STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

In the Matter of Remedial Action by: United States Army, Fort Lewis, Washington, now Joint Base Lewis-McChord (Main/North), Washington State	FIRST AMENDMENT TO AGREED ORDER No. DE 00HWTRSR-1122

TO: Thomas H. Brittain
Colonel, U.S. Army
Garrison Commander
Joint Base Lewis-McChord, WA

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INTRODUCTION

On February 23, 2001, the Department of Ecology (Ecology) and the United States Army (Army) entered into Agreed Order No. DE 00HWTRSR-1122 (Order) for corrective actions to be performed at the Fort Lewis Facility. Fort Lewis is now known as Joint Base Lewis-McChord Main/North (JBLM). The Order requires that the Army perform a Remedial Investigation (RI) and Feasibility Study (FS), and develop a draft Cleanup Action Plan. By this First Amendment to the Order the Army will perform the following interim actions to address lead contaminated soils at the former Miller Hill Ranges and the former Skeet Range. The map in Attachment 3 shows the locations of the ranges and interim actions.

The former Miller Hill Ranges are divided into three distinct work zones. The interim actions at Miller Hill Ranges will involve soil excavation, engineering and institutional controls as appropriate. The interim actions at the former Skeet Range will involve soil excavation but no institutional controls will be required if the Skeet Range is remediated to Model Toxics Control Act (MTCA) unrestricted land use cleanup levels. Specific details are presented in the 2012 Former Miller Hill Ranges and Former Skeet Range Interim Action Work Plan attached hereto as Attachment 4.

This First Amendment does not attempt to recite all of the provisions of the Order. Provisions of the Order not specifically addressed in this First Amendment remain in full force and effect. Format and section numbering of the Order have been maintained to the extent possible.

I. JURISDICTION

This First Amendment to the Order is issued pursuant to the authority of RCW 70.105D.050(1) and WAC 173-340-530(8)(b).

. . . .

IV. FINDINGS OF FACT

The Order, Section IV (Findings of Fact), is hereby amended to add the following findings of fact. Ecology makes the following findings of fact, without any express or implied admissions of such facts by the Army:

. . . .

9. The United States Army, on JBLM, is the owner and operator of the JBLM Dangerous Waste Management Facility.

10. The former Miller Hill Ranges are located on the south side of Miller Hill, west of Colorado Avenue within the Cantonment Area of JBLM, and encompass approximately 300 acres. Active small arms and pistol range activities occurred there from approximately 1917 until the 1960s.

11. The former Skeet Range is located northwest of NCO Beach Road and southeast of American Lake and encompasses approximately 16 acres. The range was used as a recreational skeet range between 1963 and 1972.

12. Lead in the form of lead shot and associated fragments and dust are located throughout the former ranges in excess of the applicable MTCA soil cleanup levels. Lead is the contaminant of concern and concentrations range from less than detect to 300,000 mg/kg at the Miller Hill Ranges and from less than detect to 1,500 mg/kg at the Skeet Range. Interim actions are required to reduce the risk to human health and the environment.

13. As required by the Order, the Army submitted a draft Remedial Investigation Report on February 27, 2008, that indicated that it would be appropriate to perform interim actions at select areas of the Facility. The report covered areas identified in Attachment 2 to the Order; however, it did not cover the entire Facility since additional areas may be subsequently identified. On December 14, 2009, the Interim Action Feasibility Study Report for the former Miller Hill Ranges and former Skeet Range was submitted. It was approved by Ecology on December 29, 2009.

V. ECOLOGY DETERMINATIONS

The Order, Section V (Ecology Determinations), is hereby amended to add the following determinations:

. . . .

9. Ecology has determined that additional work, in the form of interim actions, is necessary to remediate lead contamination in soil resulting from activities at the former Miller Hill Ranges and former Skeet Range.

10. Ecology believes the additional work to be performed as required by this First Amendment is in the public interest.

11. Based on all information known to Ecology, Ecology has determined that the additional interim actions required by this First Amendment are technically necessary to reduce a threat to human health or the environment by substantially reducing one or more pathways for

exposure, to correct a problem that may become substantially worse or cost substantially more to address if remedial actions are delayed, and to help provide for completion of design of a final cleanup action plan. WAC 173-340-430(1).

12. Ecology has determined that the additional interim actions will not foreclose reasonable alternatives for the cleanup that are currently being considered or that may be considered for future action(s) at the Facility.

13. RCW 70.105D.030(2)(a) requires that, at a minimum, this First Amendment be subject to concurrent public notice. Ecology shall be responsible for providing such public notice and reserves the right to modify or withdraw any provisions of this First Amendment should public comment disclose facts or considerations which indicate to Ecology that the First Amendment is inadequate or improper in any respect.

VI. WORK TO BE PERFORMED

The Order, Section VI (Work to be Performed), is hereby amended to add the following:

. . . .

19. All performance and/or deliverables shall be completed as indicated in Attachment 5 the "Project Schedule for Former Miller Hill Ranges and Former Skeet Range Interim Actions." This attachment is an integral and enforceable part of this Order.

The Order, Section VI (Work to be Performed), is hereby amended to authorize the interim actions and add the following information and requirements:

20. 2012 Interim Action: Based on the Findings of Fact and Ecology Determinations, it is hereby ordered that the Army take the following interim remedial actions at the Miller Hill and Skeet Ranges and that these actions be conducted in accordance with Chapter 173-340 WAC unless otherwise specifically provided for herein. These plans are more specifically described in the attached "Former Miller Hill Ranges and Former Skeet Range Interim Action Work Plan, 2012" (Attachment 4). This First Amendment and its attachments are an integral and enforceable part of the Order.

a. Location of interim actions. The location of the interim actions work is illustrated in Attachment 3.

b. Scope of Work. The Army shall implement the Former Miller Hill Ranges and Former Skeet Range Interim Action Work Plan, 2012, attached hereto as Attachment 4.

The effective date of this First Amendment to the Order is the date of the last signature.

STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY

_____ Date_____

Ava Edmonson
Section Manager Southwest Region
Hazardous Waste & Toxics Reduction
Olympia, WA
(360) 407-6337

JOINT BASE LEWIS-MCCHORD

_____ Date _____

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ATTACHMENT 3

SITE MAP AND INTERIM ACTION LOCATIONS

ATTACHMENT 4

FORMER MILLER HILL RANGES AND FORMER SKEET RANGE INTERIM ACTION WORK PLAN, 2012

ATTACHMENT 5

PROJECT SCHEDULE FOR FORMER MILLER HILL RANGES AND FORMER SKEET RANGE INTERIM ACTIONS

Deliverables	**Due Dates in Calendar Days***
1. Implement interim action as detailed in the 2012 Interim Action Work Plan (Attachment 4)	Within 35 days of the effective date of the Agreed Order Amendment.
2. Draft Interim Action Evaluation Report for Ecology review and approval	Within 60 days of completion of field work
3. Final Interim Action Evaluation Report	Within 30 days after Ecology's comments on the draft report

***** *An extension to the listed due dates may be granted by Ecology under the terms of the Order, Section VII.12 (Terms and Conditions of Order, Extension of Schedule).*

JOINT BASE LEWIS-MCCHORD
AGREED ORDER
SAMPLING AND ANALYSIS PLAN/
QUALITY ASSURANCE PROJECT PLAN

FORMER MILLER HILL RANGES AND FORMER SKEET RANGE (AREAS OF CONCERN 4-2 AND 4-3) INTERIM ACTION JOINT BASE LEWIS-MCCHORD, WASHINGTON

Contract #: W91ZLK-05-D-0013/0002
KEMRON Project #: CH0006

February 2012
FINAL

PREPARED FOR:

Joint Base Lewis-McChord Environmental Division
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PREPARED BY:

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LIST OF ACRONYMS

bgs	Below Ground Surface
CA	Cleanup Action
COC	Chain of Custody
COC	Contaminant(s) of Concern
CY	Cubic Yards
Ecology	Washington Department of Ecology
GPS	Global Positioning System
HASP	Health and Safety Plan
IAWP	Interim Action Work Plan
JBLM	Joint Base Lewis-McChord
KEMRON	Kemron Environmental Services, Inc.
MIDAS	Munitions Items Disposition Action System
mg/kg	milligram per kilogram
MTCA	Model Toxics Control Act
PQL	Practical Quantification Limit
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SI	Site Investigation
SOP	Standard Operating Procedure
TCLP	Toxicity Characteristic Leaching Procedure
USACE	US Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
XRF	X-Ray Fluorescence

1.0 Introduction

This Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) describes the field sampling procedures and quality assurance procedures that will be implemented by KEMRON Environmental Services, Inc. (KEMRON) to complete performance monitoring and to confirm the cleanup action has attained the cleanup standards as specified in the Interim Action Plan (IAP) for the Former Miller Hill Ranges and the Former Skeet Range at Joint Base Lewis-McChord (JBLM) (IAP, KEMRON 2010a). This SAP/QAPP provides the sampling and analytical requirements for the Interim Action and has been prepared in accordance with WAC 173-340-820, Sampling and Analysis Plans. The SAP/QAPP supports the work described in the Interim Action Work Plan (IAWP, KEMRON 2012) for these sites. Health and safety requirements to be followed during on-site field sampling are described in the Health and Safety Plan (HASP, KEMRON 2012).

1.1 Site Descriptions and Background

Located in western Washington near the southern tip of Puget Sound, Joint Base Lewis-McChord is surrounded by the communities of DuPont, Lakewood, Steilacoom and Spanaway. In addition to more than 25,000 soldiers and civilian workers, the installation supports approximately 120,000 retirees and 30,000 family members. The facility consists of approximately 87,000 acres of cantonment areas, natural prairies, lakes, wetlands, and forest. Weapons qualifications and field training have been conducted at Joint Base Lewis-McChord since the Fort was established in 1917.

JBLM is considered the premier Army installation in the Western Region and is the only power projection platform on the West Coast. JBLM is home to the I Corps, 2nd Calvary Regiment, and the Army's first two Stryker Brigades. The installation is essentially divided into two areas - the operational range area and the Cantonment Area. Soldiers training in the JBLM operational range area have access to 115 live-fire ranges including a number of high-quality close quarters, urban combat training areas. The Former Miller Hill Ranges and the Former Skeet Range are located within the Cantonment Area.

1.1.1 Miller Hill Ranges

The site is a collection of former small arms ranges located on the south side of Miller Hill. Miller Hill collectively encompasses approximately 300 acres with the affected sites totaling approximately 30 acres. The site was used for range activity from circa 1917 until the 1960s. Identified former ranges at the site are Closed Small Arms Ranges 42, 54, 62, 67, and an unnumbered pistol range to the east of former Range 42. The typical small arms ammunition expended at the ranges were the .30, .45, or .50 caliber cartridges. At each former range (except for the unnumbered pistol range in which a small berm was constructed), small arms were fired from firing lines on flat ground at targets placed in front of the undisturbed hillside (which served as the backstop). The impact area (i.e., south-facing hillside) is approximately 0.5 miles long. Based on the nature of site use and the composition of bullet slugs, lead is the only Contaminant of Concern (COC) for the site (KEMRON 2009 and 2010a). Figure 1B is a site map illustrating the location of the Former Miller Hill ranges in reference to JBLM.

In order to more clearly present the distinct areas of Miller Hill, the ranges have been divided into four distinct work zones (see Figure S1):

1. *Flatlands:* The Flatlands include the low-gradient areas on the southern base of the hill that are easily accessible to humans, construction personnel and equipment, and

is slated by the Army for future commercial development. The David L. Stone Education Center and the Distance Learning Center with large asphalt paved parking lots sit along the southern boundary in the Flatlands and additional training/support buildings are planned to the west of the Stone Education Center for future use. The Flatlands is mostly vegetated with grass and invasive non-native species such as Himalayan Blackberry and Scot's Broom. A portion of this area also served as the impact area, the base of the hillside that acted as the backstop, which generally displays the highest concentrations of lead at the site.

2. *Steep Hillside Area:* The Steep Hillside Area at Miller Hill includes the high-gradient areas progressing up the hillside, are heavily forested, and contain mature native ecosystems. As described in the Terrestrial Ecological Evaluation Report, the Steep Hillside Area of Miller Hill is a relatively rare example of a dry forest dominated by Oregon White Oak and Douglas Firs that once dominated the otherwise prairie areas to the south of the Puget Sound (KEMRON, 2008). This area is difficult to access by humans, construction personnel and equipment, and contains a wide variety of local, native wildlife. With the exception of water storage and communications facilities, there has been no development of the interior portions of Miller Hill. The Army plans to use the area for recreational use. Miller Hill serves as a bridge between ecological habitat areas in the training areas and wetlands to the North and the Army's development plans are sensitive to protecting that use. These areas received ricochets from the former firing ranges and were not utilized as impact areas.

3. *Miller Hill Area Resident Buffer Zone:* A buffer zone has been established extending from the Hillside Housing residential area into the Flatland industrial area located east of the Hillside Housing. The 200-foot radius established from the Equity Housing Property line in the Hillside Housing Area extends east into the Miller Hill former Ranges 62 and 67 to be protective of residents that may access this area.

4. *Hillside Residential Area Existing Dirt Road:* Based on the results included in the Hillside Housing Area Interim Action Completion Report, the lead impacts in soil above the Model Toxics Control Act (MTCA) Method A unrestricted use level of 250 mg/kg have been removed from the residential areas and the property east of the residential area up to the dirt access road (KEMRON 2008). However, additional remediation is required up to the residential property boundary, which includes the dirt road (refer to Figure 3).

Based on the historical sampling results, the lead concentrations and distribution are similar across the former range sites. Lead concentrations are generally highest in the impact areas (the base of the hillside, which served as the backstop), with less impacts in the ricochet areas and terminal end of firing areas. As expected based on historical use, lead concentrations are generally highest from 0 to 6 inches and decreases with depth. A review of the soil sampling data from the former ranges (Bussey 2007) indicates several grids contain significantly elevated lead concentrations in excess of 10,000 mg/kg (Bussey 2008).

1.1.2 Skeet Range

The approximately 16-acre Former Skeet Range was apparently used as a recreational skeet range between 1963 and 1972 based on a review of historical maps and aerial photography. Shot was fired toward the northwest on flat land without a backstop. Based on the nature of site use and the composition of lead shot, lead is the only COC for the site. Figure 11 of the Work Plan illustrates a site map of the Former Skeet Range.

As documented in the U.S. Army Corps of Engineers (USACE) 2004 Site Investigation (SI) report and the FLAO RIWP (USACE and FTL-Public Works 2004b), lead is present at elevated concentrations in surficial soils above the MTCA Method A soil cleanup levels for unrestricted land use. The maximum detected lead concentration was approximately 2,000 mg/kg. Additional site background information is included in the FLAO RI Report (Bussey 2008).

1.2 Purpose and Objectives

The purpose of this SAP/QAP is two-fold. The first is to provide the approach for performance monitoring to confirm attainment of the site-specific cleanup levels or remediation levels for lead-contaminated soils as identified in the IAP (KEMRON 2011). The second objective is to provide the approach for verifying that excavated soils with lead concentrations greater than 2,000 mg/kg that will have been stabilized with a phosphatic stabilizer, achieve a Toxicity Characteristic Leaching Procedure (TLCP) result of less than 5 mg/L lead prior to the transportation, and reuse of the material at active ranges at JBLM.

The cleanup levels and remediation levels have been determined for both sites (Miller Hill Ranges and Skeet Range) and are separated by work zones at Miller Hill (KEMRON 2011). During the 2008 Interim Action (IA) conducted at the Hillside Housing Area for Miller Hill, all lead-impacted soils west of the existing chain link fence above the cleanup goal (MTCA Method A unrestricted use cleanup level of 250 mg/kg lead) were excavated and stockpiled near Range 67. The stockpile will be managed along with the contaminated soil found in Range 62/67 in accordance with the requirements in the IAP and the IAWP (KEMRON 2012).

The cleanup objectives indentified in the IAP are shown in the following table.

Table 1. Site Cleanup/Remediation Objectives for Total Lead

Site	Cleanup Levels	Remediation Level
Hillside Residential Area Existing Dirt Road (east of the chain link fence)	250 mg/kg	
Miller Hill Flatlands		1,066 mg/kg
Miller Hill Area Residential Buffer Zone		475 mg/kg
Skeet Range:	250 mg/kg	
*Total Lead		

In addition to the information contained in Table 1, the WAC/MCTA Criteria for the treated lead contaminated soil will be used. This criterion specifies that the treated soil must be less than 5.0 mg/L (TCLP) for lead. This applies only to the impacted staging piles that contained soil with total lead greater than 2,000 mg/kg (that have been shown to exceed the TCLP level without treatment).

1.3 Project Organization

Project organization and personnel are presented below.

Table 2. Project Organization

Position	Team Member	Phone
Program Manager	Tracy Bergquist, PMP	(404) 601-6902
Deputy Program Manager	Lou Ehrhard, P.G., PMP	(847) 266-1350
Project Manager	Larry Emerson, P.E., PMP	(847) 266-1350
Field Coordinator, Assistant PM	Mark Roberts, PMP	(253) 884-6784
Staff Scientist, Site Safety/Health Officer	Tim Duda	(847) 266-1350
Staff Scientist /XRF Analyst	TBD	TBD
Project Laboratory	Microbac Laboratories, Inc.	(740) 373-4071
JBLM Program Lead	Jim Gillie, P.E., Public Works	(253) 966-1774
JBLM Program Manager/COR	William Myers, LHG, Public Works	(253) 477-3742
WA Dept. of Ecology Site Manager	Greg Caron	(509) 454-7893

Soil samples will be collected by KEMRON personnel and/or subcontractors. Ecology's site manager will be notified at least 72 hours in advance of any field activities.

Microbac Laboratories will perform the off-site total lead and TCLP lead analyses for the samples. The contact information for the project laboratory is:

Microbac Laboratories, Inc.
Attn: Stephanie Mossburg
158 Starlite Drive
Marietta, OH 45150
Phone: (800) 373-4071
Fax: (740) 373-4835
Email: smossburg@microbac.com

1.4 Project Schedule

The proposed schedule for this investigation is presented below.

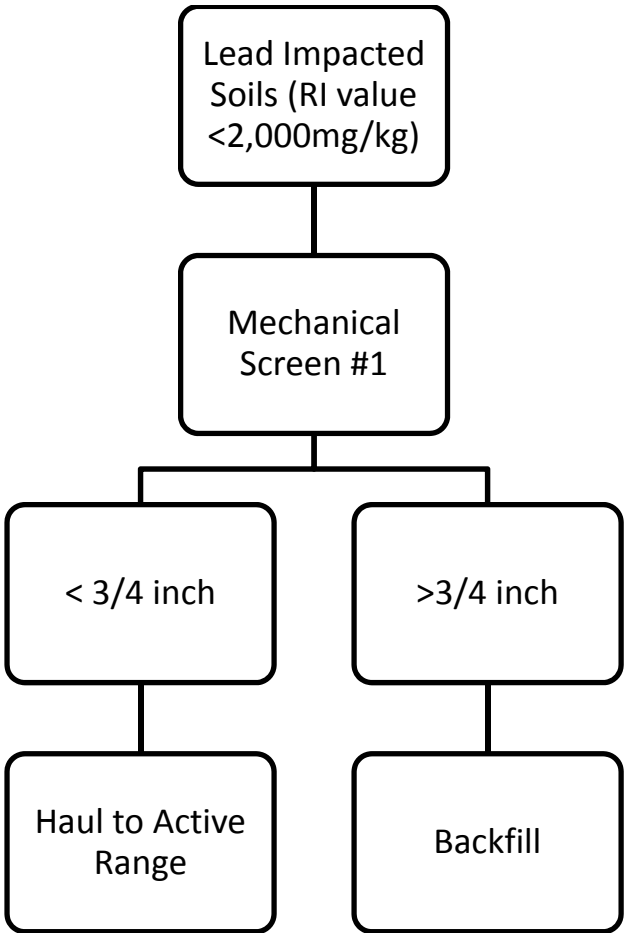
Table 3. Project Schedule

Activity	Time of Completion
Notice to Proceed (pending)	29 February 2012
Complete Interim Action	July 2012
Submit Interim Action Completion Report	October 2012

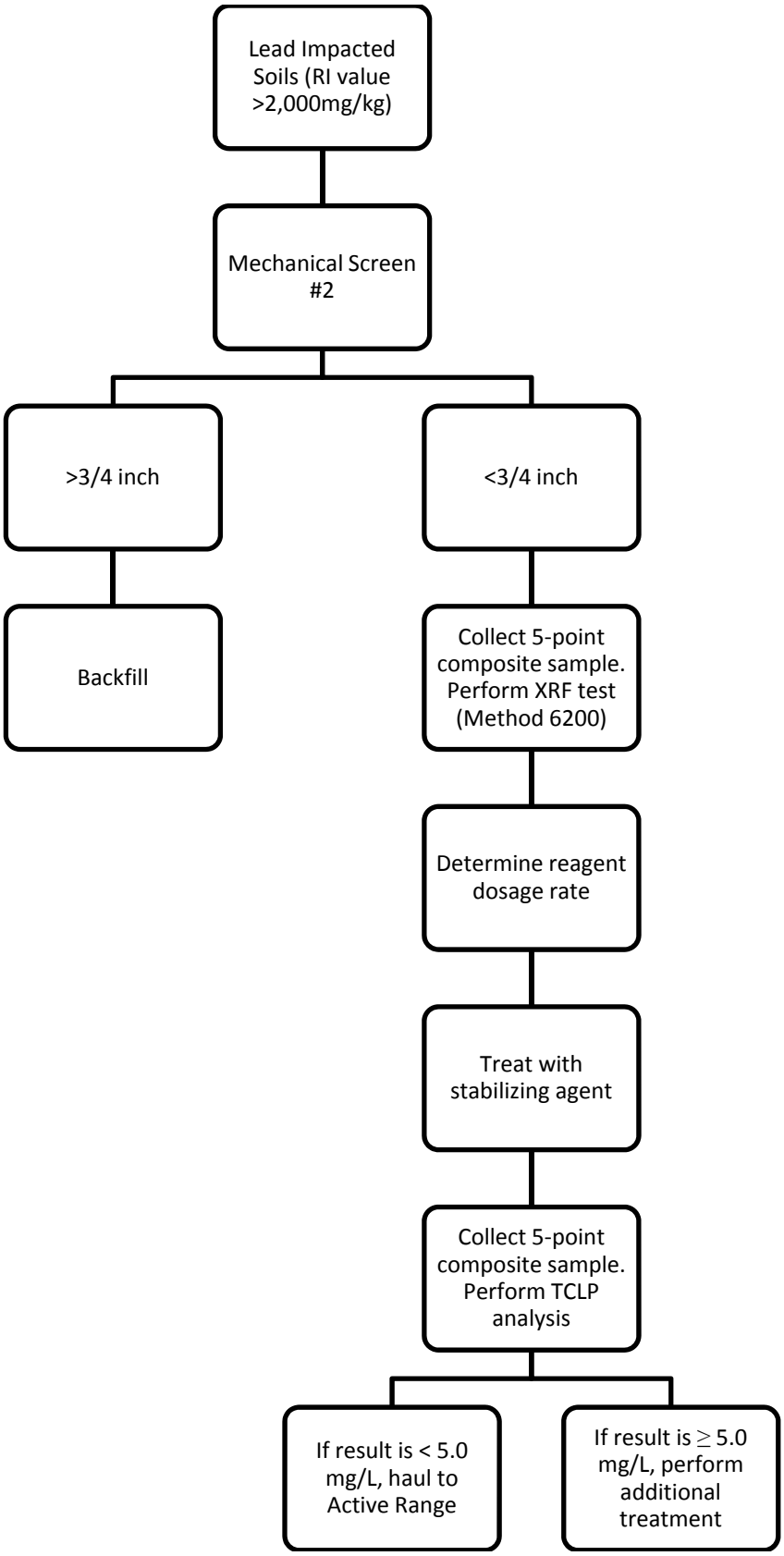
2.0 Sample Collection, Analysis, and Handling

This section describes the planned excavation, performance monitoring; soil handling; mechanical screening; and soil treatment and treated soil verification sampling and analysis. Refer to Flow Charts 1 and 2 for process flow diagrams illustrating the handling and testing requirements for the soil.

Lead Impacted Soils Flow Chart 1



Lead Impacted Soils Flow Chart 2



2.1 Performance Monitoring Soil Sampling

Initial performance monitoring soil samples will be collected from the floor of each grid following the excavation to the minimum depth identified. The following section presents the procedure for using in-field X-Ray Fluorescence (XRF) analysis with laboratory confirmation analyses for total lead in the bottom of excavations along with laboratory methods for total lead as a quality control procedure.

2.1.1 Performance Monitoring Sampling and Analysis

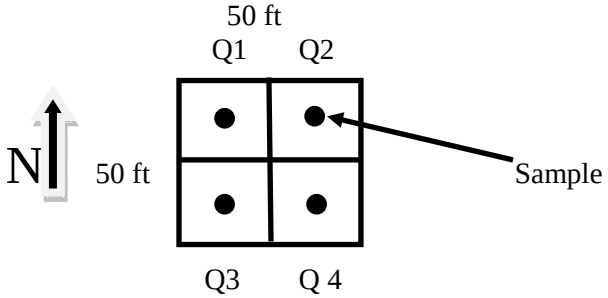
Prior to excavating soil, KEMRON will obtain JBLM Dig Permits. This will include a utility locate as required in the KEMRON HASP (KEMRON 2012). Excavations will be conducted within grids approximately 50 ft x 50 ft or 2,500 sf (see Work Plan Figures 3 and 9 through 11) utilizing the grid network established during the RI for Ranges 62/67, 54 and 42. Grids at the Unnumbered Pistol Range are much smaller (typically 10 ft x 25 ft) but also follow the grids established and used during the SI/RI process. Excavations at the Skeet Range will be conducted within 50 ft x 50 ft grids established for this corrective action and based on the data points generated during the RI. Grids may be smaller as needed to conform to boundaries of fences, parking lots, etc. Confirmation soil samples will be collected from the completed excavation floor bottom to verify that soil with lead concentrations does not exceed the cleanup or remediation level for each area.

Real time total lead data will be generated using an on-site Innov-X portable XRF analyzer in accordance with United States Environmental Protection Agency (USEPA) Method 6200. The XRF will be utilized for decision making purposes and to drive the final depth of the excavations. Table 5 lists the initial number of XRF samples to be collected and analyzed for lead for Former Miller Hill Ranges and the Former Skeet Range.

XRF sampling and analysis will be conducted as follows:

a. The targeted remediation area will be excavated in accordance with the grids based on data from the RI. Confirmation soil samples will be collected from the bottom of each excavation area (grid) at a frequency of four samples per grid (no grid exceeding 2,500 sf). Confirmation soil samples will be collected as grab samples using a trowel, hand auger, stainless steel spoon, or other type of hand tool. Each aliquot will be collected from the center of each of the quadrants of the excavated grid for a total of four (4) samples per grid. The samples will consist of a scoop of soil 1-2 inches BGS placed in a labeled plastic Ziploc sandwich size bag for each analysis. The Ziploc sample bags should be labeled pertaining to each of the four grid quadrants, as well as the range and grid number, as shown in the illustration below.

