Soil Background Criteria*."

O-10	21/29-32	Text change.	Revise to read: "… each of the MI samples were sent to the laboratory. Subsequent to lab analyses, excess soils were disposed of by the laboratory. As such, no IDW was generated that required disposal by PIKA."	The noted text on page 21, lines 29-32 will be revised to read "*Additionally, all the soils generated from the 30 aliquots at each of the MI samples were sent to the laboratory. Subsequent to lab analyses, excess soils were disposed of by the laboratory. As such, no IDW was generated that required disposal by PIKA*.
O-11	25/16	Text change.	Change to: "…above the RSL and/or RVAAP- specific Surface Soil…"	The noted text on page 25, line 16 will be revised to read "T*he RVAAP full suite sample (MI sample Area 2, Sample PCTss-002M-0001) did show detectable concentrations for five (5) metal analytes (arsenic, lead, mercury, vanadium, zinc) that are slightly above the RSL and/or RVAAP-specific Surface Soil Background Criteria*."
O-12	25/20	Text change.	Change to: "...estimated, i.e., below the reporting limit." (The screening levels have nothing to do with the flagging.)	The noted text on page 25, line 20 will be changed to read "*Both perchlorate and propellants were reported at MI Sample Area 1 (sample PCTss-001M-0001-SO); including the associated duplicate sample, and also at MI Sample Area 3 (sample PCTss-003M-0001-*

				SO), however each result was flagged as estimated, i.e., below the reporting limit."
O-13	25	Notes to Army.	1. Subsurface samples need to be taken. 2. The other 2 clusters need to have sampling conducted. 3. What are the plans for investigating the individual anomalies? 4. What are the plans for AOC clean-up?	Acknowledged.
O-14	App A	Point of information.	Did not review the SOW.	Acknowledged.
O-15	App B/ Fig 1	Map change.	Need to add AOC boundaries to the key, or remove from the lower map.	Appendix B, Figure 1 will be revised to include the AOC boundaries in the key.
O-16	App B/ Fig 2	Map changes.	a. Need to add AOC boundaries to the key, or remove from the map. b. Need to add igloos (etc.) to the key. c. There are a number of rectangular areas that appear on this map. Unclear as to what these are. If these are artifacts, please remove. d. Check all roads (ex. there are 2 Demolition Roads at the bottom of the map on the SW.)	Appendix B, Figure 2 will be revised as noted in the listed changes a through d.

O-17	App B/ Fig 3	Map clarification.	Clarify whether or not any of the depicted streams/tribs should be intermittent.	Appendix B, Figure 3 will be revised to depict which streams/tributaries are intermittent and a new symbol for intermittent streams will be added to the key.
0-18	App B/ Fig 4	Map change.	Add AOC boundary to the legend.	The AOC boundary will be added to Appendix B, Figure 4.
0-19	App B/ Fig 5	Map changes.	a. Add the source of this information to the figure. b. The key is not legible, please re-do.	Appendix B, Figure 5 will be revised as noted in the listed changes a and b.
O-20	App B/ Fig 6	Map changes.	a. Add a key. b. The anomaly designations are not legible. Please re-do so, that the figure can be read.	Appendix B, Figure 6 will be revised as noted in the listed changes a and b.
O-21	App B/ Fig 7	Map changes.	a. Add a scale. b. Add a key.	Appendix B, Figure 7 will be revised as noted in the listed changes a and b.
O-22	App B/ Fig 8	Map change.	In the small “Site Location” box, the site is marked as a small dot on the SE side of a larger red area. It is unclear as to what the red area depicts. Please clarify.	The large red area is the fenced in area comprised of the RVAAP Group 2, Area 1, and Area 2.
O-23	App D/ Pg 13/ Fig 1	Map changes.	a. Add a scale. b. Add a key. c. Add a north arrow.	Figure 1 on page 13 of Appendix D will be revised as noted in the listed changes a through c.
O-24	App D/	Map changes.	a. The map is very difficult to read. Please make this more legible.	Figure 2 on page 14 of Appendix D will be revised as noted in the listed