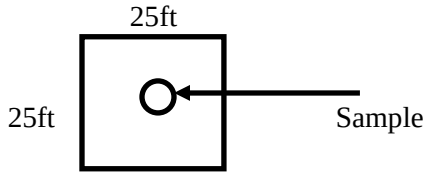
Illustration 1
Example of a grid (i.e. Range 62/67, Grid 8-22)



The sample taken from the northeast corner (quadrant 1) would be labeled: R62/67-8-22-Q1 and be initially composited with the other quadrants for a result representative of the entire grid.

b. An equal portion of each set of four aliquots will be composited by placing them in a stainless steel bowl and homogenized using a stainless steel spoon. The homogenized samples for each grid will be placed in a labeled sampling tin and dried on-site. The remaining sample from each quadrant shall be reserved and individually resampled if the composite for the entire grid fails (see Section 2.2.1.d, below).
c. All composited soil samples to be analyzed will be sieved with a #10 (2.0 mm) sieve in accordance with WAC 173-340-740 (7)(a). Sieved samples from grids will be hand searched for lead material (e.g. slugs, pellets, jackets, etc.), which will be removed if found. Any metal jackets or lead slugs found during the interim action will be collected in separate 5 gallon containers and taken to local recyclers. The KEMRON Technical Memorandum (Appendix E) presents the results of lead slug screening and concludes that physical separation in search for slugs would not be cost effective. However, if slug rich soils are encountered, then the area will be analyzed for lead content greater than 5% by weight. If the lead is greater than 5% by weight, then additional screening and hand removal of the lead slugs will be conducted. Alternatively, the lead slugs and soil will be removed from the site and hauled to a dealer who will reclaim the lead.
d. Sieved samples will be oven dried on site and placed in small plastic containers (e.g. SPEX Industries, Catalogue No. 3529) for testing with the XRF device. These sample containers will be logged on site and labeled. Some (10%) of these containers will also be used for off-site lab testing for total lead via Method 6020.
e. In the event the grid fails, the remaining four (4) aliquots from the quadrants will be analyzed individually.
    i. For those aliquots (quadrants) that are below the cleanup or remediation level, no further excavation will be required.
    ii. For those aliquots (quadrants) that fail cleanup or remediation levels, further excavation will be conducted for each failed quadrant consisting typically of a 25 ft x 25 ft section.
        a) Once excavation is complete from the 25 ft x 25 ft quadrant, the quadrant will be resampled by collecting one soil sample from the center of the quadrant floor to 2 inches in depth as shown in the following illustration.

Illustration 2



        b) If the aliquots for each of the quadrants are below cleanup or remediation levels, no further remediation is required within that grid quadrant. However if the sample(s) should fail, additional excavation will be required and the same collection procedure will follow the procedure outlined in Section 2.2.1.d.ii.a), above.

f. If the XRF confirmation lead result (Method 6200) is less than but within 5% of the cleanup/remediation level, then either a lab analysis (Method 6020) will be performed prior to backfilling the grid or the grid will be over-excavated and resampled.
g. Quality control samples will be collected at a frequency of 10% over a broad range of values, consistent with the QC requirements specified in the 2005 SAP (Environmental and Natural Resources Division Fort Lewis Public Works 2005).
h. If a quality control field duplicate, analyzed by Method 6020 fails, then the grid or grid sub-area will be excavated deeper and resampled. If it passes, then the grid or grid sub-area will be deemed complete.

A summary of the projected confirmation sampling and analysis to be performed after excavating the affected grids is presented on Table 5.

Table 5. Former Miller Hill Ranges and Skeet Range Sampling and Analysis Summary

Total # of Grids (~2,500 sq. ft per grid)	Estimated # of Initial On-site XRF Composite Samples Method 6200 Samples
Former Ranges 62/67- Residential Area (cleanup level of 250 mg/kg)	
2	2 composite samples (6 quadrants)
Former Range 62/67 – Area Resident Buffer Zone (remediation level of 475 mg/kg)	
25	25 composite samples (90 quadrants [a])
Former Ranges 62/67-Flatlands Zone	
37	37 (143 quadrants)
7 (additional grids to be delineated)	7 composite samples (22 quadrants [b])
Former Machine Gun Range 42 – Flatlands Zone	
15	15 composite samples (60 quadrants)
Unnumbered Pistol Range – Flatlands Zone	
6 [c]	6
3 (additional grids to be delineated)	3 composite samples (12 quadrants)
Skeet Range	
40	40 composite samples (160 quadrants)
44 (additional grids to be delineated)	44 composite samples (164 quadrants [d])
Total samples	**179 initial composite samples (estimated)**
QA/QC Samples Estimated	
Field Duplicate (1 for every 10 samples)	18 (based on 179 initial composite samples)
Method Blank (1 per digestion batch/ 1 for every 20 samples)	9 (based on 179 initial composite samples)
Laboratory duplicate (1 per digestion batch/ not to exceed 20 samples	9 (based on 179 initial composite samples)
Instrument Blank (1 for every 20 sample/1 per day)	20 (based on estimated 20 days of interim action)
Lab QC Sample (Splits) Off-Site Lab Analyses by Method 6020 (10% of total XRF samples)	18 (based on 179 initial composite samples)
Total # QA/QC sample analyses	**74 (Estimated)**

[a] Eight of the 25 grids are partial grids (<2,500 sf) and will have less than 4 samples per grid).
[b] Delineation samples for Grid numbers 9-23, 9-24, 9-27 9-28, 11-17, 11-18, and 11-19 (refer to Figure 6 in the Work Plan).
[c] The Unnumbered pistol range has 6 small distinct grids all less than 300 sf each and will have one confirmation sample per grid.
[d] The Skeet Range has 44 grids to be delineated. See Figure 11.

Sample handling and custody procedures described in the 2005 SAP will be used/followed for off-site samples.

The on-site field COC will be completed for each set of samples that is submitted for on-site XRF analysis. The COC form will be completed by the field sampling personnel at the time of sample collection. The field samples and COC form will be delivered to the on-site project chemist. The project chemist will review the sample containers and verify that the samples match the information on the COC form. This form will be signed by the project chemist to document receipt and custody of samples.

2.1.2 Lead ICP Sampling and Analysis

Ten percent of the samples analyzed by the on-site XRF will be submitted to the project laboratory for correlation and confirmation analysis of lead by USEPA method 6020 (Inductively Coupled Plasma – Mass Spectrometry) from *Test Methods for Evaluating Solid Waste, SW-846* (EPA, 1994c). The full range of total lead values will be represented in the selection of samples from each major task area. The dried and sieved aliquots analyzed by on-site XRF will be submitted as the off-site confirmation sample. The project chemist will prepare and sign the COC form for shipping samples to the project laboratory.

2.2 Soil Treatment, TCLP Sampling and Analysis

The second objective of this SAP is to provide confirmation that the lead contaminated soils that will be treated with Ecobond® will pass the requirement for a TCLP value of less than 5.0 mg/L, thereby rendering the soil as non-dangerous. This will be done in accordance with the IAP (KEMRON, 2010) and in accordance with requirements of Ecology as described in WAC 173-340-820.

Soils that are excavated from grids showing RI total lead concentrations below 2,000 mg/kg will be physically screened to remove cobbles and soil particles greater than ¾-inches. No further testing is required for either fraction of these soils. All dangerous waste soils (presented in the FS to be soils >2,000 mg/kg total lead based on RI data) that are less than ¾-inches will be stabilized by the addition of ECOBOND® and subsequently tested for TCLP analysis in accordance with the frequency described below (refer to Flowchart 1).

It is anticipated that a large volume of soil, approximately 14,000 CY, will require soil stabilization treatment to obtain the lead TCLP value of less than 5.0 mg/L rendering the soil non-dangerous. A five-point composite sample will be taken from the designated screened (<¾-inch) staging piles originating from lead impacted grids with lead exceeding 2,000 mg/kg. The sample may first be tested for total lead using the XRF Method 6200, in order to determine the dosage rate for reagent. Alternatively, the contractor may determine the dosage based on the RI data. Following treatment, a 5-point composite sample will be taken and analyzed for TCLP lead using Method 1311 for sample preparation and Method 6010 for TCLP lead. If the result is less than 5.0 mg/L, then the soil will be considered stabilized and hauled off directly to an active range designated by JBLM. However if the TCLP result is greater or equal than 5.0 mg/L, then the soil staging pile will undergo additional treatment. Off-site lab analysis for total lead via Method 6020 will not be required for staging pile samples (refer to Flowchart 2).

Each batch of stabilized soil will be composite sampled using a small hand trowel. Due to the large volume of soil to be treated, it is anticipated that the batch frequency will start at 1 sample per 100 CY staging pile for the first 1,000 CY (e.g., 10@100 CY piles) to establish a high degree of confidence of acceptable treatment and 1 sample per 500 CY staging piles thereafter as verification of the acceptable treatment (refer to Table 4). A total of five (5) trowel aliquots will be taken from each staging pile batch using a random sampling method to represent the batch. All composite subsamples will be placed in a plastic Ziploc bag and homogenized by hand

shaking and kneading. A sample from the bag will be placed in a clean 16-oz wide-mouth sample jar, appropriately labeled, entered into a Chain of Custody (COC) form and sent to the project laboratory for lead TCLP analysis.

Ten percent of the total TCLP samples taken from the stabilized staging piles will be analyzed as duplicates. The duplicate samples will be split from the same bowl as the parent sample as described above. Field duplicates and environmental samples will contain separate sample nomenclature in order to prevent the laboratory from distinguishing between the two samples. In the event of different values obtained from the duplicate sample, the average value of two samples (i.e. original and duplicate) will be used to determine the outcome of the tests. If the average value is less than 5.0 mg/L, then the pile will be hauled to an active range. If not, it will be remixed (treated) with additional reagent and retested.

Each batch of stabilized soil will be maintained as a discrete staging pile entity until TCLP analytical results have confirmed a TCLP value of less than 5.0 mg/L lead and the project or site manager has approved the batch for placement at active ranges at JBLM.

Table 4. Soil Stabilization Staging Pile Sampling and Analysis Summary

Soil Stabilization (*14,000 yds)	Projected TCLP Lead Samples by EPA Methods 1311 and 6010 Samples
Initial 1,000 yds	10
13,000 yds (estimate)*	26

*Note: One TCLP lead sample taken for every 500 yards of stabilized soil.

2.3 Delineation Sampling

2.3.1 Miller Hill

Additional sampling will be performed to delineate the vertical extent of lead in soils in seven grids located on Former Ranges 62 and 67 and three grids at the Unnumbered Pistol Range (refer to Work Plan Figures 5, 6 and 10). For these areas, the remediation level is 1,066 mg/kg.

Delineation samples will be collected from Grid numbers 9-23, 9-24, 9-27, 9-28, 11-17, 11-18, 11-19, and MH32 (N, E, and W). A composite sample will be collected from four locations (one sample from each quadrant) within each sampling grid. Samples will be collected from each 0-6 inch, 6-12 inch, and 12-24 inch depth intervals at each location. Samples will be collected using a hand or power auger, skidster, backhoe or post hole digger. Each depth interval from the three sample locations will be composited from a portion of each discreet quadrant sample and submitted for analysis on-site by Innov-X portable XRF. A portion of each quadrant sample will be retained for possible analyses. On-site XRF sample collection will follow the same procedures described in the 2005 SAP, but samples will be collected in plastic bags. If XRF lead concentrations in composites from all depth intervals are below the cleanup goal of 1,066 mg/kg within the grid(s), investigation activities will be deemed complete. If XRF lead concentrations within the grid(s) exceed the remediation level, the individual quadrant samples will be analyzed and any quadrant that exceeds the remediation level will be excavated to the depth indicated by the results and until confirmation samples are below the remediation level of 1,066 mg/kg.

2.3.2 Skeet Range

A total of 41 grids will be delineated at the Skeet Range as indicated on Figure 11. The same procedures as listed in Section 2.3.1 will be followed with the following exceptions. The depths to be sampled will be 0-6 inches only and the cleanup goal is 250 mg/kg.

2.4 Post-Remediation Confirmation Sampling Criteria

Because the Miller Hill site is composed of several smaller ranges and Range 62/67 has different cleanup/remediation levels, compliance with the cleanup/remediation levels will be determined for each zone individually (i.e., Flatlands, Buffer Zone, and Skeet Range/Residential). The compliance criteria applicable to each work zone are presented in Table 6 below.

Table 6. Post-Remediation Cleanup Levels Compliance Criteria for Confirmation Samples

Site Description/Work Zone	Compliance Criteria
Miller Hill Buffer Zone (Applies to 200-foot radius from Hillside Housing Area [Equity Housing Property Line] extending into Former Pistol Ranges 62/67) Cleanup Level = 475 mg/kg	• Samples taken by XRF (method 6200) must be less than 95% of the remediation level/cleanup level (< 451 mg/kg).
	• The RPD value between an XRF sample and its associated duplicate must be <50. (Refer to Table 9)
	• The RPD value between the XRF sample and the associated total lab lead duplicate sample must be <50. (Refer to Table 9)
Miller Hill Flatlands (Applies to Former Pistol Range 62/67, Former Range 54, Former Machine Gun Range 42, and Unnumbered Pistol Range) Cleanup Level = 1,066 mg/kg	• Samples taken by XRF (method 6200) must be less than 95% of the remediation level/cleanup level (< 1012 mg/kg).
	• The RPD value between an XRF sample and its associated duplicate must be <50. (Refer to Table 9)
	• The RPD value between the XRF sample and the associated total lab lead duplicate sample must be <50. (Refer to Table 9)
Former Skeet Range and Remaining Hillside Housing Residential Area (Existing dirt road - area between the Interim '07 Action and the Equity Housing Property Line - see Figure 5 in the Work Plan) Cleanup Level = 250 mg/kg	• Samples taken by XRF (Method 6200) must be less than 95% of the remediation level/cleanup level (< 237 mg/kg).
	• The RPD value between an XRF sample and its associated duplicate must be <50. (Refer to Table 9)
	• The RPD value between the XRF sample and the associated total lab lead duplicate sample must be <50. (Refer to Table 9)

XRF results of lead concentrations in unexcavated soil samples from the excavation area (grids) will be compared to the cleanup/remediation compliance criteria applicable to the area to determine if an exceedance of the criteria is present. If XRF lead concentrations from the excavated areas meet the compliance criteria in Table 6, and provided a corresponding QA/QC lab sample does not exceed the cleanup level, excavation activities will be deemed completed. If XRF lead concentrations in the excavation areas exceed cleanup/remediation levels and/or the compliance criteria, excavations will continue in the sampled excavation area until the cleanup criteria is met.

Confirmation soil sample locations will be located by experienced personnel using Global Positioning Satellite (GPS) technology (sub-meter accuracy).

2.5 Reporting

The remediation work including the results of the confirmation sampling will be incorporated into the Interim Action Completion Report, which will include:

- Brief site description.
- Brief discussion of excavation and sampling methodology including any deviations from this plan.
- A site map showing relevant surface features, excavation locations and limits, sampling locations and contaminant concentrations.
- Brief discussion of QA/QC review and verification process including implications for project data as described in the QAPP.
- Laboratory certificates of analysis with COC records.
- Copies of original field forms.

3.0 Quality Assurance/Quality Control Project Plan (QAPP)

3.1 Field Quality Control Samples for Total Lead

Field duplicate samples will be collected and submitted for total lead analyses (at a rate of at least ten percent of the primary samples). This will be accomplished by collecting enough sample volume to ensure adequate volume to have a duplicate sample collected and tested. Field duplicate samples will be collected as composite sets with the original sample and homogenized. Duplicate samples will be analyzed by on-site XRF.

Spilt samples from the on-site analysis will be used to evaluate the comparability of the XRF data to data generated by an off-site laboratory using USEPA methods. Ten percent of samples analyzed by on-site XRF will be submitted to an off-site laboratory for correlation and confirmation analysis by USEPA Method 6020 (Inductively Coupled Plasma – Mass Spectrometry) from *Test Methods for Evaluating Solid Waste, SW-846* (EPA, 1996). The dried and sieved aliquot analyzed by on-site XRF will be submitted as the off-site confirmation sample. Data from the two analyses will be plotted using regression analysis. Interpretations on the correlation of the XRF and off-site laboratory will be presented in the Interim Action Completion Report.

3.2 On-Site XRF Laboratory Quality Control

All field QC and lab QA samples for total lead analyses will be collected and prepared in the same manner as the primary samples. Daily operation of the XRF instrument at the site will include the following QC measures:

- Instrument standardization resolution check standard
- Initial and continuing calibration check standards
- Instrument blank
- Method blanks
- Laboratory duplicate analyses

Components of XRF QC:

1. An energy calibration check sample will be analyzed at the beginning of each day. The Innov-X analyzer performs this automatically; this is the purpose of the standardization check when the analyzer is started. The software does not allow the analyzer to be used if the standardization is not completed. The energy calibration check is performed by placing the snap on metal clip on the front of the analyzer and selecting standardize on the analysis screen.

2. An instrument blank will be analyzed for every 20 environmental samples or at the beginning of each day. The operator should use the SiO_2 (silicon dioxide) blank provided with the analyzer. The purpose of this test is to verify there is no contamination on the analyzer window or other component that is “seen” by the x-rays. Method 6200 recommends an instrument blank at least once per day, preferably every 20 samples. For either in-situ or prepared-sample testing, the operator should just test the SiO_2 blank to be sure there are no reported contaminant metals.

3. A method blank will be analyzed daily or for every 20 prepared samples. The purpose of the method blank is to verify that cross-contamination is not introduced into samples during the sample preparation process (Method 6200 recommends following the sample preparation procedures with clean SiO_2 once every 20 prepared samples).

4. A calibration verification check (NIST SRM check standard) will be analyzed at the beginning of each day, after 20 samples have been analyzed and every 4 hours, whichever is more frequent. The operator will perform a 2-minute test on a NIST standard. The difference between the XRF result for an element and the value of the standard should be 20% or less. If the calibration check is greater than 20% of the standard value, then the operator will adjust the calibration factor of the instrument and re-analyze the standard (based on the instrument manual for re-adjustment of calibration factors).

5. A laboratory duplicate sample will be analyzed daily. The project control limit for the laboratory duplicate relative percent difference (%RPD) between the original sample and lab duplicate sample is 50, when positive results for both samples are ≥ 5 times the quantitation limit.

3.3 Field Quality Control Samples for TCLP Lead

Field duplicate samples will be collected and submitted for TCLP lead analyses (at a rate of at least ten percent of the primary TCLP samples). This will be accomplished by collecting enough sample volume to ensure adequate volume to have a duplicate sample collected and tested. Field duplicate samples will be collected as composite sets with the original sample and homogenized. Duplicate samples will be analyzed by off-site laboratory TCLP methods.

3.4 Off-Site Laboratory Quality Control

The project laboratory will be responsible for conducting laboratory QC procedures and reporting laboratory QC results in accordance with laboratory Standard Operating Procedures (SOPs). All field QC and lab QA samples for lead analyses will be collected and prepared in the same manner as the primary samples. It is expected at a minimum that the project laboratory will perform and report the following laboratory QC at a frequency of one per batch of total lead and lead TCLP samples:

- Method blank
- Blank spike (Laboratory Control Sample)
- Matrix spike/matrix spike duplicate
- Laboratory duplicate

3.5 Data Qualifiers

Data qualifiers described in the 2005 SAP (Environmental and Natural Resources Division Fort Lewis Public Works 2005) will be used. Data qualifiers shall be added by the laboratory during the data generation/review process. These qualifiers would be applied when quality objectives were not met and corrective action was not successful or when corrective action was not performed. All flags used by the laboratory shall be defined completely within the chemical data reportable packages. The following example data qualifiers are suggested for use.

U – Non-detect when analyte concentration is below the Practical Quantification Limit (PQL).
J – Estimated concentration when analyte concentration falls below the lowest calibration standard.
B – Blank contamination when any associated blanks are above the “PQL check samples.”
R – Data rejected due to the exceedance of method-specific holding times or calibration of batch QC data associated with the samples do not meet method quality objectives.

These flags should also identify any suspected bias in the data, either low or high, and whether the estimation is related to the suspected identification (qualitative) or whether the value reported is an approximation (quantitative). The Project Manager or appropriate technical personnel, shall be notified as soon as possible to discuss possible corrective actions should the data be qualified. Additional data flagging may be performed during external data review or validation.

3.6 Practical Quantification Limit (PQL)

Table 7 presents the on-site XRF and off-site laboratory PQL. The expected off-site PQL for total lead is 1,250 times lower than that of the lowest cleanup level objective for the Miller Hill and Skeet Range sites (250 mg/kg). The expected on-site PQL for lead is approximately 16 times lower than the most stringent potential regulatory criteria. Thus, it is expected that the project laboratory will be able to achieve a PQL of appropriate sensitivity for comparisons between project data and regulatory standards.

Table 7. Practical Quantification Limit (PQL) by Method

Parameter/Method and Matrix	PQL	Unit
Total Lead in soil (Off-Site Method 6020-ICP-MS)	0.2	mg/kg (or ppm)
Total Lead in soil (On-Site Method 6200-XRF)	16	mg/kg (or ppm)
TCLP Lead in soil (Off-Site Method 1311)	0.05	mg/L

3.7 QA/QC Review and Verification

Overall data quality will be reviewed and verified by the project manager to determine the appropriateness of project-related data. Project data as well as QA/QC data (i.e., field QC results, lab QC results, PQL, and holding times) will be evaluated in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity. Results of this evaluation will be summarized in the project completion report. Corrective action for field or laboratory procedures will be taken as needed in consultation with the Department of Ecology. Level IV Reports shall be required for both total lead and TCLP lead soil analysis.

Table 8. Sample Collection, Preservation, and Holding Time Criteria for Soil Samples

Parameter	Method	Container Type	Preservation	Extraction Holding Time	Analysis Holding Time (days)
Metals (on-site XRF)	6200	Plastic bag	None	N/A	180
Metals (off-site laboratory)	6020	1 4-8-oz. Clear wide-mouth glass or plastic jar with lid	None	N/A	180
TCLP (off-site laboratory)	1311	1 4-8-oz. Clear wide-mouth glass or plastic jar with lid	None	14 days	180

N/A - Not applicable

Table 9. Quality Control Samples

*QC Type	Frequency	RPD	Purpose
Field Duplicate	1 for every 10 samples	RPD <50	Evaluate precision of field collection procedures
Method Blank	1 per digestion batch not to exceed 20 samples	<1/2 PQL	Evaluate laboratory contamination
Blank Spike	1 per digestion batch not to exceed 20 samples	80 - 120 %	Determine accuracy of analytical process
Laboratory Duplicate	1 per digestion batch not to exceed 20 samples	RPD < 35	Evaluate laboratory precision

**QC samples criteria are for both total lead and TCLP lead*

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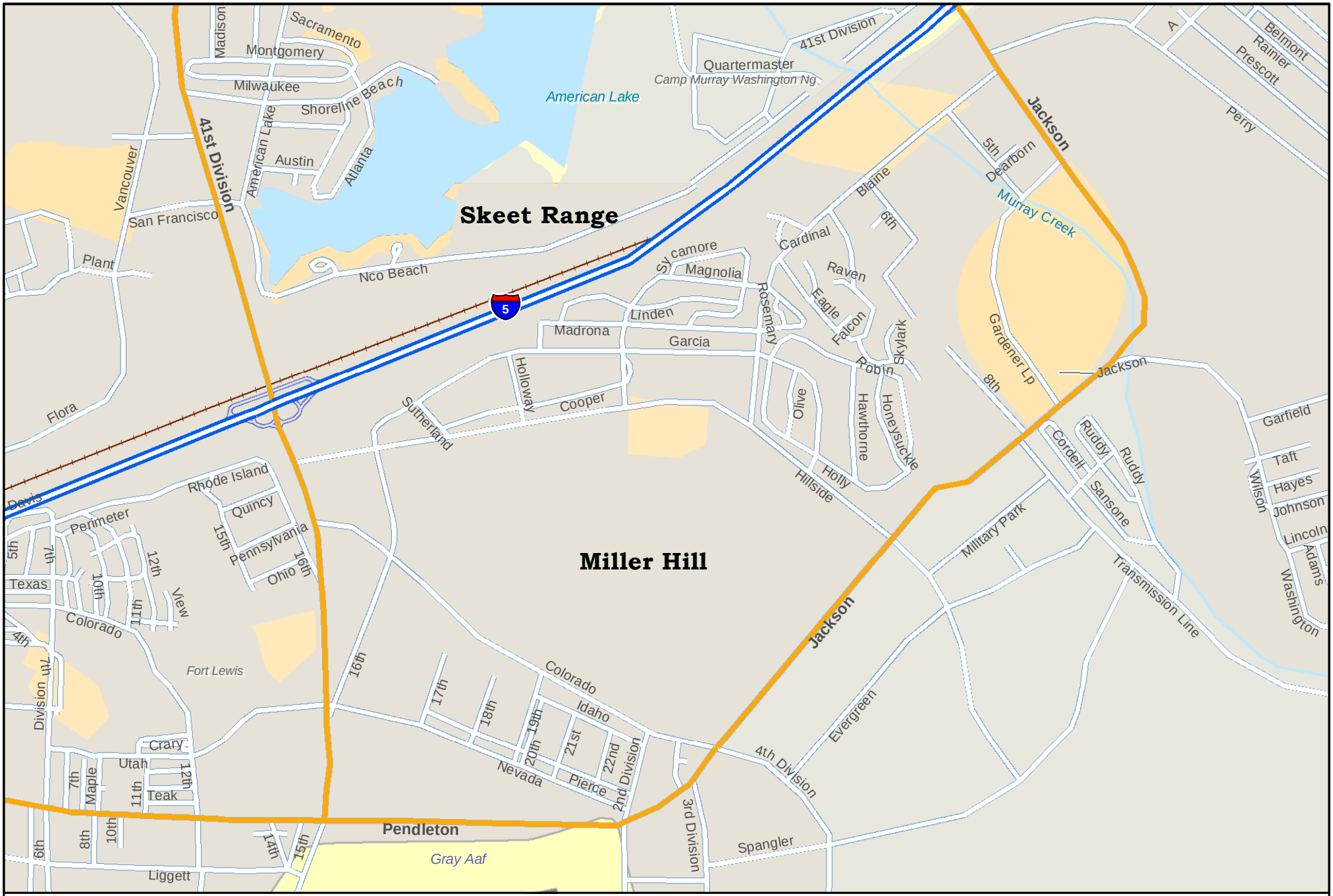

1 in. = 1,600 ft. at 8.5x11 in. figure

0 1,600 3,200 6,400 Feet

N

Figure 1B

Site Map

Joint Base Lewis McChord

1
See Figure 4

2
See Figure 5

3
See Figure 6

Steep Hillside (Ecological Open Space)

Approximate division between Flatlands and Steep Hillside
(Determined in field based on ecological value)

Hillside Housing Residential Area

200'

As-Built Soil Stockpile Location from Interim Action

Existing Chainlink Fence

Residential Buffer Zone

Contamination Reduction Zone

Support Zone

Stone Education Center

Distance Learning Center

KEMRON Trailer

Bathrooms

Flatlands (Commercial)

Colorado Avenue

Legend

- New 4 Wire Stand Fence
- Existing 4 Wire Strand Fence
- Remove Existing 4 Wire Strand Fence
- Erosion Control/Silt Fence
- Equity Property Line
- Site Control (Barricade Tape)
- Steep Hillside (Ecological Open Space)
- Road Edgeline
- Contours (Half Meter)

- Construction Drive
- KEMRON Trailer
- Residential Buffer Zone (cleanup level - 475 mg/kg)
- Residential Cleanup Level of 250 mg/kg
- Flatlands (cleanup level - 1066 mg/kg)
- Clean Backfill Stockpile Area
- Truck Pad
- Hydrant

** Hillside Housing Residential Area was remediated during Interim Action in 2008.

1 in. = 100 ft. at 11x17 in. figure

0 50 100 200 300 400 Feet

N

Figure 3

Pistol Ranges 62 and 67

Key

Joint Base Lewis McChord

KEMRON ENVIRONMENTAL SERVICES

Remove Existing Fence

Exclusion Zone

Remove Existing Fence

Construct New Trail and Install New 4-wire Fence

Close Trail

Contamination Reduction Zone

Exact location of new fence will be based on field conditions (i.e. topography and presence of trees)

New 4-wire Fence

Support Zone

Remove Existing Fence

Steep Hillside (Ecological Open Space)

Stone Education Center

Legend

- New 4 Wire Fencing
- Existing 4 Strand Wire Fence
- REMOVE-Existing 4 Strand Wire Fence
- Trail
- New Trail
- Site Control (Barricade Tape)
- Edgeline-Road
- Gate
- Gravel Road
- Ecological Cleanup Level = 1066 mg/kg

1 in. = 80 ft. at 11x17 in. figure

0 40 80 160 240 320 Feet

N

Figure 8

Range 54

Excavation Area and Site Control

Joint Base Lewis McChord

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Steep Hillside (Ecological Open Space)

Unnumbered Pistol Range

Stone Education (east) Parking Lot

Exclusion Zone

Support Zone

Contamination Reduction Zone

Picnic Shelter

Former Concrete "Shield"

Colorado Avenue

Legend

- Erosion Control/Silt Fence
- New 4 Wire Strand Fence
- Remove Existing 4 Wire Strand Fence
- Existing 4 Wire Strand Fence
- Former Concrete Shield Wall
- Steep Hillside (Ecological Open Space)
- Road Edgeline
- Contours (Half Meter)
- Flat Lands (cleanup level - 1066 mg/kg)
- Potential Backfill Stockpile
- Construction Drive
- Truck Pad

1 in. = 80 ft. at 11x17 in. figure

0 37.5 75 150 225 300 Feet

N

Figure 9

Revised 02/2012

Range 42

Excavation Area and Site Control

Joint Base Lewis McChord

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Note - Site Control Will Extend from Fence Corner to Picnic Shelter and then to Range 42 Fencing
Empty Trucks Enter
Full Trucks Exit
MH1 324 229 - -
MH2 477 182 - -
MH3 574 458 - -
MH4 797 727 45 158
MH5 767 221 - -
MH6 703 393 - -
MH7 834 446 - -
MH8 294 219 - -
MH9 1780 934 45 57
MH10 1560 424 - -
MH11 821 706 - -
MH12 1160 72 - -
MH13 788 519 - -
MH14 107 113 - -
MH15 139 87 - -
MH16 255 108 45 101
MH17 269 110 - -
MH18 222 86 - -
MH19 291 - -
MH20 1250 - -
MH21 275 - - -
MH22 72 - -
MH23 321 - - -
MH24 206 - - -
MH25 124 - - -
MH26 45 - - -
MH27 1500 - -
MH28 72 - - -
MH29 699 - -
MH30 242 - - -
MH31 180 - - -
MH32 6500 - - -
MH33 73 - - -
MH34 97 - - -
MH35 45 - - -
MH36 1060 - - -
MH37 508 - - -
MH38 104 - - -
*
Support Zone
Exclusion Zone
Contamination Reduction Zone
Colorado Ave.
Legend
Gate
Flatlands (cleanup level - 1066 mg/kg)
Site Control (Barricade Tape)
Existing Chain Link Fence
* Additional Delineation Grid
N
Note - Silt Fence Will Be Added at the Discretion of the Engineer
1 in. = 20 ft. at 11x17 in. figure
0 5 10 20 30 40 Feet
Figure 10
Revision 02/2012
Unnumbered Pistol Range
Excavation Area and Site Control
Joint Base Lewis McChord
KEMRON ENVIRONMENTAL SERVICES

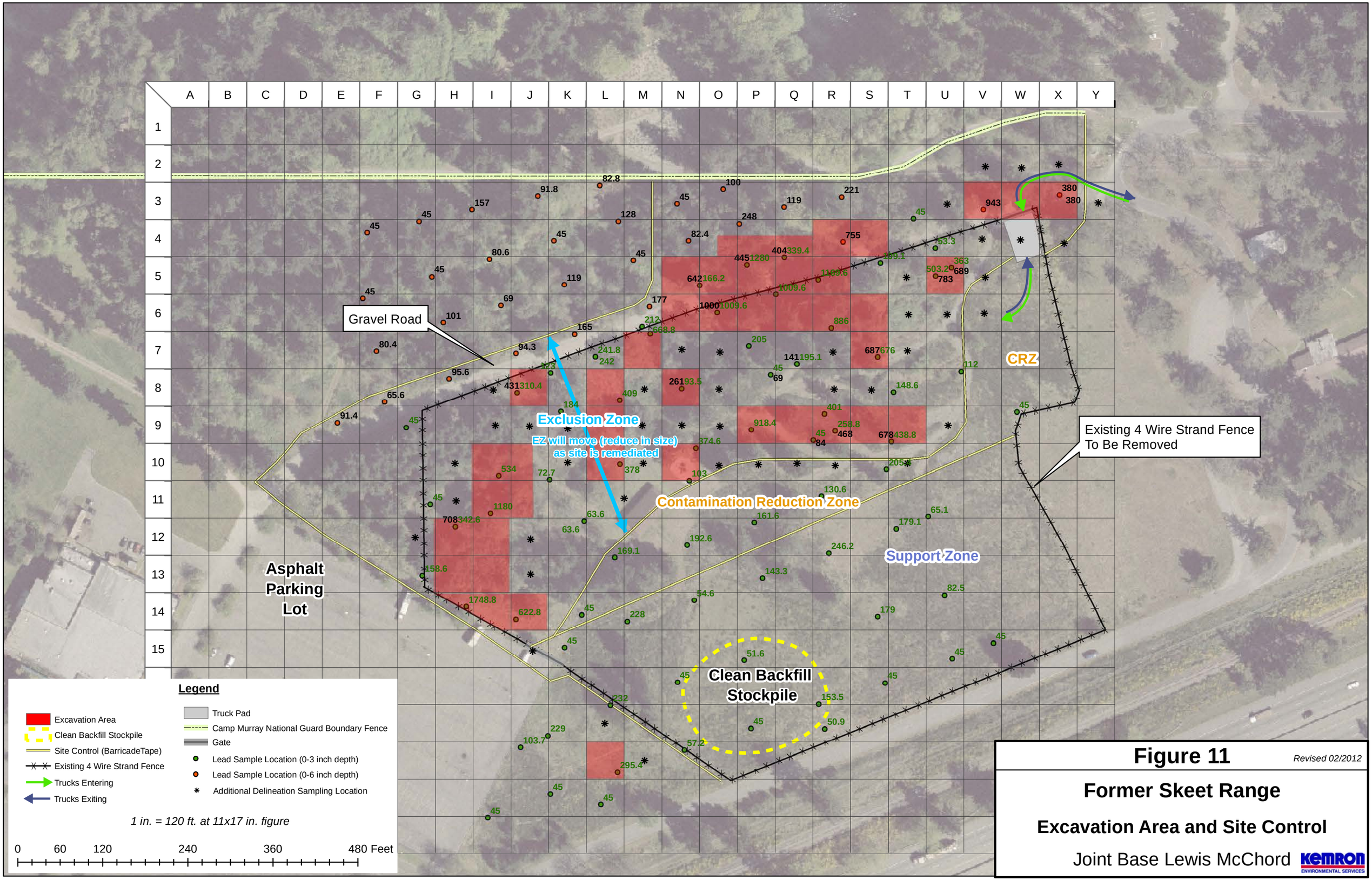

Figure 11

Revised 02/2012

Former Skeet Range

Excavation Area and Site Control

Joint Base Lewis McChord

kemron ENVIRONMENTAL SERVICES

JOINT BASE LEWIS-MCCHORD
AGREED ORDER
HEALTH AND SAFETY PLAN

FORMER MILLER HILL RANGES AND FORMER SKEET RANGE
JOINT BASE LEWIS-MCCHORD, WASHINGTON

Contract #: W91ZLK-05-D-0013/0002
KEMRON Project #: CH0006

23 March 2010
Revision 1.0

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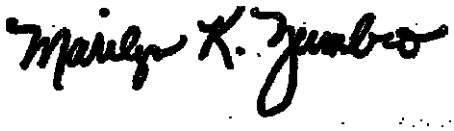

Approved by Marilyn Zumbro
Corporate Health & Safety Manager

23 March 2010
Date

Approved by Larry Emerson, P.E.
Project Manager

23 March 2010
Date

Reviewed by Mark Roberts
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23 March 2010
Date

Revised by Tim Duda
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23 March 2010
Date

Table of Contents

LIST OF FIGURES

LIST OF APPENDICES

Section 1.0 Introduction and Site Entry Requirements

This Health and Safety Plan (HASP) is intended to guide the site activities performed under the direction of KEMRON Environmental Services, Inc. (KEMRON) and conducted under the Performance Based Acquisition Task Order (PBA TO) for the environmental remediation for two sites (Miller Hill and Former Skeet Range) at Joint Base Lewis-McChord, Washington. KEMRON's subcontractors will be required to develop and implement site specific health and safety plans which will be applied by them to their employees and subcontractors. KEMRON will review these plans to ensure conformance with this HASP. Additionally, KEMRON will perform oversight of its subcontractors to ensure conformance with the project requirements of this plan. The HASP is designed to show plans for compliance with 29 CFR 1910.120, 29 CFR 1926.62 App A & B, WAC 173-340-810, WAC 296-155-176, WAC 296-62 (Part R) and WAC 296-843, and to be consistent with and in general conformance to KEMRON's site specific work plan.

KEMRON was awarded a PBA TO for the environmental remediation for the two sites at Joint Base Lewis-McChord, Washington. The contract was issued by the Army Contracting Agency (ACA) Aberdeen Proving Ground (APG), Contracting Officer (KO), Directorate of Contracting office located at 4118 Susquehanna Avenue in APG, Maryland. This TO # 2 was issued under KEMRON's Assistant Chief of Staff for Installation Management (ACSIM) contract, number W91ZLK-05-D-0013, with an award date of 4 April 2008.

1.1 Introduction

This document describes the health and safety guidelines developed for performance of all activities of the Joint Base Lewis-McChord lead removal effort. The plan is designed to provide measures necessary to protect on-site personnel, residents, visitors, and the public from physical harm and exposure to the work to be conducted. The procedures and guidelines contained herein were based upon the best available information at the time of the plan's preparation. Specific requirements will be revised when new information is received, or conditions change. A written amendment will document all changes made to the plan. Any amendments to this plan will be included as attachments. Where appropriate, specific OSHA, EPA standards and/ or other guidance will be cited and applied.

1.2 Project Setting

Joint Base Lewis-McChord encompasses an area of 86,176 acres within Pierce County, Washington (67,650 acres) and Thurston County, Washington (18,526 acres). The two sites included in this Performance Work Statement (PWS) are Former Miller Hill Ranges (Miller Hill) and Former Skeet Range. Miller Hill is in the Army's Installation Restoration Program (IRP) and the Former Skeet Range is part of the Military Munitions Response Program (MMRP). Refer to Figure H1 for Joint Base Lewis-McChord Vicinity Map.

MILLER HILL

The Miller Hill Site (AOC 4-2) is a former small arms firing range (SAFR) complex located on the south side of Miller Hill. The site was used for range activity from circa 1917 until the 1960s. Identified former ranges at the site are Pistol Range 62, Pistol Range 67, Subcaliber Tank Range 54, Machine Gun Range 42, and another unnumbered pistol range (AOC 4-2.2). At each former range (except the unnumbered pistol range in which a small berm was constructed), small arms were fired from firing lines on flat ground at targets placed in front of the undisturbed hillside (which served as the backstop). The impact area (i.e., lower portion or toe of the south-facing hillside) is approximately one-half mile long. Based on the nature of site use and the composition of bullet slugs, lead is the only contaminant of

concern for the site identified in the RI. To limit potential human direct contact with surface soil, a 4-strand wire perimeter fence was installed as an interim measure in 2004.

Miller Hill is located within the Cantonment Area in an area currently zoned for open space in the Joint Base Lewis-McChord Master Plan. Although the site itself is not used for recreation, Miller Hill is a common outdoor recreation area within Joint Base Lewis-McChord. Various unmarked trails and roads are located on Miller Hill and the area around the site is used for outdoor recreation. Discussions are underway to revise the Joint Base Lewis-McChord Master Plan to consolidate and improve the recreational trail network on Miller Hill. In addition, a residential housing area is located in the western portion of the site.

Surficial soils on site and in the residential areas west of Miller Hill have been impacted by the former range activities. Miller Hill has been divided into five distinct impacted areas: (1) Former Pistol Ranges 62 and 67, (2) Former Tank Range 54, (3) Former Machinegun Range 42, (4) Unnumbered Pistol Range, and (5) Hillside Housing (residential) areas. Soil sampling conducted in 2001, 2003, 2005, 2006 and 2007 have delineated the vast majority of the lead contaminated soils. Refer to H1.

Based on the sampling results, the lead concentrations and distribution are similar across the former range sites. Lead concentrations are generally highest in the impact areas (the base of the hillside, which served as the backstop), with less impacts in the ricochet areas and terminal end of firing areas. As expected based on historical use, lead concentrations are generally highest from 0 to 6 inches and decreases with depth, although significant heterogeneity has been documented in vertical concentration profiles. It has been determined based on the MTCA Method B soil cleanup level for the potential leaching to groundwater pathway that lead leaching to groundwater is not a complete pathway. Therefore, no action is needed to address groundwater at the site. As the FLAO Final FS Report dated 14 December 2009 indicated, four separate clean-up objectives exist at four sites (Miller Hill Flatlands, Miller Hill Area Resident Buffer Zone, Hillside Housing Area and the Former Skeet Range).

1. FLATLAND AREA

The Flatland areas are designated as commercial use areas. The areas identified for active remediation will be excavated to below the ecological cleanup level of 1,066 mg/kg lead. It is estimated that the majority of the lead impacted soils will be present within the top two to three feet of soils. Based on the soil sampling data from the Flatland Area, the estimated excavation volume was calculated at 33,000 CY. The excavated material is expected to be composed of 30% cobbles and gravels in excess of ¾ inch that will be considered clean and reused onsite as backfill or trail coverings, 30% lead impacted soils with total lead concentrations of 2,000 mg/kg or less that will not be classified as a dangerous waste, and 40% lead impacted soils with total lead concentrations that may be classified as a dangerous waste and may require additional treatment prior to reuse. The estimated 14,000 yards of soil above 2000 mg/kg and classified as dangerous waste shall undergo soil stabilization treatment to obtain a lead TCLP value of less than 5.0 mg/L rendering the soil non dangerous. The work activities include screening of all soils to separate the + ¾ inch size material to be used onsite as clean fill. The finer sized soils with total lead concentrations less than 2,000 mg/kg will be hauled directly to Range 91. Soils classified as potentially dangerous waste will be blended with a stabilizing reagent ECOBOND® or similar. This includes the approximate 2,000 CY of contaminated soil excavated and stockpiled from the Interim Action at the Hillside Housing Area during 2008.

2. MILLER HILL AREA RESIDENT BUFFER ZONE

A buffer zone has been established extending from the Hillside Housing residential area into the Flatland industrial area located east of the Hillside Housing. The 200-foot radius established from the perimeter fence in the Hillside Housing Area extends east into the Miller Hill former ranges 62 and 67 to be

protective of residents in this area. The lead contaminated grids within the 200-foot buffer zone will be remediated to a level below the area resident cleanup level of 475 mg/kg lead. This area resident value has been calculated to be protective of potential exposures to children who may be exposed to lead in areas of the former ranges that are in close proximity (e.g. 200 feet) to the Hillside Housing Area. An estimated 11,000 CY of materials is to be excavated from this area. The work activities are the same as described above for the Flatland Area.

3. HILLSIDE HOUSING AREA

A small access road near the housing units will be cleaned to the unrestricted use cleanup level of 250 mg/kg.

4. FORMER SKEET RANGE

The site is currently zoned for Community Services in the Joint Base Lewis-McChord Master Plan and was used for recreational purposes prior to the 2004 installation of a perimeter fence with warning signs. The former use was a recreational park area with picnic tables and sports activity fields. Although there is no current use of the site, the site is a desirable piece of property on the installation and future land use is anticipated to be residential once the site contamination is addressed. The site map is included in Figure H5 of this plan.

Soils will be excavated until the MTCA Method A unrestricted use cleanup level of 250 mg/kg lead has been reached. The clean-up goal of 250 mg/kg is based on future use for residential standards. The estimated volume requiring excavation is approximately 4,500 CY assuming varying excavation depths. Based upon TCLP results from site soils at the Former Skeet Range, collected in 2003, none exceeded the lead toxicity threshold of 5 mg/L to classify the waste stream a dangerous waste. Therefore, the excavated material is not subject to the WAC dangerous waste regulations and is considered non-dangerous. Work activities include screening all soils to separate the +¾ inch material for use as clean backfill. The -¾ inch material will be hauled to Range 91 for berm construction. Refer to the Work Plan for a map of the truck route to Range 91.

1.3 Daily Safety Meetings

Daily meetings will be held at the start of each shift to ensure that all personnel understand site conditions and operating procedures, to ensure that personal protective equipment is being used correctly and to address worker health and safety concerns. All new amendments to the HASP will also be reviewed at these meetings. The daily meetings will be documented using Form A of Appendix A of this HASP. These forms will be kept in the project files at Join Base Lewis-McChord.

1.4 Site Safety Plan Acceptance Acknowledgment

The Project Manager and the designated Site Safety Officer (SSO) will be responsible for informing all individuals entering the exclusion zone or contamination reduction zone of the contents of this plan and ensuring that each person signs the Safety Plan Acknowledgment Form in this plan. All subcontractors working at the sites must also sign off on this HASP. By signing the Safety Plan Acknowledgment Form, individuals are recognizing the hazards present on-site and the policies and procedures required to minimize exposure or adverse effects of these hazards.

1.5 Training Requirements

All personnel (including visitors) entering the exclusion zone or contamination reduction zone must have completed training requirements for hazardous site work in accordance with WAC 296-843-200, OSHA

29 CFR 1910.120. Subcontractors may be used for various segments of the work. Documentation of training requirements is the responsibility of each employer. Each individual must provide evidence of training before site entry. All site employees entering the exclusion zone will have at a minimum, the following training:

- 40-Hour Hazardous Waste Operations, 29 CFR 1910.120 (Level C, D)
- 8-Hour Refresher Hazardous Waste Site Worker, 29 CFR 1910.120 (current)
- Lead training per WAC 296-155-17625 (applicable for all employees who are subject to exposure to lead at or above the action level on any day or who are subject to exposure to lead compounds which may cause skin or eye irritation). **All workers who may be exposed to lead must review and sign off on Form K within Appendix A of this plan.**
- Select personnel will be trained in CPR & First Aid.
- Daily Safety Briefing and Tailgate Meetings (See Appendix A Form A).

Additionally, KEMRON will maintain a copy of the required training certificates for KEMRON and its subcontractors while working at Joint Base Lewis-McChord. These training certificates will be reviewed to assure that training is current. Subcontractors will monitor and ensure that all of their employees are current with training requirements during the performance of the site work. Any personnel not having current training certificates will be granted the same site access as visitors and may require an escort.

1.6 Medical Monitoring Requirements

All personnel (including visitors) entering the exclusion zone or contamination reduction zone must have completed appropriate medical monitoring requirements under OSHA 29 CFR 1910.120 (f), WAC 296-843 and WAC 296-155-176 (lead standard). Subcontractors may be used for various segments of the work. Documentation of medical monitoring is the responsibility of each employer.

All KEMRON personnel and subcontractors will have successfully completed a physical examination which meets the requirements of WAC 296-843-210 prior to entering work zones. All field personnel must undergo a physical examination annually, which is to be performed by a physician Board-certified in Occupational Medicine. The physician will be made familiar with the job-related duties of each employee examined as well as each employee's anticipated exposure and description of any Personal Protective Equipment (PPE) to be used. In addition, the physician will be provided a copy of WAC 296-843-210, any information from previous examinations, a copy of Section 5.0 of NIOSH 85-115, and information required by WAC 296-843-210 and 220 if any of these documents are not already in his possession.

In addition, onsite workers who are or may be exposed to lead at or above the action level (30 $\mu g/m^3$) for more than 30 days in any consecutive 12 month period will have to undergo a blood test for lead and zinc protoporphyrin **prior** to entering the exclusion zone. Personal air monitoring will be conducted and results will be reviewed to evaluate workers' exposure to lead (refer to Section 6.0 Air Monitoring). If results indicate exposure above safe levels (as determined by the occupational physician and based on published standards), follow-up medical tests to include blood lead and zinc protoporphyrin at least every two months for the first six months will be required and, if needed, special protection or removal from the site will be conducted in accordance with WAC 296-155-176 (refer to Appendix A, Form K).

If there are additional medical monitoring requirements for this site, evidence of compliance must also be included.

KEMRON will maintain a copy of the required medical monitoring clearance for KEMRON and its subcontractors in project files for Joint Base Lewis-McChord. Medical monitoring clearance will be

reviewed to assure that clearance is kept current. Subcontractors will monitor and ensure that all of their employees are in compliance with medical monitoring requirements and are cleared for work.

1.7 Site Orientation Training

All personnel working on site will attend a site orientation that includes a review of the HASP including site-specific safety rules and requirements. All personnel will also be required to attend all facility specific safety orientations including the lead training per WAC 296-155-17625 as discussed in Section 1.5. All personnel must also review and sign Form K, Lead Regulatory Review. Personnel accessing the site strictly for deliveries or administrative purposes will not be required to attend the training.

1.8 Delivery Personnel and Support Subcontractors

Personnel whose sole purpose is to deliver goods to the support zone will not be required to meet the training and medical monitoring requirements described in this section. Personnel performing site work strictly within the support zone and clean areas of the site or where safety and health hazards have been removed, will also not be required to meet the training and medical qualifications, but will attend the Site Orientation Training described in Section 1.7. The site orientation training will cover the HASP including site hazard communication information.

Section 2.0 Responsible Site Authority

2.1 KEMRON Project Team

The following personnel are identified as the KEMRON/MT2 project team:

Tracy Bergquist Program Manager KEMRON Environmental Services, Inc. 1359-A Ellsworth Industrial Blvd. Atlanta, GA 30318 (Office) 404-601-6902 (Fax) 404-636-7162 (Cell) 770-329-1745 tbergquist@kemron.com	Tim Duda Project Geologist KEMRON Environmental Services, Inc. 3155 Blackhawk Drive, Building 379, Suite 17 Fort Sheridan, IL 60037 (Office) 847-266-1350 (Fax) 847-266-3584 (Cell) 847-815-5694 tduda@kemron.com
Larry Emerson, P.E. Project Manager KEMRON Environmental Services, Inc. 3155 Blackhawk Drive, Building 379, Suite 17 Fort Sheridan, IL 60037 (Office) 847-266-1350 (Fax) 847-266-3584 (Cell) 847-815-3768 lemerson@kemron.com	Sharon O'Flaherty Project Assistant KEMRON Environmental Services, Inc. 1359-A Ellsworth Industrial Blvd. Atlanta, GA 30318 (Office) 404-601-6902 (Fax) 404-636-7162 (Cell) 770-329-1745 tbergquist@kemron.com
Louis Ehrhard, P.G. Deputy Program Manager KEMRON Environmental Services, Inc. 3155 Blackhawk Drive, Building 379, Suite 17 Fort Sheridan, IL 60037-1289 (Office) 847-266-1350 (Fax) 847-266-3584 (Cell) 847-721-8000 lehrhard@kemron.com	Michael Burkett Program Manager MT2, LLC 14045 West 66th Avenue Arvada, CO 80004 (Office) 303/456-6977 (Fax) 303/456-6998 mburkett@mt2.com
Marilyn Zumbro Corporate Health & Safety Manager KEMRON Environmental Services, Inc. 156 Starlite Drive Marietta, OH 45750 (Office) 740-373-4308 (Fax) 740-376-2536 (Cell) 740-350-0846 soflahrety@kemron.com	Bob Anderson Project Manager MT2, LLC 14045 West 66th Avenue Arvada, CO 80004 (Office) 303/456-6977 (Fax) 303/456-6998 banderson@mt2.com
Mark Roberts Asst. Project Manager/Site Safety Officer/Field Team Leader KEMRON Environmental Services, Inc. P.O. Box 274 Vaughn, WA 98394 (Office) 253-884-6784 (Fax) 253-884-2196 (Cell) 206-225-3590 mroberts@kemron.com	James Uhlinger, P.G. MT2, LLC 14045 West. 66th Avenue Arvada, CO 80004-1049 (Office) 303/456-6977 (Fax) 303/456-6998 juhlinger@mt2.com

2.2 Joint Base Lewis-McChord Project Team

The following personnel are identified as the Joint Base Lewis-McChord project team:

William Myers, COR JBLM Environmental Restoration Program Manager Public Works - ED Building 2012 Liggett Avenue, Room 313 Box 339500, MS-17 Joint Base Lewis-McChord, WA 98433-9500 (Office) 253-477-3742 (Fax) 253-966-4985 william.w.myers@us.army.mil	Jim Gillie, P.E. Versar, Inc. Public Works - ED Building 2012 Liggett Avenue Box 339500, MS-17 Joint Base Lewis-McChord, WA 98433-9500 (Office) 253-966-1774 (Fax) 253-966-4985 james.gillie@us.army.mil
Jonathan Harrington US Army Environmental Command Cleanup & Munitions Response Division - West Branch Building 2264 1st Floor/Room 128/Cubicle 010 2450 Connell Road Fort Sam Houston, TX 78234-7664 (Cell) 210-793-7917 jonathan.harrington2.civ@mail.mil	

2.3 Regulatory Agency Contacts

The following personnel is identified as the state government representative:

Greg Caron Site Manager Washington State Department of Ecology Central Regional Office 15 W. Yakima Avenue, Suite 200 Yakima, WA 98902-3452 (Office) 509-454-7893 grca461@ecy.wa.gov	

2.4 Personnel Descriptions

Project Manager

The Project Manager is responsible for the progress of the work at the project level. He supervises all project personnel to ensure that all on-site work is performed in compliance with the Work Plan specifications. In addition, the Project Manager directs the on-site personnel in correction of non-conformance found in the work.

- Prepares and organizes the background review of the work plan. The Project Manager also organizes the field team.
- Obtains permission for the site access and coordinates activities with appropriate officials.
- Ensures that work plan is completed and on schedule.
- Ensures compliance with the HASP.
- Briefs the field teams on their specific assignments.
- Supports the SSO to ensure that safety and health requirements are met.
- Prepares the final reports and support files on the remedial activities.

Field Team Leader

The Field Team Leader provides daily oversight of all work activities. The Field Team Leader works with the Project Manager to ensure that activities are performed using procedures and equipment designated in the contract. The Site Manager alerts the Project Manager of any potential scheduling issues and provides information regarding delivery of materials.

- Manages field operations.
- Executes the work plan and schedule.
- Enforces safety procedures.
- Coordinates with the SSO in determining protection level.
- Enforces site control.
- Documents field activities.

Site Safety Officer (SSO)

The SSO is assigned to the project full-time, reporting to the Corporate Health & Safety Manager. The SSO reports all site-specific safety issues and concerns to the Project Manager. He is responsible for daily implementation of the HASP, including such issues as PPE, training, policy enforcement, and health monitoring and report preparation, among others. He is also responsible for decontamination procedures, equipment, and supplies. The SSO may modify the PPE worn in the field in response to current site conditions and/or hazards.

- Ensures protective clothing used is consistent with the requirements of the HASP.
- Periodically inspects protective clothing and equipment.
- Ensures that PPE are properly stored and maintained.
- Controls entry and exit at the Access Control Points.
- Coordinates safety and health program activities with on-site essential personnel.
- Confirms each team member's suitability for work based on a physician's recommendations.
- Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue.
- Monitors on-site hazards and conditions.
- Participates in the preparation of and the implementation of the HASP.
- Conducts periodic inspections to determine if the HASP is being followed.
- Enforces the "buddy" system.
- Set up decontamination lines and the decontamination solutions appropriate for the type of chemical contamination on site.
- Controls the decontamination of all equipment, personnel, and samples from the contaminated areas.
- Assists in the disposal of contaminated clothing and materials.
- Ensures that all required equipment is available.
- Advises medical personnel of potential exposures and consequences.
- Is aware of emergency procedures (Joint Base Lewis-McChord), evacuation routes, and the telephone numbers of the Fort's emergency services, ambulance service, local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local public emergency officials.
- Coordinates emergency medical care.

Field Team Members

Depending on the size of the field team, any or all of the field team may be in the Work Party, but the Work Party should consist of at least two people. The field team members may consist of equipment operators, sampling technicians, environmental technicians, etc.

The field team has the following specific responsibilities:

- Safely completes the on-site tasks required to fulfill work plan.
- Complies with the HASP.
- Notifies SSO or Site Supervisor/Foreman of any unsafe conditions.

Section 3.0 Site Characteristics

3.1 Objectives

KEMRON has been contracted to perform remedial activities at the Joint Base Lewis-McChord Site. It is KEMRON's objective to perform these operations in a safe and efficient manner and in accordance with all KEMRON Standard Operating Procedures and all applicable regulations found in 29 CFR 1910.120 and Washington State Department of Labor and Industries regulations to include WAC 173-340-810, WAC 296-155-176, WAC 296-62 and WAC 296-843 regulating Hazardous Waste Operations and General Construction.