	Pg 14/ Fig 2		b. Add a scale. c. Add a key.	changes a through c.
O-25	App D/ Pg 15/ Fig 3	Map change.	a. Add a scale.	A scale will be added to Figure 3 on page 15 of Appendix D.
O-26	App D/ Pg 16/ Fig 4	The map depicts the GPR processed data.	However, the text does not have a corresponding good explanation of this figure or for the GPR data as a whole. This should be added to the text.	For explanation, additional text will be added to Figure 4, Appendix D to point out that the GPR data images are showing consistent soil lithology (i.e.,. undisturbed) at each of the cluster areas.
O-27	App D/ Pg 17/ Fig 5	Map changes.	a. Add a scale. b. Add a key. c. Add a north arrow.	Figure 5 on page 17 of Appendix D will be revised as noted in the listed changes a through c.
O-28	App D/ Pg 18	Text clarification.	What is meant by "project size anomalies?"	For clarification the noted text on page 18 of Appendix D will be revised to read *"Smaller events near the surface did register on the raw data when collecting, and these have been noted, however these events are much smaller than the Propellant Can Tops."*
O-29	App D/ Pg 18	The text indicates that all the anomalies were surveyed and the GPS coordinates are on an attached spreadsheet.	No spreadsheet was included. Please include.	The coordinates have been added to Figure 2. For clarification the noted text will be changed to read "*All anomalies have been surveyed*

				and the coordinates are included on Figure 2."
O-30	App D/ Pg 19	Disagree with the statement that the goal of the project was to identify the areas of the Propellant Can Tops.	The goals and objectives were as stated on pages 7 and 8 of the main text. Revise accordingly.	The noted text on page 19 of Appendix D will be revised to read "*The data collection achieved the overall defined objectives for the project by delineating the boundaries of the propellant can top areas in order confirm the presence or absence of releases of propellants and/or other MC to the surface soils at the Group 2 Propellant Cans Tops site.*"
O-31	App E	No chain of custody form is included in the document.	Add the COC to the revised document.	The missing COC noted in Appendix E will be included in the revised document.
O-32	App E	Revision of the tables needed.	The tables should have the RLs listed, not just that the analytical results were <RL. Please revise.	The summary tables in Appendix E will be revised to list the RLs as noted.
O-33	App E	Addition of footnotes.	Add to the revised tables what is meant by ER and SO.	The following information will be added to the footnotes for the tables in Appendix E: "*ER = Equipment Rinse* *SO = Soil*"
O-34	App G	a. pg 3/2nd para. b. pg 5/2nd sentence. c. pg 6/section 2.2 d. pg 8/section 2.4	a. The text indicates that the samples were picked up by North Canton personnel, then went to Denver and Sacramento, and then back to North	a. Based upon the chain of custodies, the samples were picked up by North Canton, There is no further evidence that as to how the

		e. pg 10/section 2.5 f. pg 10/section 2.5.4 g. pg 11/section 2.6 h. pg 12/section 2.7 i. pg 13/section 2.8 j. pg 14/section 2.9 k. pg 15/section 2.10 l. pg 16/section 2.11 m. pg 23/section 2.18.4 n. pg 26/section 2.23 o. pg 26/section 2.23.5 p. pg 27/section 2.23.5 q. pg 27/section 3.3.3 r. pg 28/section 3.4/top of the page s. pg 8 of the App B checklists t. pg 10 of the App B checklists	Canton. As this doesn't make a lot of sense, please clarify. b. Please clarify the sentence that begins: "Ten Percent…" c. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. d. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. e. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. f. Because something is not investigated further the recovery issue is not significant, and the data is valid? Please explain this reasoning. g. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a	samples were distributed by the laboratory narrative. I can only state what labs received what. Based upon the reports generated, North Canton picked up the samples on 5/26/11. They state in their general chemistry report for Nitrocellulose that the samples were received 6/3/11. Based upon that information, what you said in point a may be true. They did send the samples to Sacramento and then back to North Canton. b. In a level IV review only 10% of the data is completely reviewed. The remaining data is verified if an issue is found in the initial review. Common comment for c, d, e, f, g, h, i, j, k, l, n. That is a boiler plate comment. In some reviews certain compounds are of concern and others are not. For example PAHs are run by 8270 and that was the only part of the list that was of concern. Additionally, the method list contains numbers of compounds or elements that are not part of the standard reporting list but are included in the raw data.

			particular method are of concern. h. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. i. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. j. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. k. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. l. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern.	Those compounds or elements that are analyzed but not reported are not analytes of concern and are not reviewed. It can be removed but is typically required. f. The laboratory uses that statement as a means to terminate their review. If nothing is done to further verify the supposed issue then there is no confirmation that an issue exists or that the problem may have been laboratory error and not necessarily a true matrix problem. Therefore if the laboratory does not further investigate, then the issue cannot be verified. MS/MSD is more of a validation of digestion than true matrix interference. A true matrix interference would be resolved by use of Method of Standard Additions as required for CLP work. Additionally, the MS/MSD only affects the sample tested and does not affect the entire batch. m. This comment is in regard to the Lead MS/MSD recoveries. The issue with lead in many of these munitions and firing ranges is that

			m. The matrix spike passed and the matrix spike duplicate and RPD failed. The validator indicated that the MS/MSD did not impact the sample data based upon professional judgment. Can additional explanation be given? (Trying to understand the reasoning, not questioning the validator's professional judgment.) n. The text indicates that the validation reviewed only those compounds of concern. How were these determined and by whom? Explain. All compounds analyzed within a particular method are of concern. o. The text in this section indicates that sample homogeneity may have been an issue. It is unclear as to how this could have been an issue, given that the samples were to be dried, sieved, and ground. Please explain further. p. The text indicates that antimony is not a common element in soil. Please provide further clarification, sources, etc., for this statement. While it may be a trace element compared to others, it is quite frequently found in soil samples obtained from RVAAP. q. The text references a holding time issue with the equipment rinsate sample. Provide additional	the lead source above normal soil lead levels is often metallic. Metallic Lead does not go through the mixing, grinding, and sieving process well because it is malleable. Often it does not break up into a finer particle but into slivers or pieces that get through the process and are still not uniformly distributed throughout the soil. Most soil lead is a compound and not the lead metal by nature. Based upon my experience in these types of facilities this is a common problem. At firing ranges it also includes copper as well. o. This comment relates to the MS/MSD comment. It comes back to the grinding part. Lead does not like to grind up so the metallic lead will not distribute evenly throughout the sample. p. This comes from experience in the CLP program. Antimony in water digests well and recoveries are often very good. Antimony in soil is a different situation. Since I have been doing this (1987), Antimony spike recoveries in soil

			information. r. Change text to read: "… in the proper condition, and all soil analyses were performed within the proper holding time." (Section 3.3.3 indicated that there were holding time issues with the equipment rinsate.) s. The first row/last column indicates that the samples were extracted within the holding time. Yet the comments on pg. 9 state the opposite. Rectify the disconnect. t. The first row/last column indicates that the samples were extracted within the holding time. Yet, the comments on pg. 11 state the opposite. Rectify the disconnect.	were poor at best. In the CLP program we ignored the spikes because the problem was so common. This is due to using a digestion process that does not work for Antimony in the soil. The digestion for soil is the same as for water. The digestion has to be changed for soil but such modifications are not under the laboratory's control, thus this problem will continue. Basically I can change the value to either estimated or outright reject it. Though Antimony is found in the soil at that site is it high enough to be an issue or would it suffice to just flag the MS/MSD data and J flag the Antimony data. I can do that. It will happen on every soil taken there. Historically that is the trend. q and r. To clarify, this issue was discussed with the USACE Louisville Chemist who also felt that the holding time issue was not one since the sample was a rinsate and not a real site sample. As such, the text as it reads was agreed upon during review of the

				pre-draft iteration. s. and t. That can be changed to read as stated by the commenter in item r.

END OF REPORT