3.2 Technical Approach

The Miller Hill Range sites have been segregated into two areas as follows to represent the remedies being applied: the Flatland area (which includes the more accessible base of the hillside), and the Steep Hillside area. The Flatland area is the most accessible and will be remediated to meet the TEE cleanup standard of 1,066 mg/kg (Flatlands) with the exception of the buffer zone in which the residential cleanup standard of 250mg/kg to 475 mg/kg must be met and the Hillside Housing access road which has a cleanup level of 250 mg/kg. The Steep Hillside area may have some delineation of trails and possible remediation to recreational level of 1,440 mg/kg lead. Areas of the trail network that have been documented with lead concentrations above this remediation level will be covered with clean cobbles and gravel. Contamination will also be addressed through land-use controls.

KEMRON anticipates the following overall tasks for this site:

- Perform clearing and grubbing operations.
- Mark out cells in the field in preparation for excavation.
- Perform soil excavation in the Flatland area of approximately 33,000 CY of impacted soil to be screened and recycled at active ranges. An estimated 14,000 CY of the excavated soil is considered to be potentially dangerous waste soils (>2,000 mg/kg) and will require stabilization prior to being recycled at active ranges.
- Excavated soils will be screened of large gravels and cobbles (≥ ¾ inches).
  - The large gravels and cobbles shall be reused as clean backfill.
  - Screened soil containing minus ¾ inch gravel shall be transported to active Range 91 at Joint Base Lewis-McChord for use as construction materials to maintain, construct, or reconstruct berms.
- Conduct confirmatory sampling utilizing a field X-Ray Fluorescence (XRF) analyzer, along with laboratory confirmation samples to certify that soils above the ecological cleanup level of 1,066 mg/kg of lead within the Flatlands and above the remediation level of 250 mg/kg to 475 mg/kg within the residential buffer zone and the unrestricted cleanup level of 250 mg/kg have been removed.
- Perform delineation of six grids (refer to Figure H2) within Flatlands and possible remediation there.
- Delineation of trails and possible remediation to recreational level of 1,440 mg/kg lead.
- Conduct LTM activities for the remainder of the period of performance under this task order.

Summary of the Technical Approach for Former Skeet Range

KEMRON anticipates the following tasks for the Skeet Range under this task order:

- Perform soil excavation of approximately 4,500 CY followed by screening and reuse at active ranges.

- Impacted soils will be screened of large gravels and cobbles (≥ ¾ inches).
  - The large gravels and cobbles shall be reused as clean backfill.
  - Screened soil containing minus ¾ inch gravel shall be transported to active Range 91 at Joint Base Lewis-McChord for use as construction materials to maintain, construct, or reconstruct berms.
- Conduct confirmatory sampling following the Triad guidance to certify that soils above the unrestricted use threshold of 250 mg/kg lead have been removed.
- Site restoration.

3.3 Scope of Work

- Mobilization/Setup
- Field Tasks
  - Fence removal and replacement
  - Soil contamination delineation
  - Soil excavation
  - Dry screening
  - Soil relocation
  - Confirmatory sampling
  - Backfilling and restoration activities
- General Site Work
  - Waste management
  - Tree removal, clearing, grubbing and chipping
- Decontamination
- Demobilization/Project Closeout

*Refer to CAWP and SAP/QAPP for detailed information.

Section 4.0 Personal Protection Equipment

Engineering controls will be employed to eliminate and/or minimize exposure potential to the extent practicable. Where engineering controls alone cannot reduce exposure potential to less than published exposure limits, PPE will be employed. Air monitoring will be performed to determine the appropriate level of PPE for each task outlined in this Plan. Action levels and PPE upgrade information is outlined in Section 6.0.

4.1 Description of Protection Levels

Note: Use of Levels A or B is not anticipated to be necessary for completion of tasks on this project. In the unlikely event it is found necessary to work in these levels. The HASP will be modified as required.

4.1.1 Level C

Note: Although Level C is not anticipated to be used on this project, Level C may be implemented at the SSO's discretion if the action level is exceeded and the engineering controls (e.g. watering, dust control) are not adequate.

EQUIPMENT REQUIRED:

- Air purifying, cartridge equipped respirator (P100 HEPA Filter)
- Coveralls and/or Uniform
- Disposal Coverals that block out dust and dirt
- Hard hat
- Two-way radio communications
- Noise Protection (if above 85 dBA)

OPTIONAL:

- Disposable boot covers
- Face shield
- Gloves (Cotton or Leather Palm Work)
- Disposable Coveralls (Block out dust and dirt)

PROTECTION PROVIDED:

Respiratory protection

SHOULD BE USED WHEN:

- The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin.
- The types of air contaminants have been identified, concentrations measured, and a cartridge is available that can remove the contaminant.
- All criteria for the use of air-purifying respirators are met.

LIMITING CRITERIA:

- Atmospheric concentration of chemicals must not exceed IDLH levels.
- The atmosphere must contain at least 20.0 percent oxygen.

4.1.2 Modified Level D

Note: Modified Level D may be worn in contingency of Level D. Proper PPE must be readily available during site remediation.

EQUIPMENT REQUIRED**:**

- Disposal Coverals that block out dust and dirt
- Coveralls and/or Uniform
- Outer chemical-resistant gloves
- Chemical-resistant steel toe boots
- Hard hat (site dependent)
- Safety Glasses w/ Side Shields
- Monogoggles on Hard Hat (site dependent)
- Two-way radio communications or cell phone
- Noise Protection (if above 85 dBA)

OPTIONAL:

- Disposable boot covers
- Gloves (Cotton or Leather Palm Work)
- Inner chemical-resistant gloves
- Chemical Splash Goggles

PROTECTION PROVIDED:

Protection from dust and contaminated surfaces where respiratory hazards have been characterized to below established exposure limits or site action levels.

SHOULD BE USED WHEN:

- The atmosphere contains no known hazard.
- Work functions involve splashes or immersion.
- Performing soil sampling
- Modified Level D should be used when no atmospheric hazards exist but potential for dermal exposure is expected.

LIMITING CRITERIA:

- Modified Level D should only be worn where respiratory hazards have been characterized and determined to be below established exposure limits or site action levels.
- May not be used in areas where respiratory hazards exist or may be expected to develop.

4.1.3 Level D

Note: Level D will be used in any non-contaminated active work area of the site including utility clearance and site set-up during mobilization, during site restoration and demobilization.

EQUIPMENT REQUIRED**:**

- Coveralls and/or Uniform
- Steel toe work boots
- Safety glasses w/ Side Shields
- Monogoggles on Hard Hat (site dependent)
- Hard hat (site dependent)
- Noise Protection (if above 85 dBA)

OPTIONAL:

- Gloves (Cotton or Leather Palm Work)
- Chemical Splash Goggles
- Face shield

PROTECTION PROVIDED:

Level D provides minimal skin protection. Modified Level D provides increased skin protection.

SHOULD BE USED WHEN:

- The atmosphere contains no known hazard.
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemical.

LIMITING CRITERIA:

- Level D should not be worn in the exclusion zone. (Unless deemed acceptable by SSO). Modified Level D is the minimum level allowed in the contamination reduction zone (CRZ) and exclusion zone.
- No respiratory protection provided.

4.2 Task-Specific Levels of Protection

FIELD ACTIVITIES COVERED UNDER THIS PLAN				
TASK DESCRIPTION	**TYPE**	**PRIMARY**	**CONTINGENCY**	**ADDITIONAL INFORMATION ***
1. Mobilization/Setup (General)	Non-Intrusive	D	Modified D	(See Sub-Tasks)
1a. Establish site access and temporary facilities	Non-Intrusive	D	Modified D	▪ Be aware of biological hazards ▪ Be aware of slip/ trip/ fall hazards ▪ Locate Utilities ▪ Be aware of chemical hazards with pre-treatment chemicals
1b. Install stormwater controls (e.g. siltfence/ hydroseeding)	Intrusive	D	Modified D	▪ Locate Utilities ▪ Be aware of slip/ trip/ fall hazards ▪ Be aware of biological hazards ▪ Wear Leather gloves for protection
1c. Deploy required equipment and personnel to subject task area	Non-Intrusive	D	Modified D	▪ Be aware of biological hazards.
2. Task area site work	Intrusive Contact	D	Modified D	(See Sub-Tasks)
2a. Tree removal, clearing and chipping	Non-Intrusive	D	Modified D	▪ Be aware of biological hazards. ▪ Be aware of slip/ trip/ fall hazards ▪ Wear Leather gloves and chaps for protection ▪ Flying and falling debris hazards

FIELD ACTIVITIES COVERED UNDER THIS PLAN				
TASK DESCRIPTION	**TYPE**	**PRIMARY**	**CONTINGENCY**	**ADDITIONAL INFORMATION ***
2b. Grubbing	Intrusive	D	C	▪ Be aware of biological hazards. ▪ Be aware of slip/ trip/ fall hazards ▪ Wear Leather gloves and chaps for protection ▪ Flying and falling debris hazards ▪ Be aware of buried utilities.
2c. Soil contamination delineation	Intrusive Contact	D	C	▪ Maintain air monitoring ▪ Heavy Equipment Operations Safety ▪ Dust Control Measures ▪ Use a spotter to prevent overturning ▪ Ensure that drivers are advised on site safety requirements
2d. Soil excavation and test pitting	Intrusive Contact	D	C	▪ Maintain air monitoring ▪ Heavy Equipment Operations Safety ▪ Dust Control Measures ▪ Use a spotter to prevent overturning ▪ Ensure that drivers are advised on site safety requirements ▪ Be aware of buried utilities.
2e. Dry screening	Intrusive Contact	D	C	▪ Maintain air monitoring ▪ Heavy Equipment Operations Safety ▪ Dust Control Measures ▪ Use a spotter to prevent overturning

FIELD ACTIVITIES COVERED UNDER THIS PLAN				
TASK DESCRIPTION	**TYPE**	**PRIMARY**	**CONTINGENCY**	**ADDITIONAL INFORMATION ***
2f. Soil treatment	Intrusive Contact	D	C	▪ Maintain air monitoring ▪ Heavy Equipment Operations Safety ▪ Dust Control Measures ▪ Use a spotter to prevent overturning or collision
2g. Confirmatory sampling	Intrusive Contact	D	C	▪ Follow SAP/QAPP procedures
2h. Soil relocation and grading	Intrusive Contact	D	C	▪ Heavy Equipment Operation Safety ▪ Maintain air monitoring ▪ Startup operations in Contingency Level Modified D
3. General site work	Non-Intrusive	D	Modified D	(See Sub-Tasks)
3a. Groundwater and/or Stormwater Management (If Applicable)	Non-Intrusive Contact	D Upgrade to Modified D for handling contaminated water	Modified D	▪ Upgrade to Modified Level D where splash hazard exists ▪ Avoid slip/ trip/ fall ▪ Use care when handling pumps and hoses
4. Decontamination	Non-Intrusive Contact	D	Modified D	▪ Wear splash protection ▪ Wear eye protection
5. Demobilization/Project Closeout	Non-Intrusive	D	Modified D	▪ Be aware of biological hazards ▪ Be aware of slip/ trip/ fall hazards ▪ Be aware of moving vehicle hazards ▪ Ensure that drivers are advised on site safety requirements

* Refer to Section 5.6 Task Hazard Identification and Safe Work Practices for detailed information.

Section 5.0 Site Hazards

5.1 Chemical Hazards

Based upon information on chemicals of concern at the Miller Hill Range sites and the Skeet Range identified in documents provided by Joint Base Lewis-McChord, a potential for employee exposure exists during the implementation of the scope of work for this project. Engineering controls and work practice will be the primary mechanisms for minimizing lead exposure. Level C PPE will only be used when exposure cannot be controlled to acceptable levels using engineering controls and work practices. Air monitoring information and assessment of the potential for contact with contaminants will be used to guide selection of appropriate PPE. The primary source of direct contact with site contaminates will come in the form of lead contaminated soil (LCS). Lead has been the only potential chemical hazard.

Metals - Lead is categorized as a heavy metal. Heavy metals are stable elements and have no function in the body and can be highly toxic. Heavy metals may build up in biological systems and become a significant health hazard.

Dermal Contact – Hands and face washing is required at each break and before employees leave the site. OSHA maintains that ingestion via lack of good hand washing can be a significant exposure risk. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be decontaminated, disposed of and/or set a side to be laundered prior to leaving the site.

5.1.1 Chemical Hazards Summary

Previous investigations and evaluation of the nature of materials handled at the site has provided information on the potential hazards that may be expected at the site. Based upon this information, lead listed in section 5.1.2 below, has been identified as the primary material that may be encountered in quantities to present a significant exposure hazard. A Material Safety Data Sheet and additional chemical hazard information for the chemical of concern is contained in Appendix C. Monitoring of this material will be used to assess the overall potential for chemical exposure. If differing conditions are observed, additional assessment may be warranted.

5.1.2 Chemicals of Concern Quick Reference

COMPOUND	IONIZATION POTENTIAL	PEL/TWA	IDLH	MEDIA
Lead	NA	PEL: 0.05 mg/m^3	100 mg/m^3	soil

NA - Not Applicable
Ionization Potential - This is the energy level at which the contaminant is ionized by UV radiation (i.e., a material with an IP = 12.2 eV IP cannot be monitored by a PID with a 10.6 eV lamp because the IP is too high, thus giving a false negative reading).
OSHA PEL - Permissible Exposure Limit (8 hour day)
IDLH - Immediately Dangerous to Life or Health

5.2 Physical Hazards

Slip, Trip, Falls - Good housekeeping will be maintained at all work sites. Trip hazards will be removed, marked, or guarded. Extreme caution will be used when working on or around slippery surfaces. Use of disposable boot covers is discouraged when working on slick surfaces. All necessary precautions will be taken to prevent personnel from injuries caused by slick surfaces.

Back Strain - Lifting techniques will be used when handling heavy or bulky loads. Personnel will lift with legs, keeping backs straight, and loads close to their bodies. Avoid twisting at the waist during lifting. Personnel will receive help from others when loads appear to be too heavy. Mechanical means of lifting is the most preferred method and should be used whenever possible.

Overhead Hazards - Investigation of a work area must be conducted before any work is to begin. Proper clearances must be maintained at all times. Equipment will not deviate from established travel ways or work areas where clearances are unknown/ insufficient.

Buried Utilities - All buried utilities will be identified before any intrusive work in the work area. Joint Base Lewis-McChord Dig Permits shall be obtained (which include a utility locate) for all excavations and subsurface sampling activities. At no time will a buried utility be attempted to be located by mechanically powered excavating equipment. Buried utilities will be located by hand excavation.

Heavy Equipment - Daily inspections of heavy equipment will be conducted to insure all safety and operating mechanisms are in place and working properly (i.e., backup alarm, fire extinguisher, brakes, controls, etc.). This inspection will be documented and kept on file for review. Ground personnel will communicate with the operator before he enters and after he leaves that operator's work area. The swing radius of any piece of equipment must be established and at no time are ground personnel to enter that area when the equipment is in operation. Only qualified personnel are allowed to operate equipment.

Excavation/Trenching - A competent person on site will perform the soil characterization and inspect the sloping, shoring, and/ or other appropriate safeguards. KEMRON Excavation, Trenching, and Shoring procedures will be used. **IF UNEXPLODED ORDNANCE (UXO) AND/OR DISCARDED MILITARY MUNITIONS (DMM) ARE OBSERVED, STOP WORK IMMEDIATELY AND NOTIFY PM AND ARMY SITE MANAGER IMMEDIATELY.**

Confined Space - In the event that there are confined spaces present at the job site specific procedures covering air monitoring, training, permitting, rescue, and PPE as recognized by KEMRON procedures must be reviewed and followed. At no time will any personnel be allowed to enter a confined space until all criteria as stated by the KEMRON Confined Space Entry procedures are met.

Noise - Personnel exposed to noise levels over 85 dBA will be required to wear approved hearing protection provided by KEMRON.

Electrical - Only qualified personnel are authorized to work on electrical circuits. KEMRON Lock Out-Tag Out procedures will be used before any maintenance on electrical circuits is performed. Extension cords will be inspected daily. Damaged extension cords will be taken out of service. Ground fault circuit interrupters (GFCI) will be used on all temporary electrical circuits (i.e., generators, site trailers, etc.). Electrical cords not specifically made for water submersion will be kept out of wet areas.

Bulk Fuel Storage Areas - Bulk Storage containers used for flammable liquids must be properly grounded and have bonding cables attached. Flammable-No Smoking signs will be placed at the area so that they are clearly visible. Areas that are designated as a bulk fuel storage area must be capable of retaining 110% of the largest tank inside that area. A dedicated 20-B rated fire extinguisher (20-lb. ABC or equivalent) must be located between 25 and 75 feet of the storage area as per 29 CFR 1926.152.

Small Quantity Flammable/Combustible Materials - Small quantities of flammable/ combustible materials will be stored in "safety" cans with appropriate flame arrestors, self-closing lids, and labeled according to their contents.

Lifting/Rigging - When using cranes for lifting large objects, the weight of the object to be lifted must be known. A qualified person must ensure that the crane selected to perform the lift is capable of performing the lift safely within the height reach and range of the crane to be used. Where the lift exceeds 75% of the rated capacity of the crane as configured for the lift or where a lift must be performed over critical process equipment, this lift will be considered a critical lift and performed by a specialized rigging/crane contractor. Only qualified operators will operate cranes. All slings will be inspected before use.

Security - The Joint Base Lewis-McChord site is a restricted military maintenance and training facility. Personnel are restricted to authorized areas only. Military activities may occur near the site during sampling. KEMRON personnel and their subcontractor shall inform any unauthorized personal entering the remediation area to leave immediately. The location for storage of equipment and supplies used in the remediation activities shall be approved by a member of the Joint Base Lewis-McChord Project Team.

5.3 Environmental Hazards

Heat/Cold Stress - KEMRON personnel have the potential to be exposed to both climatic extremes of heat and cold. Because of these conditions, operating procedures were developed so that the hazards associated with these temperature extremes on the body can be recognized and avoided. The type of protective ensembles (permeable and non-permeable) used on the project is also taken in account when dealing with heat/cold stress conditions.

Heat/Cold stress standard operating procedures should be reviewed and followed. For Heat Stress, the following general precautions are taken:

- Training in the prevention and recognition of heat stress symptoms
- Encourage proper physical fitness and diet in employees
- Maintain fluid intake (prevent dehydration)
- Modify, as needed, the anticipated work rate
- Use of the buddy system
- Availability of shaded and cooled rest areas and personal cooling devices

For Cold Stress, the following precautions are taken:

- Training in the prevention and recognition of cold stress symptoms
- Encourage proper physical fitness and diet in employees
- Dressing in layers to protect exposed skin and provide insulation
- Use of cotton or other absorbent materials to absorb sweat and maintain body warmth when wearing protective ensembles
- Maintain fluid intake (prevent dehydration)
- Modify, as needed, the anticipated work rate
- Use of the buddy system
- Availability of heated rest areas

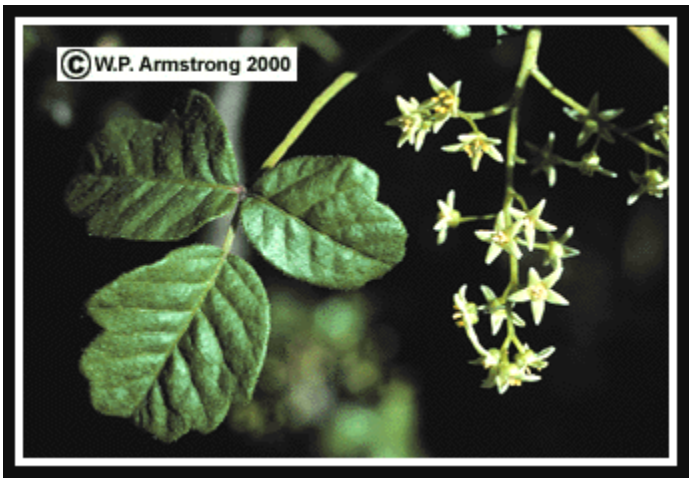
Severe Weather - During severe weather, outdoors operations will be stopped under these conditions:

1) Lightning is within 15 miles of the site. Lightning has been known to strike within a radius of 8 miles from cloud to ground. Depending on the severity of the storm the speed at which it can move into the immediate area can be swift therefore notification of work stoppage to all crews must be immediate. Crews will discontinue operations, meet at a predetermined staging area and wait for further instructions.

2) Heavy Precipitation (rain, snow, sleet, etc.) that affects visibility, mobility, or the overall conditions in which equipment and personnel can operate safely.

In evaluating the time when it is safe for crews to resume work, the following method will be used. The supervisor will wait 30 minutes after the first lightning strike to evaluate the weather conditions. The 30-minute wait clock will be reset after each additional lightning strike. After the heavy weather has left the area, the supervisor will determine that operations can continue in a safe manner. The "all clear" signal will be given and personnel will return to work.

Animal/Insect/Vegetation – **Poison oak has been confirmed at the Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range**. **Contact with the plants oily sap called *urushiol* may cause moderate to severe dermatitis. A person can be exposed to urushiol directly or by touching objects such as vehicle tracks or wheels, shovels or any other equipment which had contact with the plant or by inhalation if the poison plants are burned. The smoke may expose not only the skin to the chemical but also the nasal passages, throat and lungs. Inhaled urushiol can cause a very serious allergic reaction. This area will be cleared (clearing shall not be conducted using a controlled burn) prior to intrusive activities to prevent contact with this plant, refer to photo below.**



Male flower cluster of poison oak (**Toxicodendron diversilobum**). The unisexual flowers have 5 fertile stamens and a rudimentary pistil. [Seed-bearing female flowers with sterile stamens typically occur on separate plants.]
(Reference: Herbalgram (American Botanical Council); Volume 34: 36-42, 1995 by W.P. Armstrong and W.L. Epstein, M.D.)

In addition, stinging insects (wasps) were confirmed at the Miller Hill Range sites and ground nests are present around Range 42. Stings can be fatal if an allergic reaction occurs. Wasps, yellow jackets, and hornets have stingers without barbs that are usually retracted upon stinging, and these insects can sting people multiple times. The honey bee has a barbed stinger that remains in the victim's skin with its venom sack attached. About 3% of people stung by bees and wasps have an allergic reaction to the sting, and up to 0.8% of bee sting victims experience the severe and life-threatening allergic reaction known as anaphylaxis.

If you are stung by a bee:

1. **Call emergency medical services** if you have a history of severe reactions to insect stings or if you experience any severe symptoms as described above.

2. **Determine if the stinger is still present** (look for a small black dot at the sting site) and remove it immediately if is visible in the wound. Many doctors recommend using a hard object like a credit card or blunt knife to swipe over the area and remove the stinger. The honey bee venom sack, which remains in the skin of the victim, can take 2-3 minutes to release all of its venom, so prompt removal of the stinger can reduce the severity of the sting.

3. **Apply ice or cold packs** to the area to reduce the body's inflammatory response.

4. **Clean the area with soap and water,** then apply hydrocortisone cream to the site to decrease the severity of the reaction. Alternative treatments include a paste made of unseasoned meat tenderizer and water (the enzyme in meat tenderizer can break down bee venom) or a paste of baking soda and water.

5. **Taking an antihistamine** such as Benadryl (diphenhydramine) in tablet form and/or nonprescription pain relievers such as ibuprofen or acetaminophen can also provide relief of symptoms.

Stings in the mouth or nose, even in persons not known to be allergic to bee stings, also require emergency medical attention, since they can lead to swelling that can interfere with breathing.

(Reference : www.medicinenet.com-Melissa Conrad Stoppler, MD)

Black Bears, rodents, snakes, stray animals, **stinging insects**, and poison ivy/sumac are all environmental hazards that may be encountered during daily site operations. Site investigation to identify the hazards before work related activities are performed is essential. The information obtained can then be passed on to site personnel. Site specific procedures will be instituted should there be a reasonable potential for these hazards to exist.

5.4 Task Hazard Analysis and Certification

TASK DESCRIPTION: Task 1. Mobilization/Setup (General)

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

Obtain Joint Base Lewis-McChord Dig Permits (which include a utility locate) for all excavation and subsurface sampling activities. Refer to Appendix C for Utility Clearance SOP, Former Miller Hill Range sites .[X] PHYSICAL EXERTION [X] HEAT STRESS [X] COLD STRESS [X] HEAVY EQUIPMENT

[X] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[X] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[X] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[X] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[o] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : _____

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Obtain Joint Base Lewis-McChord Dig Permits (which include a utility locate) for all excavation and subsurface sampling activities prior to mobilization. Refer to Appendix C for Utility Clearance SOP. Observe all site signs and requirements. Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION:

TASK DESCRIPTION: Task 1a. Establish Site Access and Temporary Facilities

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[o] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[X] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[X] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[X] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[o] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : _____

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the unloading area. Use a spotter to aid in unloading and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Ensure that hazard communication training is conducted for any chemicals used on site.

TASK DESCRIPTION: Task 1b. Install stormwater controls (e.g. siltfence/hydroseeding)

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[X] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[X] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[o] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : _____

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Use proper lifting technique to avoid back strain when unloading and using equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the work area. Ensure that hazard communication training is conducted for any chemicals used on site.

TASK DESCRIPTION: Task 1c. Deploy Required Equipment and Personnel to Subject Task Area

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[X] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[X] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[o] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : _____

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Use proper lifting technique to avoid back strain when unloading equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the unloading area. Use a spotter to aid in unloading heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Ensure that hazard communication training is conducted for any chemicals used on site.

TASK DESCRIPTION: Task 2. Task Area Work

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[X] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[X] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[X] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[X] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[X] GRINDING	[x] FLYING DEBRIS	[x] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during delineation process.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol. Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Maintain air monitoring during all active operations.

TASK DESCRIPTION: Task 2a. Tree Removal, Clearing and Chipping

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[X] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[X] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during delineation process.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Watch for pinch/grab/roll and slip/trip/fall hazards. Use proper lifting technique to avoid back strain when unloading materials and handling equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the operating area. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Refer to H2-H5 regarding clearing and grubbing/erosion control. **IF UNEXPLODED ORDNANCE (UXO) AND/OR DISCARDED MILITARY MUNITIONS (DMM) ARE OBSERVED, STOP WORK IMMEDIATELY AND NOTIFY PM AND ARMY SITE MANAGER IMMEDIATELY.**

TASK DESCRIPTION: Task 2b. Grubbing

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[X] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[X] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during delineation process.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol. Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. **Insure all utilities are located.** Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Watch for pinch/ grab/roll and slip/trip/fall hazards. Use proper lifting technique to avoid back strain when unloading materials and handling equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the operating area. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Refer to H2-H5 regarding clearing and grubbing/erosion control. **IF UNEXPLODED ORDNANCE (UXO) AND/OR DISCARDED MILITARY MUNITIONS (DMM) ARE OBSERVED, STOP WORK IMMEDIATELY AND NOTIFY PM AND ARMY SITE MANAGER IMMEDIATELY.**

TASK DESCRIPTION: Task 2c. Soil Contamination Delineation

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[X] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[X] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during delineation process.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol. Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Watch for pinch/ grab/roll and slip/trip/fall hazards. Use proper lifting technique to avoid back strain when unloading materials and handling equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the operating area. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Ensure that hazard communication training is conducted for any chemicals or materials brought on site. Maintain air monitoring during active operations. Refer to the Work Plan regarding excavation area and site control.

TASK DESCRIPTION: Task 2d. Soil Excavation and Test Pitting

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[X] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[o] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[X] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[X] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during excavation process.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol. Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Watch for pinch/ grab/roll and slip/trip/fall hazards. Use proper lifting technique to avoid back strain when unloading materials and handling equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the operating area. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Ensure that hazard communication training is conducted for any chemicals or materials brought on site. Maintain air monitoring during active operations. Water may be used to minimize dust. Wash hands and face before eating, drinking, smoking, or other hand to mouth contact. Wash hands and face after completing work. Refer to the Work Plan regarding excavation area and site control. **IF UNEXPLODED ORDNANCE (UXO) AND/OR DISCARDED MILITARY MUNITIONS (DMM) ARE OBSERVED, STOP WORK IMMEDIATELY AND NOTIFY PM AND ARMY SITE MANAGER IMMEDIATELY. INSURE ALL UTILITIES ARE LOCATED.**

TASK DESCRIPTION: Task 2e. Dry Screening

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[o] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[o] POISONOUS PLANTS
[o] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[X] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : _____

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during excavation process.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Coveralls and/or Uniform Chemical resistant clothing	Inner Latex and Outer Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Chemical resistant steel toe boots

ADDITIONAL INFORMATION: Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Watch for pinch/ grab/roll and slip/trip/fall hazards. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the operating area. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Ensure that hazard communication training is conducted for any chemicals or materials brought on site. Maintain air monitoring during active operations. Water may be used to minimize dust. Wash hands and face before eating, drinking, smoking, or other hand to mouth contact. Wash hands and face after completing work. Refer to the Work Plan regarding soil processing/treatment and truck route. **IF UNEXPLODED ORDNANCE (UXO) AND/OR DISCARDED MILITARY MUNITIONS (DMM) ARE OBSERVED, STOP WORK IMMEDIATELY AND NOTIFY PM AND ARMY SITE MANAGER IMMEDIATELY.**

TASK DESCRIPTION: Task 2f. Soil Treatment

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[o] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[o] POISONOUS PLANTS
[o] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[X] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : _____

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during excavation process.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Watch for pinch/ grab/roll and slip/trip/fall hazards. Use proper lifting technique to avoid back strain when unloading materials and handling equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the operating area. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Ensure that hazard communication training is conducted for any chemicals or materials brought on site. Maintain air monitoring during active operations. Water may be used to minimize dust. Wash hands and face before eating, drinking, smoking, or other hand to mouth contact. Wash hands and face after completing work. Refer to the Work Plan regarding soil processing/treatment and truck route.

TASK DESCRIPTION: Task 2g. Confirmatory Sampling

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[X] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[x] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during sampling.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol. Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Ensure that all drivers and equipment operators are given the general safety briefing and truck routes prior to entering the site. Do not store waste in open containers or uncovered roll off boxes. All offsite waste management must be approved by the project manager. Engineering controls and decontamination stations shall be set in place to prevent tracking lead contaminated soils off-site. Maintain air monitoring during active operations. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Water may be used to minimize dust. Wash hands and face before eating, drinking, smoking, or other hand to mouth contact. Wash hands and face after completing work. Refer to the Work Plan regarding excavation area and site control and soil processing/treatment. **IF UNEXPLODED ORDNANCE (UXO) AND/OR DISCARDED MILITARY MUNITIONS (DMM) ARE OBSERVED, STOP WORK IMMEDIATELY AND NOTIFY PM AND ARMY SITE MANAGER IMMEDIATELY.**

TASK DESCRIPTION: Task 2h. Soil Relocation and Grading

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[o] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[o] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[X] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[X] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid inhalation of dust and direct contact with soils during excavation and transportation and grading processes.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary), safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots
CONTINGENCY: C Up to 0.5 mg/m^3 of lead (Refer to Section 4.1.1)	See Additional Information	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls)	Leather or cotton work gloves; Inner Latex and/or Outer Nitrile gloves (optional)	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe work boots and/or PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol. Use of half-mask or full-face respirator with an APF of at least 10 with HEPA filter. Respirator shall be fit tested prior to use. Filters should be changed at the beginning of each work day at a minimum. More frequent changes will be dictated by lead levels (replace cartridge if it becomes clogged with particles). Refer to Project Manager and/or H&S Officer for guidance. Hands and face washing is required at each break and before employees leave the site. Clothing that comes into contact with impacted lead soil (e.g boots and coveralls) must be deconned, disposed of and/or set a side to be laundered prior to leaving the site.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Be alert to material and equipment loading/unloading hazards, and moving equipment. Check area for overhead hazards, level ground, and adequate room to maneuver equipment before unloading. Watch for pinch/ grab/roll and slip/trip/fall hazards. Use proper lifting technique to avoid back strain when unloading materials and handling equipment. Inspect all equipment for safe working order upon receipt. Heavy equipment may only be operated by properly trained personnel. Route pedestrian and other vehicular traffic away from the operating area. Use a spotter to aid in backing and maneuvering heavy equipment and to watch for overhead and backing hazards, and pedestrian/vehicular traffic. Ensure that hazard communication training is conducted for any chemicals or materials brought on site. Maintain air monitoring during active operations. Wash hands and face before eating, drinking, smoking, or other hand to mouth contact. Wash hands and face after completing work. Refer to the Work Plan regarding final grading plans and two truck routes.

TASK DESCRIPTION: Task 3. General Site Work

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[X] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[X] OVERHEAD UTILITIES	[X] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[X] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[o] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : _____

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: See following subtask descriptions for specific detailed safety and health requirements. **IF UNEXPLODED ORDNANCE (UXO) AND/OR DISCARDED MILITARY MUNITIONS (DMM) ARE OBSERVED, STOP WORK IMMEDIATELY AND NOTIFY PM AND ARMY SITE MANAGER IMMEDIATELY.**

TASK DESCRIPTION: Task 3a. Groundwater/Stormwater Management

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[o] OVERHEAD UTILITIES	[x] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[X] POISONOUS/HAZARDOUS ANIMALS	[x] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[x] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[x] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[x] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid direct contact with water during handling of water. Wear nitrile gloves to protect hands from contacting media. Workers shall wear protective clothing over regular work clothes. Shower/wash hands after completing work.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Evaluate need to upgrade to Saranex coated® coveralls when dealing with potential splash or chemical exposure situations (i.e., breaking lines, etc.). Wear proper eye protection to protect from splash or spray to the eyes, including safety glasses with side shields. Face shields should be used when handling contaminated water and/or breaking lines, handling pumps/hoses, etc., or where the material may be under greater than atmospheric pressure. Manage all groundwater (purge water, etc.) in accordance with site requirements. Implement erosion controls around lead contaminated stockpiles to prevent the runoff of lead contaminated soil. Refer to SWPPP and H2-H5 regarding clearing and grubbing and erosion control.

TASK DESCRIPTION: Task 4. Decontamination

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[o] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[o] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[X] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[X] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[X] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : Lead "Heavy Metal" present, avoid direct contact with water during handling of water. Wear nitrile gloves to protect hands from contacting media. Workers shall wear protective clothing over regular work clothes. Shower/wash hands after completing work.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION: Personnel providing decontamination support must be equipped with PPE no less protective than one level below the personnel undergoing decontamination. Refer to the work plan regarding the locations and implementation of decontamination stations for pedestrian and vehicular traffic. Refer to the Work Plan regarding truck route.

TASK DESCRIPTION: Task 5. Demobilization/Project Closeout

HAZARD ANALYSIS CONDUCTED BY: Tim Duda/Mark Roberts **DATE:** 23 March 2010

PHYSICAL HAZARD IDENTIFICATION:

[X] PHYSICAL EXERTION	[X] HEAT STRESS	[X] COLD STRESS	[X] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[X] LIFTING HAZARDS	[X] SLIP, TRIP, OR FALL	[X] HIGH NOISE (> 85 dBA)
[o] OVERHEAD UTILITIES	[X] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[X] POISONOUS PLANTS
[o] POISONOUS/HAZARDOUS ANIMALS	[X] ELECTRICAL	[X] HAND/POWER TOOLS	[X] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[X] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[X] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : **Poison oak has been confirmed at the Former Miller Hill Range sites and may also be present along wooded areas to include the Former Skeet Range. Contact with the plants oily sap called urushiol may cause moderate to severe dermatitis.**

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[o] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : _____

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY: D	NA	Appropriate work attire	Leather or cotton work gloves	Hard Hat (as necessary), safety glasses w/side shields, Monogoggles, Hearing Protection (as necessary)	Steel toe work boots
CONTINGENCY: Modified D	NA	Appropriate work attire and/or Tyvek® Coverall or similar (cotton coveralls). Chainsaw Chaps if using a chainsaw.	Work or Nitrile gloves	Hard Hat (as necessary) , safety glasses w/side shields, Hearing Protection (as necessary)	Steel toe PVC boots with optional disposable boot covers.

ADDITIONAL INFORMATION: Be aware of biological hazards such as Black Bears, stinging insects and snakes. Follow security protocol.

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION:

5.5 Task Hazard Identification and Safe Work Procedures

POTENTIAL HAZARD	TASK	SEVERITY	SAFE WORK PROCEDURES
Physical Exertion	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Moderate Moderate Moderate Moderate Moderate	1. Use proper lifting techniques and body mechanics. 2. Avoid attempts to move immovable objects. 3. Use mechanical equipment where possible. 4. Get plenty of rest.
Night Operations	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	NA Moderate Moderate NA NA	1. Provide adequate lighting in active areas of operations. 2. Ensure adequate rest for night shift personnel.
Heat Stress (Summer months)	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low High Moderate High Low	1. Personnel will be trained on the signs and symptoms of heat stress 2. An effective work/rest schedule will be implemented to regulate warm weather exposures 3. Fluid refreshments will be provided. 4. Encourage personnel to refrain from alcohol use after work hours.
Cold Stress (Winter months)	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low Moderate High High Low	1. Keep warm and dry 2. Take frequent breaks in a warm place. 3. Encourage personnel to refrain from alcohol use after work hours. 4. Prevent exposure of hands and face from wind/ cold 5. Get adequate rest.
Manual Lifting Hazards	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Moderate High High Moderate Moderate	1. Personnel will use proper lifting techniques such as keeping back straight, using legs to lift, limiting twisting, using mechanical means whenever possible, and getting help when handling heavy/ bulky items.

POTENTIAL HAZARD	TASK	SEVERITY	SAFE WORK PROCEDURES
Crane Lifting/Rigging	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	NA NA NA NA NA	1. Know the weight of the load 2. Keep lifts within less than 75% of the capacity as noted on the load chart. 3. Use only qualified operators. 4. Use tag lines to control loads. 5. Keep clear of suspended loads.
Slip, Trip or Fall	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	High High High High High	1. Keep work areas clear of debris 2. Adequate illumination will be provided 3. Slip, trip or fall hazards will be marked, removed or protected 4. Housekeeping inspections will be completed and documented 5. A barrier or cover will be in place around or over excavations, pits or trenches 6. Do not work off slick surfaces and avoid the use of disposable boot covers
Puncture/ Laceration	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low Moderate Moderate Moderate Low	1. Proper hand protection will be worn to minimize the possibility of injuries due to cuts and abrasions (i.e., leatherwork gloves, steel mesh, etc.) 2. Potential pinch points will be identified prior to the task and avoided
High Noise	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low High High High Low	1. Hearing protection will be worn by personnel who are exposed to sound levels above 85dBA (i.e., heavy equipment, motorized hand tools, filter presses, etc.)
Vehicle Traffic	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Moderate High High Moderate Low	1. Routes will be designated and followed unless another route is approved by the Site Supervisor 2. Personnel will stand clear of loading and unloading operations 3. Spotters wearing high visibility vests will be used 4. Vehicles will obey all speed limits and will be operated in a non-reckless manner 5. No vehicle will be overloaded or loaded in such a way as to obscure the view of the driver

POTENTIAL HAZARD	TASK	SEVERITY	SAFE WORK PROCEDURES
Heavy Equipment	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	High High High Moderate High	1. All equipment will be inspected daily 2. All equipment will have rollover protection, direction warning systems and seat belts 3. All clearances for above and surrounding areas will be checked before operations begin 4. The use of a ground spotter will be in place during operations 5. All ground personnel will be aware of heavy equipment's' swing radius and pinch points and will stay out of those areas during operations 6. A communication system will be developed for equipment operator and ground personnel use to insure that either operations can be contacted immediately should the need to halt an operation exist 7. Only qualified personnel familiar with the inspection, operation, and maintenance of a particular piece of equipment will be authorized to operate it 8. At no time will any load be swung or suspended over any personnel's head 9. No personnel will be carried in equipment that is not equipped with passenger seats.
Fire/Explosion Hazards	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low Moderate Low Low Low	1. Pumps will be grounded and bonded prior to any operations dealing with flammable materials 2. Firefighting equipment will be staged and checked prior to any operation with potential flammable hazards. 3. Air monitoring will be conducted during hot work operations to warn of a explosive atmosphere or chemical release 4. Only personnel directly involved in the operation will be allowed in the area. 5. Smoking is not allowed near the work area.
Overhead Utilities	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Moderate Moderate Low Low Low	1. Locate all overhead utilities before beginning work. 2. Maintain minimum 20-foot clearance from utilities. 3. Use spotter when moving heavy equipment around lines. 4. Have lines disconnected by utility if proximity work is required.
Electrical	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	High High Low Low Low	1. Only licensed electricians will be used to hook up electrical circuits 2. All extension cords will be inspected before use for damage and removed from service if damage is found 3. Ground fault circuit interrupters will be used on all 110-120-240 circuits 4. All electrical wire or cord running through a work area or travel way must be either elevated or protected from damage

POTENTIAL HAZARD	TASK	SEVERITY	SAFE WORK PROCEDURES
Poisonous/ Hazardous Plants and Animals (Poison Oak) (Bears)	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low Low Low Low Low	1. Avoid brushy areas, recognize poison ivy, oak and sumac. 2. Protect skin and mucous membranes when working in proximity to poison ivy. 3. Identify individuals allergic to bees or other environmental hazards. Plan for contingencies. 4. Maintain snakebite kits on site. 5. Use of barrier creams for high risk personnel is encouraged. 6. Use buddy system in remote areas.
Hand/Power Tools	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Moderate Moderate Moderate High Low	1. Use all tools in the manner designed. 2. Do not use tools with damaged cords. 3. Avoid pinch points. 4. Wear gloves when required.
Pinch/Grab/Roll	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	High High High Low Low	1. Avoid pinch points. 2. Keep loose clothing taped. 3. Keep airlines and other entanglement hazards clear. 4. Maintain eye contact with equipment operators.
Excavation/ Trenching	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	High High High Moderate Low	1. Personnel will follow all required procedures for excavation safety as found in the KEMRON SOP and 29 CFR 1296.650
Confined Space	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	NA NA NA NA NA	1. Avoid entry into confined spaces. 2. Perform all confined entry following KEMRON Standard Operating Procedures.

POTENTIAL HAZARD	TASK	SEVERITY	SAFE WORK PROCEDURES
Chemical Splash	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	NA Low Low High NA	1. Personnel will wear full splash protection consisting of : face shield (over safety glasses/ goggles); CPF I or II (over Tyvek); Nitrile gloves (over latex gloves); and chemical resistant boots all taped at the joints
Flying Debris	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low High Moderate High Low	1. Wear face shield and goggles or respirator. 2. Avoid "kickback" of spray
Potential Atmospheric and Contact Hazards	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Moderate Moderate Moderate Moderate Moderate	1. Air monitoring will be conducted to determine the appropriate respiratory protection as outlined in this Safety Plan 2. Exclusion zone will be delineated and PPE will be utilized in accordance with Section 4.0 during all operations 3. Any down grading of protection levels must be approved by the Health and Safety Officer 4. Daily safety orientations will be held and documented
Dust Emissions	1. Mobilization/Setup (General) 2. Task Area Work 3. General Site Work 4. Decontamination 5. Demobilization/Project Closeout	Low Moderate Moderate Moderate Low	1. Visible dust emissions will be suppressed by wetting techniques. The presence of visual emissions may constitute a PPE upgrade or task termination

NOTE: *29 CFR 1910.120 states that information included in Standard Operating Procedures need not be reiterated in the Health and Safety Plan. Therefore, the KEMRON Environmental Services, Inc. Standard Operating Procedures Manual and Corporate Environmental, Safety and Health Manual will be maintained on site for reference as needed to properly implement procedures to control the site hazards.*

Section 6.0 Air Monitoring

The purpose for air monitoring on this project is to ensure that proper levels of respiratory protection are being maintained and to determine the size and location of the exclusion, contamination reduction, and support zones used during site investigation activities. Based on the results of lead soil excavation work at Miller Hill and former Skeet Range task areas, the exposure risk is expected to be low. However, personal air monitoring will be accomplished with air sampling cassettes and real-time monitoring equipment primarily during intrusive investigations such as soil excavation/test pitting activities and lead contaminated soil treatment**.** Air monitoring requirements will be reviewed and revised as necessary with any significant alteration of project scope. Refer to Tables 6.2 and 6.3 for information on air sampling equipment.

Air monitoring data collected during the Interim Action at the Hillside Housing Area in 2008 showed that lead concentrations were below the detection limit and dust concentrations were well below the action level for lead. Based on this data, and the fact that the lead concentrations within the soil at Miller Hill and the Skeet Range are similar to the soil removed from the Hillside Housing Area, the PPE required at the onset of the remediation will be Level D. The PPE will be upgraded as necessary based on particulate and lead concentrations collected during air monitoring. Refer to Appendix D for the air monitoring results collected during the Interim Action at the Hillside Housing Area.

6.1 Responsibilities

6.1.1 KEMRON Subcontractors

KEMRON subcontractors will be responsible for all health and safety monitoring and work area monitoring necessary for the subcontractor's employees working on the project site. Methods, frequency and location of monitoring will be determined by the subcontractor for its employees and documented in an Air Monitoring Plan (AMP). This AMP will follow air monitoring procedures located in Section 6.0 of this HASP. To provide for protection of employees and others (for example - Joint Base Lewis-McChord facility representatives, regulatory agency representatives, etc.) whose work requires entering the contractor work area, the subcontractor will employ minimum air monitoring requirements. The minimum air monitoring requirements will include non-specific and/or compound specific (lead) monitoring by approved methods such as passive or active personnel samplers, and dust exposure monitoring.

The subcontractor will designate a project health and safety officer who will be responsible for implementation of the AMP, documentation, interpretation, and posting of air monitoring data results, and implementation of changes to the AMP due to data review and analysis. The subcontractor health and safety officer will communicate results and any planned changes to the AMP to the KEMRON project representative on-site.

6.1.2 Joint Base Lewis-McChord Representatives and KEMRON Employees

Exclusion zone line monitoring of contaminant levels will be conducted by KEMRON during work activities in designated task areas. A minimum frequency and number of locations will be established at the site, including one background location, based upon task specific activities and contaminants of concern.

6.2 Area Air Monitoring

During contaminated soil or waste removal and excavation, periodic monitoring for total airborne particulates will be performed around the perimeter of all active work zones. Readings will be collected continuously (per work shift) from three locations (upwind, downwind, and at the stockpile area). A MIE Personal DataRAM (PDR-1000) or equivalent will be used to measure airborne particulates (dust). The perimeter readings will be downloaded and tabulated daily. The Site Superintendent will ensure that all air monitoring is also logged into the monitoring notebook. Data will include instrument used, date, time, wind direction, work process, name of person monitoring, and monitoring location. The equipment will be zeroed and calibrated daily as per manufacturer instructions. In accordance with OSHA guidelines, work activities will be stopped if readings above 5 mg/m^3 are detected.

6.3 Personnel Air Monitoring

Integrated air sampling for personnel exposure characterization will be performed for lead in the breathing zone. Specifically, a sample will be collected on the "most at risk" equipment operator and/or labor performing work in the exclusion zone.

The personnel samples will be collected for the first three days of intrusive activities and the first three days of samples will be submitted for analysis**.** KEMRON anticipates the sample results will indicate that our engineering controls are sufficient to control worker exposure to site contaminants and a negative lead exposure determination can be formulated for intrusive activities at the site. At this time, employees may downgrade to Modified Level D PPE. Should the sample results indicate the exposure to lead is above the action level (30 ug/m^3) or employees may be exposed at or above the OSHA permissible exposure limit (PEL) of 50ug/m^3 (over an eight hour period), the site engineering controls will be adjusted and an additional three days of sampling will be performed.

The sampling protocols established in NIOSH method 7300 or equivalent will be followed. The personal air pumps will be pre- and post-sample calibrated. The samples will be submitted to a laboratory accredited by the American Industrial Hygiene Association for analysis of lead.

6.3.1 Exposure Limits

For field operations where potential for airborne exposure to lead exists, it shall be initially determined if any employee may be exposed to lead at or above the lead action level (0.03 mg/m^3) through the use of personal air monitoring. Personal samples shall be representative of a full shift. All air monitoring and sample analysis shall be performed according to modified NIOSH Method 7300 or equivalent. All sites with known or suspected lead contamination shall have air monitoring performed to determine potential for exposure. Initial air monitoring results will be submitted to the Health and Safety Officer and/or Project Manager for review. Results will be submitted to other offices as directed. Adequate misting of dust will be the primary control measure used.

If the exposure assessment performed for a specific site determines that an employee is exposed to airborne concentrations of lead at or above the action level, a written record of this determination shall be created. This record shall include the date of determination, location within the work site, specific duties and the name and social security number of each employee monitored.

A summary of the published exposure limits for each of the detected chemicals is presented in Table 6-1.

TABLE 6-1. EXPOSURE LIMITS

CONTAMINANT	PEL	Action Level	MEDIA
Lead	0.05 mg/m^3	0.03 mg/ m^3	Air

OSHA PEL - Permissible Exposure Limit (8 hour day)

Air Monitoring Requirements

Industrial Hygiene Sampling Pumps and MIE Personal DataRam will be used during the handling of lead contaminated soil. Results less than OSHA PELs will be evaluated for consideration of reduction in air monitoring frequency or revision of PPE requirements.

When working in areas where lead is the primary contaminant of concern, exclusion zone line sampling will be conducted for lead using modified NIOSH Method 7300 or equivalent.

Pump calibration, operation, maintenance will be conducted in accordance with the manufacturer's instructions. Sampler media and flow rate selection will be in accordance with the modified NIOSH approved methods and analysis completed by an appropriate accredited laboratory.

For each shift/site, the person with the greatest potential for exposure shall be monitored for full shift on a weekly basis, during site operations. In addition, a stationary monitoring device may be set up during excavation activities. If the exposure assessment reveals employee exposure to be below the action level, further exposure determination need not be repeated. However, if there is a change of equipment, process, control, or a new task has been initiated that may result in any employee being exposed at or above the action level, additional air monitoring for lead shall be conducted. Analysis of sample media will be completed by an appropriately accredited laboratory in accordance with OSHA methods.

6.4 Monitoring Equipment and Descriptions

To quantify potential worker exposure concentrations to contaminants of concern during site activities, personal monitoring will be accomplished in the worker's breathing zones (BZ) throughout a representative work shift (a minimum of seven hours) to establish a baseline. Monitoring will be conducted using the most likely exposed personnel assigned to the task. Quantitative and qualitative monitoring will be conducted under the direction of a KEMRON using the instrumentation and methods specified in Tables 6-2 and 6-3.

Table 6.2

MONITORING EQUIPMENT QUICK REFERENCE CHART			
MONITORING INSTRUMENT	**TASKS**	**ACTION GUIDELINES**	**ADDITIONAL INFORMATION**
Personal monitoring pumps (battery operated) calibrated to an appropriate flow rate of 2.0 liters per minute equipped with sampling cartridge listed in the applicable OSHA or NIOSH Method. The BZ cartridges will be attached directly to the work uniform near/on the lapel.	Gilian, SKC, MSA, (or equivalent). Number of Pumps Required: Based on the number of workers performing each task. – minimum of 1/shift	Lead	Three consecutive days at beginning of task –frequency to be determined by site H&S Officer after review of data. Additional monitoring required when new task/hazard identified
Particulate Monitor	DataRam	Aerosols, mist, dust, and fumes	Daily upwind and downwind during all work shifts

6.5 Maintenance and Calibration of Equipment

All monitoring equipment will be maintained and calibrated in accordance with applicable manufacturer recommendations. All pertinent data will be logged in a health and safety logbook (or equivalent) and maintained on site for the duration of site activities. Calibration of all monitoring equipment will be performed daily per the equipment manufacturer recommendations and recorded in a log book or log.

The field H&S Manager or other designated project individual is responsible for verifying that the equipment is calibrated and working properly before on-site use. The Miniram is factory calibrated and should not require field calibration. However, the instrument must be zeroed on a regular basis as follows:

- **If on-site DataRam measurements are >1 mg/m^3**, the DataRam must be zeroed on a weekly basis. Zeroing is accomplished by placing the instrument inside the zero-air bag and performing the auto-zeroing function. Calibration information will be maintained in the Calibration Log (Appendix A).
- **If on-site DataRam measurements are >5 mg/m^3**, the DataRam must be zeroed on a daily basis. Zeroing is accomplished as described above.

Records of these activities will be maintained on the Real Time Air Monitoring Log and Air Sample Record (Appendix A). If there are any problems with the equipment, the item will be removed from use until repair or replacement can be coordinated with the Equipment Technician.

6.6 Health and Safety Action Levels

An action level is a point at which increased protection is required due to the concentration of contaminants in the work area or other environmental conditions. The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level. The action levels are based on concentrations in the breathing zone. If ambient levels are measured which exceed the action levels in areas accessible to unprotected personnel, necessary control measures (barricades, warning signs, and mitigative actions, etc.) must be implemented prior to

commencing activities at the specific work area. Personnel should also be able to upgrade or downgrade their level of protection with the concurrence of SSO or the Safety Professional.

Reasons to upgrade:

- Known or suspected presence of dermal hazards.
- Occurrence or likely occurrence of gas, vapor, or dust emission.
- Change in work task that will increase the exposure or potential exposure to hazardous materials.

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally suspected.
- Change in site conditions that decrease the potential hazard.
- Change in work task that will reduce exposure to hazardous materials.

6.6.1 Action Levels

MIE Personal DataRam (PDR-1000) monitoring will be conducted for a period of at least 5 minutes prior to the start of each workday at each individual work area where airborne dusts may be present.

- **If the DataRam measurement is below 5 mg/m^3**, for this monitoring period, work can proceed without respiratory protection. In this case, monitoring will be repeated for at least a 5-minute period at 30-minute intervals or sooner, if any signs of dust exposure is noted. If all measurements remain at background level over a period of 1 hour, monitoring may be discontinued, but must be resumed if any indications of dust exposure are observed.
- **If the DataRam measurement is between 5 and 25 mg/m^3**, site work will cease and engineering controls will be implemented. After engineering controls are put in place, work can commence. In this case, monitoring will be repeated for at least a 5-minute period at 30-minute intervals or sooner, if any visible signs of increasing dust exposure
  are noted. If all readings remain at background level for a minimum period of 1 hour, monitoring may be discontinued, but must be resumed if any indications of volatile chemicals (odor, irritation, etc.) are observed.
- **If the DataRam measurement exceeds 25 mg/m^3**, site work will cease and employees will evacuate the work area pending re-evaluation of the situation by the Project or Field H&S Manager. This plan will be modified as required to address any situations where such results are observed.

In some cases, the MIE DataRam will be used to indirectly monitor possible exposure levels to dust-borne contaminants, such as metals. For example, if lead is present in site soils at 15,000 ppm, an action level for respirable dust could be set at .03 mg/m^3 to prevent exceeding the lead PEL of 0.05 mg/m^3. In these cases, the action levels described above must be followed using the most conservative of either the general respirable dust PEL of 0.05 mg/m^3 or the PEL for the specific dust-borne contaminant of interest.

Table 6.3

AIR MONITORING QUICK REFERENCE CHART				
MONITORING INSTRUMENT	**TASKS**	**ACTION GUIDELINES**		**ADDITIONAL INFORMATION**
MIE Personal DataRAM (PDR-1000) or equivalent	Soil excavation/dust generating activities	Airborne particulates	>5 mg/m^3 If dust levels in the work area exceed 5 mg/m^3 in the EZ, work activities will stop until dust levels are reduced to <5mg/m^3	Personnel monitoring will be conducted on a continuous basis during active operations where airborne particulates are of concern. Readings will also be taken upwind, downwind of the immediate work zones as well as in the stockpile area.
Industrial Hygiene Sampling Pumps	Soil excavation/dust generating tasks	Airborne lead	> 30µg/m^3 Should the sample results indicate the exposure to lead is above the OSHA permissible exposure limit (PEL) of 50µg/m^3 (over an eight hour period), the site engineering controls will be adjusted and an additional three days of sampling will be performed.	Samples will be taken from one risk person the first three days during intrusive soil tasks.

6.7 Data Management

6.7.1 Recordkeeping

Results of all air monitoring data will be recorded on log sheets and maintained in notebooks at the site office. In addition, data will be electronically filed in spreadsheet format for use in preparation of daily charts and graphs for posting at the site. A comprehensive file of all air monitoring information generated during the project will be developed. The file will include copies of all laboratory analyses, field log sheets, and equipment maintenance and calibration records.

6.7.2 Data Evaluation and Posting

Air monitoring data will be evaluated against OSHA employee exposure standards as new data become available. Results of the evaluation will be posted daily by the Subcontractor in the project office. Revisions to frequency or types of air monitoring may result from the evaluation of air monitoring data results. All such revisions will be documented as addenda to this plan along accompanied by a rationale for the revision(s) and supporting data. Anomalies in data or documented exposures in excess of site or OSHA standards will also be discussed with employees at the daily safety briefing.

6.8 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) measures will be implemented to ensure data quality and validity. QA/QC methods will address both field and laboratory procedures. QA/QC methods will be in general accordance with applicable standard methods and agency guidance for air monitoring procedures.

6.8.1 Field QA/QC

For personal monitoring, field blanks will be employed in accordance with method requirements. Generally, a minimum of one blank for each constituent analyzed will be required per sampling event. Other direct read field instrumentation (such as a Miniram) will be calibrated and maintained in accordance with manufacturers specifications. All calibration information will be documented in the field log notebook.

6.8.2 Laboratory QA/QC

In general accordance with method requirements, the analytical laboratory completing personal sample media analyses will maintain an appropriately controlled analysis environment. The laboratory will implement QA/QC in accordance with specific method requirements.

6.9 Review and Amendment of the Air Monitoring Program

Modifications to this air monitoring program will be made as needed during the course of the project. Revisions to frequency or types of air monitoring may result from the evaluation of air monitoring data results. All such revisions will be documented as addenda to this plan along accompanied by a rationale for the revision(s) and supporting data. Approval of amendments will require signature of the on-site KEMRON Site Manager or his designated representative. Amendments will be communicated to the Project Manager. A sample amendment form is presented as Form L in Appendix A of this HASP.

Section 7.0 Site Control

Established zones are included in the Work Plan, in addition, zones will be marked and/or a site sketch indicating locations of the zones will be prepared and posted and reviewed with employees during the daily safety meeting.

7.1 Support Zone

The support zone will be located in an area that has been determined contamination free or "clean" by supporting analytical data or other objective criteria. In this zone, site break areas, toilet facilities, administrative, and other support functions will take place. Contaminated PPE and/or equipment are prohibited in this area.

7.2 Contamination Reduction Zone

The CRZ is the area between the exclusion zone and support zone designated for equipment and personnel decontamination. The CRZ may also be a staging area for site tools, emergency equipment, containment equipment, additional PPE, sampling equipment, and air bottle changes. All personnel and/ or equipment exiting the exclusion zone must enter the CRZ for decontamination before entering the support zone. PPE dress outs must be accomplished in the support zone before entry into the CRZ. Contaminated PPE will remain in the CRZ or the exclusion zone until properly disposed. The location of the CRZ will be determined mainly by the distance needed to prevent a potential release, explosion, or other hazard in the exclusion zone from affecting personnel in the CRZ and support zone.

7.3 Exclusion Zone

The exclusion zone is the restricted area where the potential for contamination, and resulting health hazards, exists. Only authorized personnel that meet all the requirements as stated in Section 1.0 "Introduction and Site Entry Requirements" of this HASP and other applicable requirements of WAC 296-843-14005 are allowed entrance. The exclusion zone will be well delineated by means of barricades, caution tape, fencing, or other highly visible and physical barriers.

7.4 Buddy System

The Buddy System will be used for all entries into the exclusion zone. This is a system of organizing employees into work teams in such a manner that each team member can observe the activities of each other. Thus, in case of an emergency, the entire team can account for the location and activity of each team member.

7.5 Visitors

All visitors will report to KEMRON's field office or to KEMRON personnel immediately upon arrival. The Joint Base Lewis-McChord Project Manager/Site Manager must approve the site visitor and will coordinate with the SSO. Visitors will be required to review and sign the Visitor Safety Orientation Sign in Sheet (Appendix A). All visitors entering the CRZ or exclusion zones must provide all required training and medical monitoring documentation before arrival on-site, if possible.

The SSO will establish a safe route through the site and away from on-going operations. All visitors will be escorted while on site. All visitors will wear:

1. Steel-Toed Shoes or Steel-Toed PVC Boots
2. Hard Hat (as necessary)
3. Safety Glasses

7.6 Site Security

Excess to Joint Base Lewis-McChord requires a gate check and IDs with passes, in addition military police are responsible for patrolling the fort. KEMRON and it's contractor will be responsible for securing their own equipment, machinery, tools etc. KEMRON and their subcontractors will secure small tools in conex box located on-site. Small expensive equipment (laptops, XRF, etc..) should be locked in a secure location or taken off-site at the end of each day. The construction/ lab trailer will be locked at night but KEMRON will be responsible for contents therein.

Joint Base Lewis-McChord personnel will be responsible for site security during non-working hours and for securing the staged IDW prior to disposal. Applicable tasks include:

1. Protecting unauthorized personnel from site physical hazards or chemical exposure
2. Preventing unauthorized personnel from entering exclusion zone
3. Prevent theft or vandalism of company equipment
4. Notify emergency agencies in case of a fire, explosion, or release after work hours.
5. Maintain site surveillance
6. To ensure all visitors are approved and have valid purpose for entering the site.
7. To ensure that all visitors are escorted

7.7 Site Maps

Site maps will be available showing designated work areas, escape routes, emergency assembly areas, hazardous and utility layouts. Refer to the Work Plan for additional information.

7.8 Site Communication

A communication system will be established on site with two communication nets. One net will be an internal communication net for on-site personnel and the other will be an external communication net for use between on-site and off-site personnel.

The internal communication net is used to alert all on-site personnel to potential emergencies. Safety information (such as the current time, heat stress check, etc.) is also sent out on this net. Common internal communication devices can range from radios to hand/visual signals. To be effective, all communication commands must be prearranged and all signals recognized by all on-site personnel in advance.

The external communication net is used to coordinate outside emergency response, report to management, and maintain contact with essential off-site personnel. This net is essential to provide personnel access to medical and emergency services. Telephones, either landline or cellular, are used to establish this external net.

7.9 Site Inspections

The SSO will conduct site inspections formally on a weekly basis, informally on a daily basis. The Project Manager or the Site Manager can also conduct site inspections. All formal inspections will be documented and kept on job file for review by Corporate Health and Safety.

7.10 Traffic Control

The Site Manager/SSO will ensure that traffic patterns and roadways are designed and operated in a manner that minimizes the potential for vehicle related accidents. Key elements that will be considered and reviewed include:

- Minimize the potential for operating vehicles in reverse (i.e., backing)
- Avoid areas with overhead obstructions. Where overhead obstructions cannot be avoided, post warning signs and/ or construct warning devices. Warning devices are recommended where traffic includes the use of large trucks.
- Maintain safe vehicle speeds. Slower traffic speeds should be required at intersections, in curves and in areas where pedestrian traffic is common.
- Instruct all drivers on proper procedures and speed limits.
- Minimize potential for dust and soil on roads via use of truck pads at exists from work sites.

Only authorized vehicles will be allowed beyond the support zone area. All vehicles that enter a potentially contaminated area will be decontaminated before leaving the site.

Section 8.0 Decontamination

The decontamination process is designed to remove any contamination acquired in the exclusion zone and to keep the spread of contaminated materials from entering the support (clean) area. Care must be exercised to ensure that contaminants are removed from personnel and equipment before the personnel or equipment leaving the site. The decontamination line should extend from the exclusion zone boundary line to the entrance of the support zone. A map delineating the proposed decontamination areas is included in the site layout drawing.

8.1 Personnel Decontamination

Dry decontamination is the preferred method for KEMRON. This method of decontamination involves the removal of contaminated layers of personal protective clothing. If PVC boots are used, they will be decontaminated by using a wet method "boot wash" station located at the CRZ. The boot wash will be comprised of two large wash tubs. The first tub will be filled with water and soap solution and a brush to remove gross contamination. The second wash tub will be a rinse. Once completed, personnel will exit the zone free of contamination.

In the event that non-disposable PPE or clothing becomes contaminated during site work, the contaminated PPE or clothing will be cleaned before being placed back in service or replaced. In the event of skin contact with contaminated media, the affected skin should be washed immediately as appropriate.

8.2 Equipment Decontamination

Equipment and vehicle decontamination is achieved with dry decontamination methods. The field team leader shall inspect all equipment entering and leaving the site and note the type of vehicle and vehicle condition in his/her log book. Vehicles shall not be allowed on or off-site until the vehicle is visually clean. This determination will be made by appointed KEMRON personnel to include the field team leader.

Decontamination of sampling equipment (e.g., split-spoons, etc.) will be performed using appropriate, environmentally friendly surfactants/ detergents. All sludge and silt will be removed from sampling equipment and the equipment washed and tripled rinsed before leaving the site. Wastewater generated from cleaning equipment will be managed in drums with other liquid IDW.

8.3 Decontamination Equipment

[X] Plastic Sheeting
[X] Buckets
[X] Brushes
[X] Disposable Plastic Bags
[X] Trash Containers

Section 9.0 Sanitary Facilities and Lighting Requirements

Sanitary facilities, permanent or temporary will be provided on all KEMRON job sites. The requirements for sanitary facilities on site will meet all applicable standards found in WAC 296-800-230 and the KEMRON operating procedure.

TOILET FACILITIES

Number of employees'	Minimum number of facilities
20 or fewer	One
More than 20, fewer than 200 employees'	One toilet seat and one urinal per 40
More than 200 employees'	One toilet seat and one urinal per 50

For this project, one sanitary facility will be provided for every 15 employees and, if necessary, a separate facility for females.

Lighting on job sites will meet all applicable standards found in WAC 296-800-21005. Minimum illumination on job sites will be at 5-foot candles for work areas and 3-foot candles for excavations. Remediation work for this project is scheduled for summer 2010 and anticipates all work performed during daylight hours.

MINIMUM ILLUMINATION INTENSITIES IN FOOT-CANDLES

Foot-candles	Area or operations
5	General site areas
3	Excavation and waste areas, access-ways, active storage areas, loading platforms, refueling, and field maintenance areas
5	Indoors. Warehouses, corridors, hallways, and exit ways
5	Tunnels, shafts, and general underground work areas. (Exception: Minimum of 10 foot-candles is required at tunnel and shaft heading during drilling mucking, and scaling. Mine Safety and Health Administration approved cap lights will be acceptable for use in the tunnel heading.)
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices.

Section 10.0 Contingency Plan

10.1 Contingency Plan Activation

The KEMRON contingency plan may be activated by the following conditions:

1. An injury occurs in any of the zones.
2. A chemical hazard action level is reached or an air monitor alarm sounds.
3. Someone observes the development of an IDLH situation.
4. An unknown odor is detected.
5. There is a security breach and/ or presence of unauthorized personnel.
6. There is a weather-related emergency.
7. There is a major release, explosion, or fire.
8. There is a facility alarm condition.

In case of an emergency, the following equipment will be used to alert on-site personnel.

1. Portable radio communications or,
2. Portable air horns. If this is used, the following alarm signals will be used:

   1 Blast - Attention, Contact command post
   2 Blasts - Emergency, Assemble at decontamination line.
   3 Blasts - General Emergency, Evacuate site immediately and meet at designated assembly area.

3. Facility alarm system

The designated assembly areas and emergency evacuation routes will be established and posted. All personnel on site will be briefed on all emergency procedures as part of the initial safety briefing.

10.2 Emergency Procedures

CRZ or Exclusion Zone Injury: Operations will cease and area will be cleared for emergency personnel. Rescue team designated by SSO will retrieve injured personnel and will decontaminate to the extent possible before movement to support zone. If condition is serious, at least a partial decontamination will be completed. First aid will be administered until professional medical assistance arrives. If movement will aggravate the injury, then the injured personnel will be left in place. If the injured personnel are at a greater risk inside the exclusion zone or emergency personnel are not able to enter the zone, then movement of the injured personnel becomes unavoidable. Care will be exercised to prevent spread of contamination. A copy of the suspected contaminants is to be provided to the responding medical team for transport back to the hospital.

NOTE: Rescue of downed personnel where the reason of that occurrence is not known will be performed in the next higher level of PPE.

Support Zone Injury: SSO and PM/ Site Manager will assess the nature of the injury. If injury does not affect performance of personnel, operations may continue. If injury increases risk to others, operations will cease, until risk is removed or minimized.

PPE Failure: The event of PPE failure or alteration, that person and his/ her buddy will immediately leave the exclusion zone and assemble at the decontamination line. Re-entry will not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: In the event of equipment failure other than PPE, the SSO and PM will determine if the problem affects the safety of personnel or prevents the safe completion of the tasks. If which case the operation will cease until repairs/replacements are made and the risk to safety is removed.

Fire or Explosion: Operations will cease and personnel will assemble at the decontamination line or the designated assembly area depending on the alarm given. The SSO and the PM/Site Manager will determine if the fire can be suppressed. If the fire is small and safety is not endangered, a team of properly equipped personnel will make entry to secure the situation. If the event is uncontrollable, all personnel will be evacuated and the proper authorities will be notified. KEMRON personnel may assist firefighters, if required, as well as all emergency responders with information related to the incident.

Spill, Leak or Release: Operations will cease and the designated suppression personnel will assemble at the upwind vapor suppression area. All other non-essential personnel in the area will meet at the decontamination line or the designated assembly area depending on the alarm given. The SSO and PM/Site Manager will attempt to determine the nature and extent of the release by air monitoring readings taken by KEMRON personnel. The SSO or PM/Site Manager will direct the assembled team to contain the release or spill by the appropriate method. The SSO or PM/ Site Manager will direct the suppression crew in making the necessary attempts to stop the release and initiate clean up operations. Operations will remain suspended until the incident is stabilized and no longer poses a threat to personnel. The SSO or PM/Site Manager will notify the Fire and Police Department in the unlikely event that a chemical release has migrated off site and that it is an immediate threat to the surrounding community.

Alarm Condition at Facility: The facility has a system of alarm codes to protect employees during emergencies. All personnel working on the site will follow this program when operating in that respective facility. In the event of an alarm condition, employees are to cease work, turn off all electric hand tools and engines, and report to the nearest head count area. They will remain at the head count areas until the all clear alarm is sounded. The alarm signals and codes and head count locations will be reviewed during the facility safety orientations.

All incidents and accidents will be reported to the Joint Base Lewis-McChord representative as well as KEMRON management.

10.3 Emergency Equipment

The following equipment will be located on the job site:

First Aid Kit
Emergency Eyewash
ABC Dry Chemical Fire Extinguishers located at the site

[O]	Carbon Dioxide Fire Extinguisher	[O]	Purple K Fire Extinguisher
[X]	Chemical Sorbents Pads and Booms	[X]	Additional PPE
[X]	Portable Communication Radios	[X]	Portable Air Horns
[O]	USCG Approved PFD		

10.4 Emergency Telephone Numbers

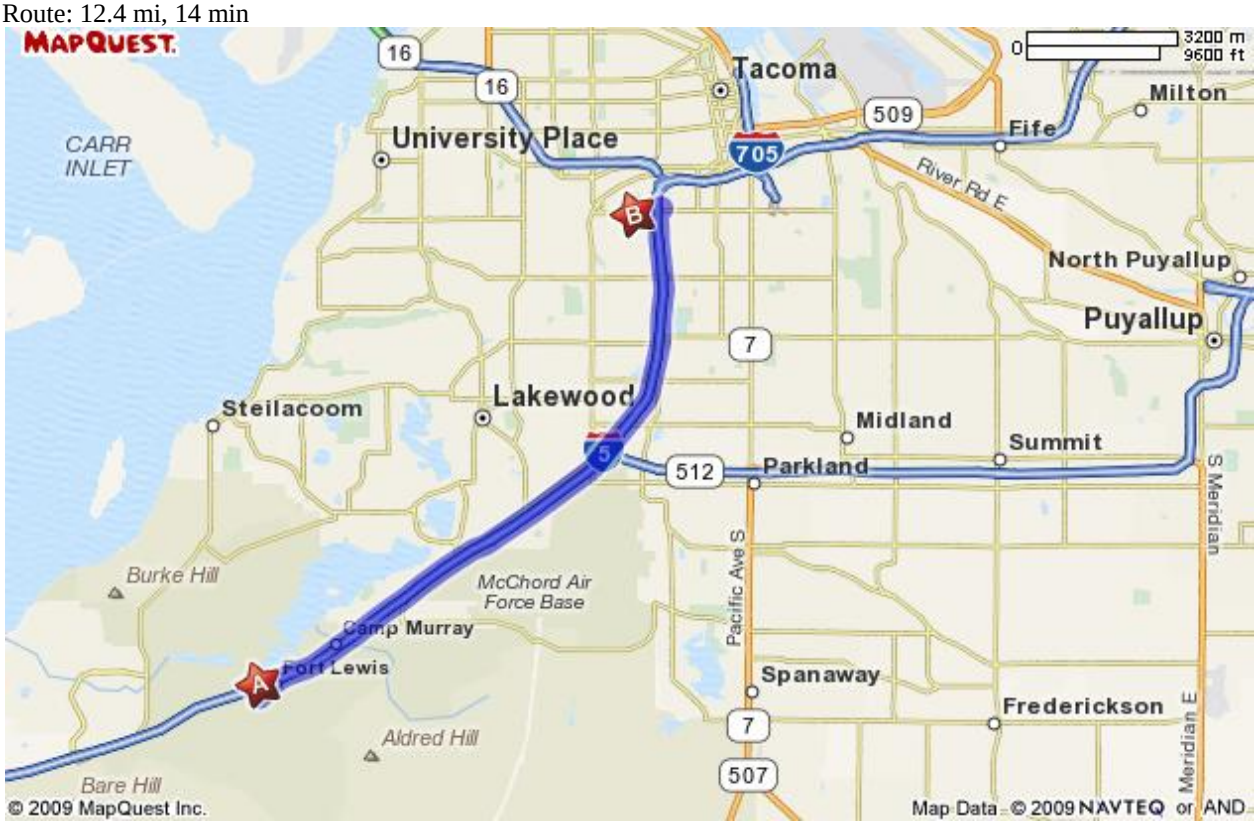
CHEMTREC	800-424-9300
National Response Center	800-424-8802
National Poison Control Center	800-362-9922
Federal Emergency Management Agency	202-646-2400
Centers for Disease Control	404-488-4100 (24HR)
United States Coast Guard	804-441-3516
AT&F (Explosives Information)	800-424-9555
KEMRON Environmental Services, Inc.	800-548-6939
US Environmental Protection Agency Region X	800-424-4372
Washington State Department of Ecology	360-407-6300
Police/Fire/Ambulance	911
Joint Base Lewis-McChord Fire Station 1	253-967-4479
Joint Base Lewis-McChord Military Police	253-967-3107
Hospital	253-968-1110
Washington Poison Center	800-222-1222
U.S. Healthworks	253-475-5908 253-475-5958

The above emergency agencies will be contacted and notified on the specific hazards on this project. Coordination for special emergency response requirements with these agencies will be completed upon arrival.

10.5 Directions to Occupational Health Clinic

Directions to U. S. Healthworks:

Route: 12.4 mi, 14 min



Source: Base Map prepared from a Mapquest Map

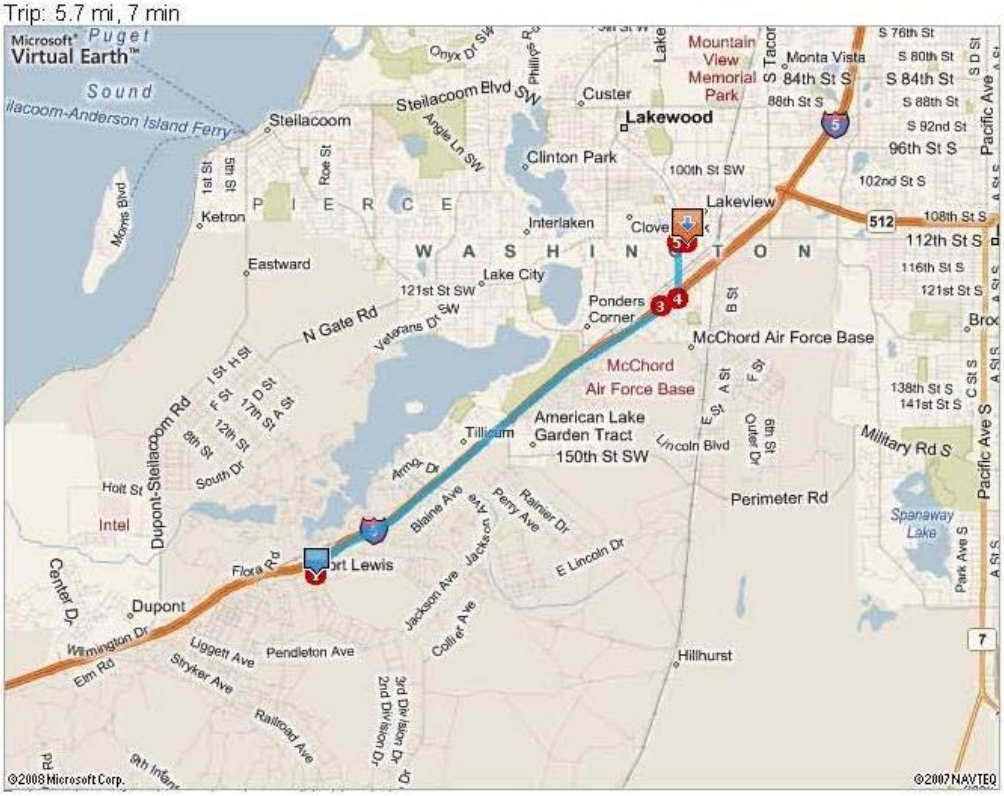
U. S. Healthworks
2624 South 38th Street
Tacoma, WA 98409
253-475-5908/253-475-5958
Attn: Minett Fernandez

1) **Merge onto I-5 N from Joint Base Lewis-McChord Military Reservation and go toward TACOMA/SEATTLE (10.7 miles)**
2) **Take EXIT 132-take ramp right for S 38 St. West toward Tacoma Mall (0.7 miles)**
3) **Bear right onto S 38th St (0.5mi)**
4) **End at 2624 S 38th St., Tacoma , WA 98409, WA 98499, US**

10.6 Directions to Hospital

Directions to St. Clare Hospital:

Trip: 5.7 mi, 7 min



Source: Base Map prepared from a Microsoft Live Search Map
St. Clare Hospital
1315 Bridgeport Way SW
Lakewood, Washington
(253) 581-6396

1) Merge onto I-5 N from Joint Base Lewis-McChord Military Reservation and go toward TACOMA/SEATTLE (4.7 miles)
2) Take the BRIDGEPORT WAY exit-EXIT 125-toward MCCHORD A.F.B. (0.1 miles)
3) Turn LEFT onto BRIDGEPORT WAY SW (3.8 miles)
4) End at 1315 Bridgeport Way SW Lakewood, WA 98499, US

Section 11.0 References

General Dynamics Information Technology, 2007. Sampling and Analysis Plan – Former Miller Hill Ranges (main area) – Area of Concern 4-2.1. Hillside Housing Area Sampling. Fort Lewis, Washington 98433. September.

Hart Crowser, 2007. Revised Supplemental Ecological Site Investigation Work Plan Miller Hill Former Firing Ranges at Fort Lewis, Washington. Prepared for Battelle Memorial Institute.

KEMRON Environmental Services, Inc, 2008. Project Management Plan for the Performance Based Acquisition Environmental Remediation Services at Fort Lewis, Washington - Draft. Prepared for Fort Lewis Public Works – Environmental Division. Fort Lewis, Washington 98433.

NIOSH Online Pocket Guide to Chemical Hazards, http://www.cdc.gov/niosh/npg/npgdname.html

OSHA Regulations 29 CFR 1910

OSHA Regulations 29 CFR 1926

OSHA Chemical Sampling Information,
http://www.osha.gov/dts/chemicalsampling/toc/toc_chemsamp.html

USEPA "Best Management Practices (BMPs) for Soil Treatment Technologies", May 1997.

Washington State Dept. of Labor and Industries Regulations; WAC 173-340-810; WAC 296-155-176; WAC 296-62 (Part R); WAC 296-843
http://www.lni.wa.gov/Safety/Rules/

Section 12.0 Site HASP Review and Documentation

I have been briefed on and understand this site HASP. I have been informed of the personnel to contact if I have any questions and know where to report any additional health and safety hazards. I agree to work to the safety plan guidelines and understand that failure to do so could result in removal from the site and/ or termination.

DATE	PRINTED NAME	SIGNATURE	ORGANIZATION

KEMRON ENVIRONMENTAL SERVICES

DATE	PRINTED NAME	SIGNATURE	ORGANIZATION

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FIGURES

FIGURES H1-H5

Former Skeet Range

Former Pistol Ranges 62 and 67

Former Tank Range 54

Former Machinegun Range 42

Hillside Housing Area

Unnumbered Pistol Range

N

0 300 600 1,200 1,800 Feet

Figure H1

Joint Base Lewis McChord

Vicinity Map

Joint Base Lewis McChord

KEMRON ENVIRONMENTAL SERVICES

Steep Hillside (Ecological Open Space) * Vegetation Preserved

Approximate division between Flatlands and Steep Hillside
(To be determined in field based on ecological value)

Hillside Housing Residential Area

As-Built

Soil Stockpile Location from Interim Action

Residential Buffer Zone

Flatlands (Commercial)

Stone Education Center

Distance Learning Center

Colorado Avenue

Legend

- Clearing and Grubbing
- Existing 4 Wire Strand Fence
- Dirt Trail
- Steep Hillside (Ecological Open Space)
- Road Edgeline
- Contours (Half Meter)
- Residential Buffer Zone Excavation Areas (cleanup level - 475 mg/kg)
- Flatlands Excavation Areas (cleanup level - 1066 mg/kg)

** Hillside Housing Residential Area was remediated during Interim Action in 2008.

0 75 150 300 450 Feet

N

Figure H2

Pistol Ranges 62 and 67
Miller Hill

Clearing and Grubbing Areas

Joint Base Lewis McChord

KEMRON ENVIRONMENTAL SERVICES

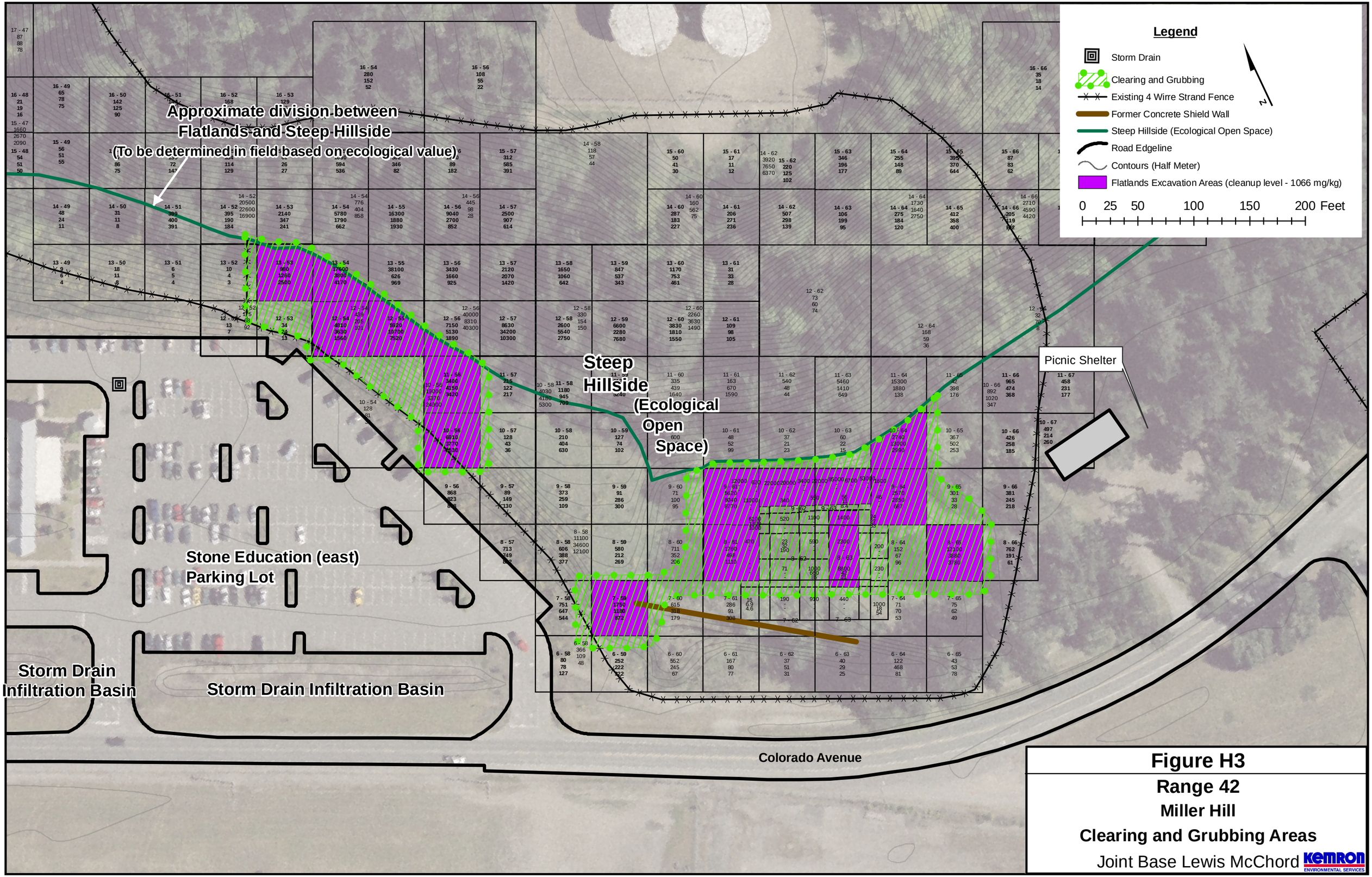

Figure H3

Range 42

Miller Hill

Clearing and Grubbing Areas

Joint Base Lewis McChord

kemron ENVIRONMENTAL SERVICES

Figure H4

Unnumbered Pistol Range

Miller Hill

Clearing and Grubbing Areas

Joint Base Lewis McChord

KEMRON ENVIRONMENTAL SERVICES

American Lake

American Lake

Joint Base Lewis McChord / National Guard - Camp Murray

Gravel Road

Storm Drain(s)

Picnic Shelter

Asphalt Parking Lot

Clean Backfill Stockpile

Legend

- Clearing and Grubbing
- Clean Backfill Stockpile
- Excavation Area
- Lake Boundary
- Gate
- Existing 4 Wire Strand Fence
- Overhead Power Line/Buried Phone
- Camp Murray National Guard Boundary Fence
- Lead Sample Location (0-3 inches depth)
- Lead Sample Location (0-6 inches depth)
- Storm Drain

N

0 25 50 100 150 200 250 300 350 400 Feet

Figure H5

Former Skeet Range

Clearing and Grubbing Areas

Joint Base Lewis McChord

KEMRON ENVIRONMENTAL SERVICES

APPENDIX A

SITE SAFETY FORMS

ALL ACCIDENTS/INCIDENTS, INCLUDING NEAR MISSES, MUST BE REPORTED WITHIN 24 HOURS.

What is reportable within KEMRON? Any on the job accident/incident that results in death, injury, illness, property damage, spills/releases, or evacuations, including near misses.

What is a near miss? Accidents or incidents which could have resulted in serious injury, property damage, or environmental issues.

KEMRON Accident/Incident Reporting Instructions

- If an accident/incident occurs, immediately notify your Supervisor and the Office Health and Safety Contact.
- As soon as possible, but no more than 24 hours following an accident/incident, the employee(s) involved in the accident/incident must complete the Accident/Incident Report form in its entirety, sign the completed form, and provide it to his/her supervisor.
- The supervisor must immediately review and sign the Accident/Incident Report form. Upon completion of review, the supervisor must complete an Initial Incident Investigation Report form.
- The completed set of forms must be transmitted to the Regional Director for review and signature within 24 hours of initial notification of the accident/incident.
- Immediately upon receipt, the Regional Director must review, sign and forward all completed forms to the Corporate Health & Safety Manager.

Accidents/Incidents will be investigated to determine the underlying cause(s) and any necessary corrective actions. The Regional Director, Office Health and Safety Contact, and Corporate Health and Safety Manager will determine if an Accident Review Board is warranted.

Fax or email your completed report to:

Marilyn Zumbro
Fax – (740) 376-2536
Email – mzumbro@kemron.com
Office Telephone – (800) 548-6938; (740) 373-4308
Mobile – (740) 350-0541

KEMRON
ENVIRONMENTAL SERVICES

FORM A - DAILY SAFETY MEETING

Project Name: _____ **Date:** _____

Location: _____ **Presented by:** _____

Check the Topics/Information Reviewed:

- ☐ Daily work scope reviewed
- ☐ safety is everyone's responsibility
- ☐ site health and safety plan reviewed
- ☐ safety glasses, hard hat, safety boots
- ☐ employee Right-To- Know/MSDS location
- ☐ vehicle safety and driving/road conditions
- ☐ hazard analysis for all tasks or new technology
- ☐ chemical hazards
- ☐ first aid, safety, and PPE location
- ☐ sharp object, rebar, and scrap metal hazards
- ☐ latex gloves inner/nitrile gloves outer
- ☐ open pits, excavations, and trenching hazards
- ☐ excavation/trenching inspections/documentation
- ☐ full face respirators with proper cartridges
- ☐ upgrade to Level C at:
- ☐ work stoppage at:
- ☐ portable tool safety and awareness
- ☐ slips, trips, and falls
- ☐ strains and sprains
- ☐ anticipated visitors
- ☐ electrical ground fault
- ☐ public safety and fences
- ☐ excavator swing and loading
- ☐ orderly site and housekeeping
- ☐ smoking in designated areas
- ☐ leather gloves for protection
- ☐ effects of the night before? Rain or snow?
- ☐ vibration related injuries
- ☐ noise hazards
- ☐ confined space entry
- ☐ hot work permits
- ☐ overhead utility locations cleared?
- ☐ all underground utilities cleared?
- ☐ equipment and machinery familiarization
- ☐ fire extinguisher locations
- ☐ eye wash station locations
- ☐ directions to hospital
- ☐ heat and cold stress
- ☐ decontamination steps
- ☐ review emergency protocol
- ☐ parking and laydown area
- ☐ vehicle backing up hazards
- ☐ accidents can be costly
- ☐ no horse play
- ☐ dust and vapor control
- ☐ refueling procedures
- ☐ flying debris hazards
- ☐ poison ivy/oak/sumac

Other Discussion Items/Comments/Follow-up Actions:

NAME (PRINT)	NAME (SIGNATURE)	COMPANY

Instructions:

- **Conduct a daily safety meeting prior to beginning each day's site activities.**
- **Complete form, obtain signatures, and file with the Daily Summary.**
- **Follow-up on any noted items and document resolution of any action items.**

KEMRON ENVIRONMENTAL SERVICES

FORM B SITE INSPECTION FORM

PROJECT/DATE:

SAFETY AREA	YES	NO	N/A
FIRST AID			
1. Are first-aid kit locations identified and accessible?			
4. Is a qualified First Aid/CPR provider on-site?			
PERSONAL PROTECTIVE EQUIPMENT			
1. Have levels of PPE been established?			
6. Are there sufficient sizes and quantities of PPE?			
7. At a minimum, are employees using safety glasses, hard hats and steel-toe shoes?			
FIRE PREVENTION			
1. Do employees smoke only in designated outdoor areas?			
6. Are fire extinguishers available and inspected monthly?			
AIR MONITORING			
1. Is required air monitoring being conducted?			
2. Are air monitoring logs up to date?			
4. Are instruments being maintained?			
HAND AND POWER TOOLS			
1. Are defective hand and power tools tagged and taken out of service?			
3. Are guards and safety devices in place on power tools?			
5. Are switches, circuit breakers, and switchboards installed in wet locations enclosed in weatherproof enclosures?			
WALKING AND WORKING SURFACES			
1. Are ladders regularly inspected?			
2. Are accessways, stairways, ramps and ladders clear of ice, mud, snow or debris?			
4. Are ladders kept out of passageways, doors and driveways?			
5. Are broken or damaged ladders tagged and taken out of service?			
6. Are metal ladders prohibited in electrical service?			
SITE SAFETY PLAN			
1. Is a site safety plan available on-site and accessible to all employees?			
2. Does the safety plan accurately reflect site conditions and tasks?			
3. Have potential hazards been described to employees on-site?			
4. Is there a designated safety official on-site?			
5. Have all employees signed the safety plan?			
6. Has a THA been completed for each major task?			
7. Are the Site Map, Hospital Route, and Lockout/Tagout posted?			
SITE CONTROL			
4. Is the site properly secured during and after work hours?			
HEAVY EQUIPMENT			
1. Is heavy equipment inspected as prescribed by the manufacturer?			

FORM B SITE INSPECTION FORM

PROJECT/DATE:

SAFETY AREA	YES	NO	N/A
2. Is defective heavy equipment tagged and taken out of service?			
3. Are project roads and structures inspected for load capacities and proper clearances?			
5. Are backup alarms installed and working on mobile equipment?			
6. Have qualified operators been designated?			
7. Are riders prohibited on heavy equipment?			
8. Are guards and safety appliances in place and used?			
9. Are operators using the “three point” system when mounting/dismounting equipment?			
CONFINED SPACES			
1. Have employees been trained in the hazards of confined spaces?			
HAZARD COMMUNICATION			
1. Are there MSDS for required materials/chemicals present on-site?			
2. Are all containers properly labeled as to content and hazard?			
3. Have employees been trained in accordance with the HAZCOM procedure?			
4. Do employees (including subcontractors) know and understand the effects of exposure from the chemicals on-site?			
5. Is there an updated list of all chemicals maintained on-site?			
TRAINING			
1. Are tailgate safety meetings conducted daily?			
2. Are current training/medical records maintained on-site?			
DOCUMENTATION			
2. Are incident report forms available?			

AUDIT PERFORMED BY/DATE

KEMRON ENVIRONMENTAL SERVICES

Form C - Accident/Incident Report Form

MUST BE COMPLETED WITHIN 24 HOURS OF THE INCIDENT

GENERAL INFORMATION

SITE INFORMATION

Job Name: _____

Physical Address: _____

_____

EMPLOYEE INFORMATION

Employee Name: _____

Home Address: _____

_____

_____

SS#: _____

Age and Gender: _____

Length of Employment: _____

Length of Time at Current Job: _____

INCIDENT INFORMATION

Location of Injury/Illness/Incident

_____

Date and Time of Incident: _____

Date Investigated: _____

Witnessed By: _____

Project Manager: _____

Type of PPE Worn _____

(if inadequate, explain) _____

CLASSIFICATION (circle all that apply)

INJURY/ILLNESS

No Injury	Irritation
Abrasion	Laceration
Bruise	Noise
Chemical Burn	Physical Agent
Cumulative Trauma	Puncture
Dislocation	Sprain/Strain
Foreign Body	Thermal Burn
Fracture	Death
Inhalation	Other (explain below)

INCIDENT

Auto	Leak/Spill
Client's Property	Near Miss (explain)
Equipment	Subcontractor (explain)
Fire/Explosion	Other (explain)

Equipment Involved in Incident: _____

_____

PART OF BODY

Eye	L	R
Ear	L	R
Head	L	R
Neck	L	R
Shoulder	L	R
Arm	L	R
Elbow	L	R
Wrist	L	R
Hand	L	R
Fingers	L	R
Chest	L	R
Abdomen	L	R
Back	L	R
Leg	L	R
Knee	L	R
Ankle	L	R
Foot	L	R
Other		

KEMRON ENVIRONMENTAL SERVICES

Form C - Accident/Incident Report Form

MUST BE COMPLETED WITHIN 24 HOURS OF THE INCIDENT

DESCRIBE THE INCIDENT IN DETAIL

Include photographs, drawings, diagrams, and any other pertinent information

IMMEDIATE CORRECTIVE ACTION DESCRIPTION

Assigned To: Completion Date:

SAFETY RULES AND PROCEDURES

None Established	None Recommended	Lack of Training	Adequate
Inadequate	Unsafe Condition	Other (describe)	

FIRST AID/MEDICAL INFORMATION

Was First Aid Provided?	Y	N	Bloodborne Pathogens Incident?	Y	N
Type of Treatment Given:			Did Kemron Respond?	Y N	N/A
			Employee Exposed to		
Who Gave the Treatment?			blood or infectious material?	Y	N
Medical Treatment Given?	Y	N	Hospital Name/Address:		
(attach medical report					
if available)					
Physician Name:			Work Limitation Given?	Y	N
Physician Address:			Describe Any Work Limitation:		
Phone:			Return To Work Date:		

ACCIDENT REVIEW BOARD INFORMATION

Completed By: _____ Date: _____

Approved By: _____ Date: _____

KEMRON ENVIRONMENTAL SERVICES

Form D – Task Hazards Analysis Form

TASK DESCRIPTION:

HAZARD ANALYSIS CONDUCTED BY: **DATE:**

PHYSICAL HAZARD IDENTIFICATION:

[o] PHYSICAL EXERTION	[o] HEAT STRESS	[o] COLD STRESS	[o] HEAVY EQUIPMENT
[o] FIRE HAZARDS	[o] LIFTING HAZARDS	[o] SLIP, TRIP, OR FALL	[o] HIGH NOISE (> 85 dBA)
[o] OVERHEAD UTILITIES	[o] EXCAVATION/TRENCHING	[o] CONFINED SPACE	[o] POISONOUS PLANTS
[o] POISONOUS/HAZARDOUS ANIMALS	[o] ELECTRICAL	[o] HAND/POWER TOOLS	[o] PUNCTURE/LACERATION
[o] OXYGEN DEFICIENT	[o] PRESSURIZED CONTAINERS	[o] EXPLOSIVE	[o] VISIBILITY
[o] VEHICLE TRAFFIC	[o] WELDING, CUTTING, BRAZING	[o] GLARE/LIGHT HAZARDS	[o] SPLASH
[o] GRINDING	[o] FLYING DEBRIS	[o] PINCH/GRAB/ROLL	[o] TEMPERATURE HAZARDS

[o] OTHER (SPECIFY) : _____

CHEMICAL HAZARD IDENTIFICATION:

[o] CORROSIVE	[o] VOLATILE	[o] OXIDIZER	[o] TOXIC
[o] RADIOACTIVE	[o] BIOLOGICAL	[o] INERT	[o] REACTIVE
[o] FLAMMABLE	[o] COMBUSTIBLE	[o] NON-HAZARDOUS	[o] POISON A (GAS)

[o] OTHER (SPECIFY) : Grout mixture can be irritating to skin, eyes, lungs. Avoid inhalation of dust and direct contact with mixture.

PERSONAL PROTECTIVE EQUIPMENT:

LEVEL OF PROTECTION	RESPIRATORY PROTECTION	PROTECTIVE CLOTHING	GLOVES	HEAD/FACE/EYE PROTECTION	FOOT PROTECTION
PRIMARY:					
CONTINGENCY:					

ADDITIONAL INFORMATION:

ADDITIONAL MODIFICATIONS/ENGINEERING CONTROLS/INFORMATION:

FORM E

DIRECT READ INSTRUMENTATION CALIBRATION LOG

Date	Time	Unit Number	Calibration Std.	Results/Comments	Name
ACCURACY:					

FORM F
AIR SAMPLE RECORD

Company Name:	**Analytical Lab:**
Project Name:	
Project Contact:	
Phone No:	**Contact:**
Fax No:	**Phone No:**

Sample Location	Pump ID	Filter No	Tube No	Date		Time		Run Time (min)	Pump Flow Rate (L/min)			Total Volume (L)	Sample ID	Analysis	NIOSH Method
				Start	Stop	Start	Stop		Start	Stop	Average				

Sampled by: (Print/Sign) _____

_____

Special Request: _____

_____

Date Time Temp.

Comments: _____ Weather @ _____ _____^{o}C / Humidity _____% / Bar. _____ mm Hg / Wind from _____ @ _____ mph

_____ Weather @ _____ _____^{o}C / Humidity _____% / Bar. _____ mm Hg / Wind from _____ @ _____ mph

_____

_____

Form G

Company Name		
Contact	Phone	
E-Mail Address	Fax	
Report Address		
City	State	Zip
Billing Address		
City	State	Zip
PO #	Project	

CHESTER LabNet
12242 SW Garden Place
Tigard, OR 97223
(503) 624-2183
Fax (503) 624-2653
cln@chesterlab.net

CHAIN-OF-CUSTODY RECORD

Page ___ of ___

Analysis Requested

Turn Around Time
- ☐ **Standard**
- ☐ **Rush** _____ Specify

LabNet ID	Field Sample ID	Site	Sample Date	Volume (m^3)	Particle Size										**Remarks**

Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time	**Notes:**
Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time	

FORM H
REAL TIME AIR MONITORING LOG

Date	Time	Site	Location*	Real Time Dust Monitor			Comments	Sampler
				Serial #	Reading (mg/m^3)			
					Conc	TWA		

**** Upgradient (UG); Down Gradient (DG); or Exclusion Zone (EZ)***

FORM H (cont)
REAL TIME AIR MONITORING LOG

Date	Time	Site	Location*	Real Time Dust Monitor			Comments	Sampler
				Serial #	Reading (mg/m^3)			
					Conc	TWA		

**** Upgradient (UG); Down Gradient (DG); or Exclusion Zone (EZ)***

Form I

TRENCHING AND EXCAVATION CHECKLIST

JOB DESCRIPTION AND LOCATION: __

_____

NAME OF COMPETENT PERSON; _____ DATE/TIME: _____ / _____

*Check boxes and initial only sections that apply to this excavation

TYPE OF TRENCHING/EXCAVATION/DEMOLITION *Comp. Person Initial* _____

1. ☐ Use of power equipment (backhoe, front end loader, etc.)
2. ☐ Manual (portable pneumatic tools and equipment)
3. ☐ Manual (shovels, spades, spikes, etc.)

INFORMATION REVIEW *Dist. Specialist Initial* _____

1. ☐ The Owner of the area to be excavated, Utilities Distribution Specialist, and/or the Facilities Engineering Group have been contacted to obtain available underground drawings of all underground utilities and process (electrical, steam products, fuel, gas, etc.) lines.
2. ☐ All relevant drawings have been reviewed.
3. ☐ Appropriate Electrical, Utility, Fire Protection, and R&D representatives have been contacted concerning the location of underground facilities that may be excluded from available drawings.

HWP/CONFINED SPACE *Comp. Person Initial* _____ *(Ref. TC3.2 Plan. Hazardous Work/TC3.2.1 Confined Space Entry)*

1. ☐ All Hazardous Work Permit requirements have been met.
2. ☐ Requirements for Confined Space Entry have been considered and met, if applicable.

SOIL CLASSSIFICATION *Comp. Person Initial* _____ *(Ref. OSHA 29 CFR 1926.652 Appendix A, "Soil Classification")*

1. ☐ Document soil classification requirements on back. Required if > 4' deep.

PROTECTIVE SYSTEMS *Comp. Person Initial* _____ *(Ref. OSHA 29 CFR 1926.652, Appendices)*

Check Method Used if > than 4' deep:

1. ☐ Appendix B - Sloping and Benching
2. ☐ Appendix C - Timber Shoring for Trenches
3. ☐ Appendix D - Aluminum Hydraulic Shoring for Trenches
4. ☐ RPE Designed Shoring - Data Must Be Posted on Job Site
5. ☐ N/A

If assistance is needed to determine proper protective system, refer to Appendix E "Alternatives to Timber Shoring" or Appendix F "Selection of Protective Systems." *(See OSHA 29 CFR 1926.652)*

EXCAVATION INSPECTION(S) Document on back. *Comp. Person Initial* _____

1. ☐ Daily inspection(s) required
2. ☐ Additional inspections required. (Water in Excavation, Rain, Seeping Water or Other Hazardous Conditions)

OTHER *Comp. Person Initial 1-3* ____ *Dist. Specialist Initial 4-5* ____

1. ☐ All employees have been informed of the potential hazards associated with the job and the measures they are to take to protect themselves and the facilities.
2. ☐ Job procedures have been discussed with all employees assigned to the job.
3. ☐ Necessary preparations have been made to ground pneumatic tools where the supervisor has determined necessary.
4. ☐ Hazardous underground energy sources (e.g., electricity, flammable gases) HAVE BEEN de-energized/isolated

   *_____ *E/S Dept. Head/designee signature required when hazardous energy sources are not de-energized / isolated.*
5. ☐ Additional Considerations/Recommendations: _____

   _____

TRENCHING AND EXCAVATION CHECKLIST

Inspections (Please list dates, times, competent person's initials, and conditions during inspection)

Date	Time	Competent Person Initials	Condition

Soil Classification (Please Check & Describe) *Comp. Person Initials* _____

1. Must use both Manual and Visual Methods of Classification.
   (Most soil at the Technical Center will be classified Type C.)

   ☐ Manual ☐ Pocket Pentrometer ☐ Vain Sheer Meter

   ☐ Plasticity (Moist sample rolled into thread) (Add water if necessary).

   ☐ Dry Strength - Dry and crumbles on its own.

   ☐ Thumb penetration - Make Ball. Add water if necessary.
   Type B - Great Effort to Penetrate.
   Type C - Easily Penetrated - Can be molded.

   ☐ Visual - Observe soil adjacent to the evacuation, soil forming sides of excavation, soil taken as sample from excavated material.

2. Type of Soil Found. Describe

   ☐ Stable Rock _____

   ☐ Type A _____

   ☐ Type B _____

   ☐ Type C _____

Post this Checklist at the Excavation Site

Form J

Visitors, Vendor Safety Orientation Sign in Sheet

I. COMMITMENT

All visitors are expected to understand and comply with the following KEMRON Health & Safety policies. Each visitor shall use his/her best judgment to safeguard themselves, our facility and the environment from harm while visiting the Marion, Ohio Site.

KEMRON H&S VALUE:
We will work safely in a manner that promotes the health and well being if the individual and the environment.

KEMRON H&S POLICY:
It is the KEMRON H&S policy to operate in a safe, responsible manner, which respects the environment and the health of our employees, our customers and the communities where we operate. We will not compromise environmental, health or safety values for profit or production.

Evacuation routes to be explained by site contact.

All visitors are required to attend a visitor orientation before entering the construction areas.

All contractors are required to attend a contractor orientation before services can be provided.

KEMRON's Health and Safety Plan is maintained on-site in site trailer.

Any visitor found not complying with the following Health & Safety policies will be asked to leave the facility immediately.

II. PERSONAL PROTECTIVE EQUIPMENT (PPE) AND ATTIRE

All visitors proceeding into the construction areas and maintenance areas shall wear the following PPE. (*Health and safety officer may modify PPE due to site conditions*)

- Hardhat
- Safety vest
- Steel toe boots
- Safety Glasses

III. Site Hazards

IV. INCIDENTS

- Immediately report any and all incidents to your site contact. An incident involving an injury will be investigated by KEMRON's Health and Safety Officer.

V. Additional Precautions

We want your stay here to be productive and safe. We are striving for continuous improvements in safety.... Please inform your site contact if you have any suggestions.

Visitors Name: _____ _____
Print Name Signature

Company Name: _____ Date: _____

Site Contact: _____

Form K

Lead Regulatory Review

Lead in Construction

Training on the hazards of lead at construction worksites: WAC 296-155-176. Attendance Roster follows this form.

Lead Exposure

Lead is hazardous to your health and if it gets in your body it can cause the following symptoms:

- Headaches, tiredness and insomnia.
- Loss of appetite and stomach pain.
- Pain, weakness or twitching in your muscles.
- Birth defects.
- Kidney damage.
- Permanent brain and nerve damage.

Effects of Lead on Children

- Children are very susceptible to effects of lead.
- The amount that can harm them is much less than adults.
- It is important not to take any lead dust home on your clothing.

Health Hazards of Lead

- There is no real safe amount of lead, but there are levels that cannot be legally exceeded. This is called the "permissible exposure limit" or PEL.
- You must not exceed more than 50 micrograms of lead in the air and no more than 40 micrograms per deciliter in your blood.
- Both these limits are in the DOSH regulations on lead

Lead "Action Level"

When the amount of lead in the air is above the "action level" of 30 micrograms per cubic meter, we are required to:

- Conduct air monitoring.
- Provide medical surveillance.
- Provide training.

The Action Level is 60% of the permissible exposure limit (PEL).

Air Monitoring

- Air monitoring of lead in the air will be performed by attaching an air sampling device to employees, equipment, or free standing object such as a fence. You have the right to observe this monitoring.
- The permissible exposure limit of lead can be found in WAC 296-155-17607.

  (1) The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 $\mu g/m^3$) averaged over an 8-hour period.

  (2) If an employee is exposed to lead for more than 8 hours in any work day the employees' allowable exposure, as a time weighted average (TWA) for that day, shall be reduced according to the following formula: *Allowable employee exposure (in $\mu g/m^3$)=400 divided by hours worked in the day.*
- Results of the air monitoring shall be posted when available.

Warning Signs

Warning signs for lead contamination are posted within the EZ. No one can enter these areas without the proper PPE (work boots, coveralls, and gloves). *SIGNS must also be posted if PEL is exceeded.*

Respirators

Respirators are not anticipated for lead remediation at this site; however the permissible exposure limit (PEL) must be achieved through a combination of engineering, work practice and administrative controls to the extent feasible".

Work Practices to Reduce Lead Exposure

There are several ways you can reduce your lead exposure:

- Always wear proper PPE in the areas where it is required.
- Don't eat, drink or smoke in the area where there is lead.
- When you take a break, wash your hands before eating, drinking or smoking.
- Use separate work clothing and boots.
- Keep your street clothing in a clean place.
- Don't wear your work clothing or boots home.
- Contractor shall furnish work clothes such as Tyvek to perform lead remediation.
- Don't dry sweep or blow down dust containing lead.
- Use a high-efficiency vacuum to clean up lead dust.

What medical monitoring is needed?

- Anyone who is exposed to lead above the "action level" (30 ug/m^3*)* must be provided blood tests.
- If the amount of lead in your blood is more than 40, a medical exam is required.
- Blood tests will be routinely done if you are exposed to lead for 30 or more days per year.

Blood sampling

- After the first blood sample is taken, an additional 3 more blood samples must be taken for the next 6 months which equates to one test every two months.
- After that, blood samples must be taken once every 6 months.
- If the level in your blood exceeds 40, blood samples will continue to be collected every two months until it drops below 40.
- Blood samples are taken at no cost to you and you will be notified of the results.

Medical Exams

- If the amount of lead in your blood exceeds 40, your company should provide you with complete annual medical exam by a doctor.
- You can request an exam or review of the findings by a second doctor.
- Your company will not have access to the entire medical exam report, only the blood test results and whether or not you have a medical condition that precludes you from working around lead or wearing a respirator.

Medical Removal for Lead Exposure

- If the amount of lead your blood is above 50, you will be temporarily removed from the lead job.
- You cannot return to that job until your blood level drops below 40.
- Your blood must be tested monthly until the lead level drops below 40**.**
- Medical removal is required because of the serious health effects of lead.
- Your body will gradually rid itself of lead over time.
- You do not lose any earnings, seniority or benefits and you can return to former job status when blood lead levels drop.

DOSH Lead Regulations for Construction

- DOSH lead regulations for construction are found in the construction safety standard and contain much more information in detail.

Lead in Construction

Attendance Roster

NAME	SIGNATURE	COMPANY	DATE

Form L - Amendment to the Air Monitoring Plan

Amendment No.:

Date:

Time:

Description of Amendment:

Reason for Amendment:

Prepared by:

_____ _____

Company Date

Approved by:

_____

KEMRON Environmental Services, Inc.

APPENDIX B

LEAD MATERIAL SAFETY DATA SHEETS

MSDS Number: **L2347** * * * * * *Effective Date:* ***07/05/07*** * * * * * *Supercedes:* ***05/07/07***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

LEAD METAL

1. Product Identification

Synonyms: Granular lead, pigment metal; C.I. 77575
CAS No.: 7439-92-1
Molecular Weight: 207.19
Chemical Formula: Pb
Product Codes:
J.T. Baker: 2256, 2266
Mallinckrodt: 5668

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Lead	7439-92-1	95 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. See also Ingestion.

Ingestion:
POISON! The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

Skin Contact:
Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

Eye Contact:
Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

Chronic Exposure:
Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning; restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

Aggravation of Pre-existing Conditions:
Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For lead, metal and inorganic dusts and fumes, as Pb:
-OSHA Permissible Exposure Limit (PEL): 0.05 mg/m3 (TWA)
For lead, elemental and inorganic compounds, as Pb:
-ACGIH Threshold Limit Value (TLV): 0.05 mg/m3 (TWA), A3 animal carcinogen
ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information).
For lead, inorganic:
-NIOSH Recommended Exposure Limit (REL): 0.1 mg/m3 (TWA)
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.
Other Control Measures:
Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

9. Physical and Chemical Properties

Appearance:
Small, white to blue-gray metallic shot or granules.
Odor:
Odorless.
Solubility:

Insoluble in water.
Density:
11.34
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1740C (3164F)
Melting Point:
327.5C (622F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1.77 @ 1000C (1832F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Does not decompose but toxic lead or lead oxide fumes may form at elevated temperatures.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide, zirconium, disodium acetylide, sodium acetylide and oxidants.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Lead and other smelter emissions are human reproductive hazards. (Chemical Council on Environmental Quality; Chemical Hazards to Human Reproduction, 1981).
Carcinogenicity:
EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Lead (7439-92-1)	No	No	2B

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to leach into groundwater. This material may bioaccumulate to some extent.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Lead (7439-92-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.

```
  ---------------------------------------------  -----  ---   ----  -----
  Lead (7439-92-1)                                Yes   Yes   No     Yes

  --------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
  Ingredient                              RQ    TPQ     List  Chemical Catg.
  --------------------------------------  ---   -----   ----  --------------
  Lead (7439-92-1)                        No    No      Yes        No

  --------\Federal, State & International Regulations - Part 2\----------------
                                                        -RCRA-    -TSCA-
  Ingredient                              CERCLA     261.33     8(d)
  --------------------------------------  ------     ------    ------
  Lead (7439-92-1)                        10         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: None allocated.
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

APPENDIX C

STANDARD OPERATING PROCEDURE FOR UTILITY CLEARANCE

Document Control #: 12-UTL-01

STANDARD OPERATING PROCEDURE FOR UTILITY CLEARANCE

Issue Date: June 15, 2005
Revision 01

Last Review/Implementation Date: November 2004

KEMRON Environmental Services

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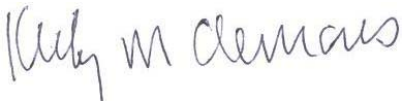
Approved by:



June 15, 2005

Kelly Clemons, Corporate Quality Assurance Manager — Date

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1. POLICY

KEMRON personnel will follow procedures established in the "SOP for Subsurface Utility Clearance" for all intrusive work, which is work that breaks the ground surface, such as drilling, probing, over-drilling, excavations and trenching. No intrusive work occurs without KEMRON present. Any deviations from this procedure require Regional Management approval.

2. PURPOSE

Subsurface utilities, product lines, and other unseen obstacles pose both potential safety and asset damage issues if encountered unexpectedly while performing drilling or excavating activities. This SOP standardizes subsurface utility identification at KEMRON in an effort to minimize the possibility of striking such obstacles.

3. SCOPE

This procedure provides technical guidance on subsurface utility identification.

4. RESPONSIBILITIES

4.1 Project Manager Responsibilities

The KEMRON Project Manager ensures that subsurface utility clearance is completed as stated in this SOP.

4.2 Field Technician Responsibilities

The KEMRON field technician(s) follow the applicable steps as stated in this procedure, in the site specific Health and Safety Plan, and as directed by the Project Manager.

4.3 Site Specific Health and Safety Officer (SSHO) Responsibilities

To review the completed Marked Utilities Verification Form.

4.4 Subcontractors

All subcontractors are secured under contract and required to meet all local, state, and federal requirements (i.e., 29 CFR 1910.333(c)(3); 29 CFR 1926.550(a)(15)(i), (ii), (iii)).

5. PLANNING

Planning will address all steps outlined in this procedure. Whether a private utility locator and/or public underground utility locating service will be used is determined during the planning stages.

5.1 Site-Specific Written Instructions for Utility Identification

The site specific health and safety plan will reference this SOP. Additionally, the forms used for this SOP (Attachments A and B), or this SOP in its entirety, will be attached to the site specific health and safety plan.

5.2 Written Instructions for Deviations

Any deviations from this SOP will be prepared and justified by the Project Manager and approved by the Regional Manager.

6. PRE-MOBILIZATION UTILITY IDENTIFICATION

6.1 Proposed Intrusive Work Locations

6.1.1 Request and conduct interview/site walk with the property owner representative (if available). Document as stated on the Utility Locator Form (Attachment A).

6.1.2 Identify and mark either with paint and/or with stakes the proposed intrusive work locations.

6.1.3 Check for the presence of over head utilities.

6.2 Pre-mobilization Documentation

6.2.1 Ensure the Utility Locator Form (Attachment A) is completed prior to mobilization. Advanced notice is necessary for the utilities to complete the utility locator process prior to the start of field work.

6.2.2 Obtain written consent of off-site property owners (e.g., through an access agreement or right-of-entry agreement) prior to performing any work on non-client property.

6.2.3 Request client maps, plans or photos showing the locations of underground tanks, lines, utilities, pipelines, etc.

6.3 Utility Locator Process

6.3.1 Complete the following initial information on the Utility Locator Form (Attachment A):

- 6.3.1.1 Site Address
- 6.3.1.2 City / County/township
- 6.3.1.3 Locations of Work Onsite
- 6.3.1.4 Extent of work: Front / Side / Rear
- 6.3.1.5 Distance from Road / ROW
- 6.3.1.6 Nearest Street Intersection
- 6.3.1.7 Distance and Direction to Intersection or list streets if work is to occur between streets
- 6.3.1.8 Project Name
- 6.3.1.9 Project Number
- 6.3.1.10 Client
- 6.3.1.11 Contractor / Subcontractor
- 6.3.1.12 Dates of Work
- 6.3.1.13 Times of Work

6.3.1.14 Type(s) of Work (i.e., excavation, blasting, railroad ROW, Highway, vertical drilling, horizontal drilling)

6.3.2 Obtain Fort Lewis Dig Permits (which includes a utility locate), and record the following information on the Utility Locator Form.

6.3.2.1 Name of the KEMRON employee calling the ONE-CALL

6.3.2.1.1 date and time of call,

6.3.2.1.2 ticket number,

6.3.2.1.3 dates the ticket is valid

6.3.2.2 Record the following specific information concerning utility owners to be contacted by the ONE-CALL service provider:

6.3.2.2.1 Utility type

6.3.2.2.2 Utility Company Name

6.3.2.2.3 Utility Company Contact Information

6.3.2.2.4 Method used by utility company to confirm completion of utility identification (i.e., fax, return call by KEMRON, etc.)

6.3.2.3 Ask for and record those utility owners that will not be contacted by the ONE-CALL service

6.3.3 Complete the following for each Utility owner that will not be contacted by the ONE CALL service

6.3.3.1 Contact each of the other utilities

6.3.3.2 Record the following on the Utility Locator Form:

6.3.3.2.1 Utility type

6.3.3.2.2 Utility Company Name

6.3.3.2.3 Utility Contact Information

6.3.3.2.4 Method used by utility company to confirm completion of utility identification (i.e., fax, return call by KEMRON, etc.)

6.3.3.2.5 Name of the KEMRON employee calling the utility company

6.3.3.2.6 Date and time of the call

6.3.3.2.7 Dates utility marking or clearance is valid

6.3.3.2.8 Record when confirmation is received

6.3.4 When confirmation of utility location is received from utility owners, record the method of confirmation and the date of receipt.

6.3.5 Review utility drawings (as-builts or plans), if available, and complete appropriate portion of the Utility Locator Form (Attachment A).

6.3.6 Under certain circumstances, the only available information will be gathered from a site walk with the property owner/representative (i.e. federal property) and/or review of utility drawings (as-builts or plans). If this is the case, the site walk

review of utility drawings (as-builts or plans). If this is the case, the site walk completed in section 6.1.1 is documented on the appropriate portion of the Utility Locator Form (Attachment A). Information from review of any site utility drawings is recorded on the utility locator form. The site walk and/or map review should provide all of the available utility information.

6.4 Optional Utility Location Methods

Private utility locating services that identify and locate all utilities on site are available for hire but not required. KEMRON may opt to meet the locater on site. If this option is utilized, document the date and time contact was made, who was contacted, and include other information as necessary.

7. MARKED UTILITIES VERIFICATION FORM

Verify that subsurface utilities have been cleared and/or marked prior to initiating intrusive site work by completing the Marked Utilities Verification Form (MUVF) (Attachment B). Subsurface utilities should be marked using standard color codes. If other color codes are used, the type of utilities marked should be verified with the locator service. The standard color codes are:

- White Work Location
- Red Electric
- Orange Telephone/Cable
- Yellow Gas/Oil
- Blue Water
- Green Sewer

Record the following on the MUVF.

7.1 Ticket number
7.2 Project name
7.3 Project number
7.4 Site location
7.5 Name of KEMRON employee completing the Marked Utility Verification Form
7.6 Date the form was prepared.
7.7 Verify and document that utilities are cleared/marked by recording the following on the Marked Utility Verification Form.
  7.7.1 A “Y” or “N” indicating whether the utility is marked. (Note: if a utility is supposed to be marked and is not marked, call the ONE-CALL service or utility company as appropriate)
  7.7.2 How the utility is marked (i.e., paint, color, stake, flag, etc.)
  7.7.3 Any additional comments

8. TAILGATE SAFETY MEETINGS

Prior to any intrusive work, conduct a tailgate safety meeting where the following are completed:

8.1 The Tailgate Safety Form is completed as stated in the Corporate Health & Safety Plan and/or in the Site Specific Health and Safety Plan.

8.2 Utility identification and verification of identification will be an agenda item for the Tailgate Safety Meeting.

8.3 Document the meeting agenda and items discussed on the Tailgate Safety Meeting Form.

9. FIELD PROCEDURES

9.1 Visual check

Conduct a walk through of the area where intrusive work is to be performed and visually identify all above ground indications of subsurface utilities such as electrical/light poles, manholes, junction boxes, etc. Compare locations and line of sight potential underground connections with available drawings and utility markings. If site conditions indicate potential unmarked or mismarked subsurface utilities, contact the Project Manager to discuss field procedures. Also, review overhead utilities in relation to the work locations. Estimating the distance between the overhead power lines and the workers or work equipment should be made and the Project Manager is notified if the distance is less than 15 feet. (see Appendix 1) Drillers may have more stringent requirements regarding the proximity of the drill rig mast to the overhead lines and shielding requirements.

9.2 Intrusive Work Location vs. Marked Utilities

Actual intrusive work locations must be at least five feet away from all marked utility lines, unless authorized by the Project Manager or addressed in the work scope.

9.3 Surface Covering: Concrete or Asphalt

Use a concrete saw followed by a jackhammer to saw and break through an asphalt or concrete surface cover. The drill bit on the rig may also be used to auger through an asphalt cover, but cannot penetrate a concrete cover. **DO NOT** advance beyond the bottom of an asphalt or concrete cover with powered equipment until manual clearance is performed.

9.4 Manual or Vacuum Clearance for Drilling Activities

Prior to mechanical drilling, excavate the borehole location using a post-hole digger, hand shovel, or other manual excavation method. Alternatively, vacuum excavation (potholing) of the location may be performed using soil vacuum equipment provided by some drillers. If vacuum excavation is used, verify volatile sampling protocol, if applicable. Excavate the borehole location to a diameter of at least two inches greater than the diameter of the drill bit on the lead auger, drill stem, or casing that is to be used. Advance the manual or vacuum borehole clearance to a minimum depth of 4 feet. If it is not possible to meet the diameter requirements using a single manual excavation boring, advance three or more hand auger borings to the required depth around the proposed location in such a manner that any subsurface utilities passing through the proposed boring location will be encountered while performing manual clearance.

If pea gravel, atypical fill material, or refusal is encountered, call the Project Manager, abandon and relocate. Pea gravel or granular fill material indicates that underground utilities or tanks may be located in the vicinity. If refusal is encountered, relocate to

complete work or identify the source of refusal and continue as applicable (i.e, a rock). If relocating or if the source of refusal was a utility, call the PM; contact the utility, if identified; and, as applicable, periodically check location of initial attempt for observations indicating a puncture (i.e., presence of liquid). Prior to selecting a new location, review any subsurface utility drawings and location of overhead utilities. Proceed with the manual or vacuum clearance procedure at the revised location.

9.5 Target Soil within 4 feet of Surface

Use a hand auger to collect an undisturbed soil sample, if soil sample collection is required within the manual or vacuum clearance range (4 feet).

9.6 Intrusive Work Location vs. Overhead Power Lines

All work (ranges of equipment use and personnel) occurs greater than 15 feet from the overhead power lines. If work is to be completed between 10-15 feet from the overhead power lines, verification that lines are not more than 50kV is required. See Appendix 1.

9.7 Limiting Access

If the intrusive work is not completed immediately after confirmed clearance, complete one of the following:

a) Surround the clearance area with barricades or cones and/or cover with a sheet of material, such as plywood, sufficient in strength to support the weight of a person or vehicle as necessary; or
b) Temporarily backfill the clearance location flush to ground surface with clean inert material.

10. REFERENCES

29 CFR 1910.333(c)(3); 29 CFR 1926.550(a)(15)(i), (ii), (iii)

ATTACHMENT A: UTILITY LOCATOR FORM

KEMRON
ENVIRONMENTAL SERVICES

ATTACHMENT A
UTILITY LOCATOR FORM

Site Address: _____ **Project Name:** _____

City/County/Township: _____ **Project #:** _____

Locations of Work Onsite: _____ **Client:** _____

Extent of Work – Front/Sides/Rear: _____ **Contractor/Sub:** _____

Distance From Road/ROW: _____ **Dates of Work:** _____

Nearest Street Intersection: _____ **Times of Work:** _____

Distance & Direction to Intersection: _____ **Type of Work:** __ **Excavation**

(Alternately) Between Streets: _____ __ **Blasting** __ **Vertical Drilling**

_____ __ **Railroad ROW** __ **Horizontal Drilling**

__ **Highway**

ONE CALL - Utilities Contacted by One Call Service:

KEMRON Employee: _____ Date and Time of Call: _____

ONE CALL Operator: _____ Does ONE CALL locate in this area? Yes__No__

(if yes) Ticket #: _____ Dates Ticket Valid: _____

Utility	Company Name	Contact Information	Confirmation Mechanism (fax, etc..)	Confirmation Received? (y/n)

UTILITIES NOT CONTACTED BY ONE CALL SERVICE (must be contacted directly by KEMRON):

Utility	Company Name	Contact Information	Confirmation Mechanism / received (y/n)?	KEMRON Employee	Date/Time of Contact	Dates Utility Marking or Clearance Valid

ATTACHMENT B: MARKED UTILITIES VERIFICATION FORM

KEMRON
ENVIRONMENTAL SERVICES

ATTACHMENT B
MARKED UTILITIES VERIFICATION FORM

Ticket #: _____ Project Name: _____ Project #: _____

Location of Site: _____ Prepared By: _____ Date Prepared: _____

Instructions:
A KEMRON employee completes this checklist while on site and before any intrusive work begins to ensure that all underground utility lines, other underground structures, as well as aboveground power lines are clearly marked out in the area selected for intrusive work. Utilities identified on the Utility Locator Form (ULF) for the site are required to be verified on-site and documented below. Any utilities identified on the ULF that are not visibly marked, or are not documented as "not present", require a call to the One-Call Company or utility company.

Emergencies:
Follow the incident procedures as stated in the corporate Health and Safety Plan.

Verification:

	Marked?			
Utility / Structure	YES	NO*	How Marked? (flags, paint, wooden stakes, etc.)	Comments
Natural Gas				
Electric Power				
Telephone Cable				
Sewer				
Storm Drain				
Water				
Steam				
Petroleum Product Lines				
Product Tank				
Septic Tank / Drain Field				
Overhead Power Line				

* all marked "no" require a call to the One- Call company or to the utility company.

APPROVAL OF UTILITY CLEARANCE:

SSHO: _____ Date: _____

Color Codes: Red = Electric, Orange = Phone/Cable TV, Yellow = Gas, Blue = Water, Green = Sewer, White = Proposed Excavation

APPENDIX 1: OVERHEAD UTILITY REQUIREMENTS

Summary of the 2 Federal Regulations below

If working in the vicinity of overhead power lines, precautions are taken so that the equipment/personnel and power lines do not come into contact by implementing one of the following:

- de-engergize and visiably ground electrical distribution and transmission lines at the point of work
- use insulated barriers that are not a part of the equipment to prevent contact with the lines
- if the power lines are not de-energized, operate equipment in the area ONLY if a safe minimum clearance is maintained as follows:
  - **At least 10 feet for lines rated 50 kilovolts (kV) or below**
  - At least 10 feet plus 0.4 inch for each kV above 50 kV; or maintain twice the length of the line insulator (but never less than 10-feet)

29 CFR 1910.333(c)(3)

(c) Working on or near exposed energized parts--(1) Application. This paragraph applies to work performed on exposed live parts (involving either direct contact or contact by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

(2) Work on energized equipment. Only qualified persons may work on electric circuit parts or equipment that have not been deenergized under the procedures of paragraph (b) of this section. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

(3) Overhead lines. If work is to be performed near overhead lines, the lines shall be deenergized and grounded, or other protective measures shall be provided before work is started. If the lines are to be deenergized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to deenergize and ground them. If protective measures, such as guarding, isolating, or insulating are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

Note: The work practices used by qualified persons installing insulating devices on overhead power transmission or distribution lines are covered by Sec. 1910.269 of this Part, not by Sec. Sec. 1910.332 through 1910.335 of this Part. Under paragraph (c)(2) of this section, unqualified persons are prohibited from performing this type of work.

(i) Unqualified persons. (A) When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

(1) For voltages to ground 50kV or below--10 ft. (305 cm);

(2) For voltages to ground over 50kV--10 ft. (305 cm) plus 4 in. (10 cm) for every 10kV over 50kV.

(B) When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded,

energized overhead lines than the distances given in paragraph (c)(3)(i)(A) of this section.

Note: For voltages normally encountered with overhead power lines, objects which do not have an insulating rating for the voltage involved are considered to be conductive.

29 CFR 1926.550(a)(15)(i), (ii), (iii)

(15) Except where electrical distribution and transmission lines have been deenergized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

(i) For lines rated 50 kV. or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet;

(ii) For lines rated over 50 kV., minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV. over 50 kV., or twice the length of the line insulator, but never less than 10 feet;

(iii) In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV., and 10 feet for voltages over 50 kV., up to and including 345 kV., and 16 feet for voltages up to and including 750 kV.

(iv) A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means;

(v) Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the requirements of any other regulation of this part even if such device is required by law or regulation;

(vi) Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded;

(vii) Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter shall be de-energized or tests shall be made to determine if electrical charge is induced on the crane. The following precautions shall be taken when necessary to dissipate induced voltages:

(a) The equipment shall be provided with an electrical ground directly to the upper rotating structure supporting the boom; and

(b) Ground jumper cables shall be attached to materials being handled by boom equipment when electrical charge is induced while working near energized transmitters. Crews shall be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load.

(c) Combustible and flammable materials shall be removed from the immediate area prior to operations.

APPENDIX D

HILLSIDE HOUSING AREA INTERIM ACTION AIR MONITORING RESULTS

FORM H
REAL TIME AIR MONITORING LOG

Date	Time	Site	Location*	Real Time Dust Monitor			Comments	Sampler
				Serial #	Reading (mg/m^3)			
					Conc	TWA		
10/7/08	0851	Hillside Housing	UG	5211	0.000	0.000		Shandi Fowler
"	1048	6045 Grid 4	EZ-~~6045 Grid 4~~	"	0.000	0.000	digging w/ handtools	"
"	1054	"	EZ	"	0.025	0.000	"	"
"	1120	6045 Grid 3	EZ	"	0.000	0.000	"	"
"	1322	6045 Grid 1	EZ	"	0.133	0.000	"	"
"	1355	Grid 5	EZ	"	0.016	0.000	"	"
"	1356	"	EZ	"	0.036	0.000	filling a sample bag	"
"	1440	Grid 6	EZ	"	RSF 0.745 ~~0.003~~	0.003	~~using a back~~ test Kits using bobcat ~~drill~~ auger	"
"	1545	Grid 7	EZ	"	0.019	0.002		"
"	1622	Grid 8	EZ	"	0.000	0.000	"	"
10/8/08	0845	Cover	~~EZ~~	5211	0.003	0.004		Shandi Fowler
"	0906	Grid 1	EZ	"	0.003	0.006	digging to locate utilities	"
10/9/08	0740	Excavation 6045	EZ	5211	0.002	0.001		Shandi Fowler
"	1336	"	EZ	"	0.176	~~0.053~~	"	"
"	1632	Trailer	UG	"	0.008	0.028		"
10/10/08	0744	"	UG	5211	0.000	0.000	just calibrated	Shandi Fowler
10/10/08	~~0~~1650	"	EZ	"	0.000	0.000		"
10/13/08	0700	"	~~EZ~~ UG	"	0.000	0.000	just calibrated	"
"	1155	Excavation Grid 7B	EZ	"	0.127	~~0.028~~	Max reading	"

* Upgradient (UG); Down Gradient (DG); or Exclusion Zone (EZ)

FORM H (cont)
REAL TIME AIR MONITORING LOG

Date	Time	Site	Location*	Real Time Dust Monitor			Comments	Sampler
				Serial #	Reading (mg/m^3)			
					Conc	TWA		
10/13/08	1250	Grid 17B	EZ	5211	—	0.029	Max TWA	Shandi Faulger
"	1653	Trailer	UZ	"	0.005	0.002	end of day	"
10/14/08	0720	Trailer	UZ	"	0.005	0.004	just calibrated	"
10/14/08	0830		EZ	"	0.001	0.003		"
10/14/08	0951		EZ	"	~~0.097~~ 0.602	~~0.602~~ 0.097	TSP	"
10/14/08	1640	Trailer	UZ	"	0.027	0.011		"
10/15/08	0725	Trailer	UZ	"	0.001	0.000	calibrated	"
10/15/08	0943		EZ	"	0.159	—	Max Reading	"
"	1312		EZ	"	—	0.076	Max TWA	"
"	1635	Trailer	UZ	"	0.011	0.014	End of day	"

** Upgradient (UG); Down Gradient (DG); or Exclusion Zone (EZ)*

KEMRON

CLIENT # K008
REPORT # 08-368

SUBMITTED BY:
CHESTER LabNet
12242 S.W. GARDEN PLACE
TIGARD, OR 97223
(503)624-2183/FAX (503)624-2653
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CHESTER LabNet

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Telephone 503-624-2183 ❖ Fax 503-624-2653 ❖ www.chesterlab.net

Case Narrative

Date: October 27, 2008

General Information

Client:	Kemron
Client Number:	K008
Report Number:	08-368
Sample Description:	37mm MCE
Sample Numbers:	08-C565– 08-C570

Analysis

Analytes:	Pb
Analytical Protocols:	Modified NIOSH 7300
Analytical Notes:	No problems were encountered during the analyses. The digestion was modified to be similar to EPA 3050. Heated HNO_3, HCl, and H_2O_2 was used instead of $HClO_4$ and HNO_3.
QA/QC Review:	All of the data have been reviewed by the analysts performing the analyses and the project manager. All of the quality control and sample-specific information in this package is complete and meets or exceeds the minimum requirements for acceptability.
Comments:	If you have any questions or concerns regarding this analysis, please feel free to contact the project manager.
Disclaimer:	This report shall not be reproduced, except in full, without the written approval of the laboratory. The results only represent that of the samples as received into the laboratory.

Paul Duda 10/27/08

Project Manager Date
Paul Duda

Client: K008 - Kemron
Report Number: 08-368

Lab ID: 08-C565
Client ID: HHAS01DG
Site: Fort Lewis
Sample Date: 10/ 7/08
Volume: 0.94 m³
Deposit Area: 8.04 cm²

Analyte	µg/filter Conc.	MDL	µg/m³ Conc.	MDL
ICP				
Pb	< MDL	0.200	< MDL	0.21270

Lab ID: 08-C566
Client ID: HHAS01UG
Site: Fort Lewis
Sample Date: 10/ 7/08
Volume: 0.92 m³
Deposit Area: 8.04 cm²

Analyte	µg/filter Conc.	MDL	µg/m³ Conc.	MDL
ICP				
Pb	< MDL	0.200	< MDL	0.21834

Lab ID: 08-C567
Client ID: HHAS01CG
Site: Fort Lewis
Sample Date: 10/ 7/08
Volume: 0.95 m³
Deposit Area: 8.04 cm²

Analyte	µg/filter Conc.	MDL	µg/m³ Conc.	MDL
ICP				
Pb	< MDL	0.200	< MDL	0.21110

Lab ID: 08-C568
Client ID: HHAS02DG
Site: Fort Lewis
Sample Date: 10/10/08
Volume: 1.16 m³
Deposit Area: 8.04 cm²

Analyte	µg/filter Conc.	MDL	µg/m³ Conc.	MDL
ICP				
Pb	< MDL	0.200	< MDL	0.17197

Client: K008 - Kemron
Report Number: 08-368

Lab ID: 08-C569
Client ID: HHAS02UG
Site: Fort Lewis
Sample Date: 10/10/08
Volume: 1.15 m^3
Deposit Area: 8.04 cm^2

Analyte	µg/filter Conc.	MDL	µg/m^3 Conc.	MDL
ICP				
Pb	< MDL	0.200	< MDL	0.17406

Lab ID: 08-C570
Client ID: HHAS02CG
Site: Fort Lewis
Sample Date: 10/10/08
Volume: 1.14 m^3
Deposit Area: 8.04 cm^2

Analyte	µg/filter Conc.	MDL	µg/m^3 Conc.	MDL
ICP				
Pb	< MDL	0.200	< MDL	0.17498

QA/QC Report

Client Name: Kemron
Project Number: K008
Analytical Technique: ICP - Optima 2000
Sample Description: 37mm MCE
Report Number: 08-368

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	MDL Conc. µg/L
Pb	ICB	< MDL	5.00
Pb	Prep_Blk	< MDL	5.00
Pb	*Meth_Blk**	*< MDL*	*0.200*
Pb	CCB	< MDL	5.00
Pb	CCB	< MDL	5.00

*: Method Blank concentration in µg/filter

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Pb	ICV	1000	1030	102.8
Pb	CCV	1000	1030	102.7
Pb	CCV	1000	1030	103.0

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
Pb	08-C565	< 5	< 5	N/C #

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
#: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

Laboratory Control Sample/Matrix Post Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Pb	LCS	< 5	949.	1000	94.9
Pb	08-C566	< 5	976.	1000	97.6

*: per EPA CLP protocol, control limits do not apply if spike concentration is less than 25% of the sample concentration

QA/QC Limits

Continuing Calibration: ± 10% *LCS: ± 20%*
Replicates: ± 20% RPD *Post Spikes: ± 25%*

Company Name		Phone
Kemron		
Contact: Shandi Fouler		Phone: 773-550-1757
E-Mail Address: sfouler@kemron.com		Fax
Report Address: 3155 Blackhawk Dr. Bldg 379, Ste. 17		
City: Fort Sheridan	State: IL	Zip: 60037
Billing Address: SAA		
City	State	Zip
PO#: CH0006	Project: Fort Lewis	

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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Turn Around Time
☒ Standard
☐ Rush ______________ Specify

LabNet ID	Field Sample ID	Site	Sample Date	Volume ~~(m³)~~ L	Particle Size	Analysis Requested: Lead									Remarks
08-C565	HHAS01DG	Fort Lewis	10/7/08	~~915.96~~	940.26 RSD	X									
08-C566	HHAS01UG	"	"	~~947.36~~	915.96 RSD	X									
08-C567	HHAS01CG	"	"	~~940.26~~	947.36 RSD	X									
08-C568	HHAS02DG	"	10/10/08	~~1142.56~~	1167.67 RSD	X									
08-C569	HHAS02UG	"	"	1141.91		X									
08-C570	HHAS02CG	"	"	1142.56		X									

Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time	Notes:
[signature] 10/22/08 1500	[signature] 10/23/08 9:25	
Relinquished By: (Signature) Date/Time	Received By: (Signature) Date/Time	

JOINT BASE LEWIS-MCCHORD
AGREED ORDER
STORMWATER POLLUTION PREVENTION PLAN
FOR INTERIM ACTION PLAN IMPLEMENTATION

FORMER MILLER HILL RANGES AND FORMER SKEET RANGE
JOINT BASE LEWIS-MCCHORD, WASHINGTON

Contract #: W91ZLK-05-D-0013/0002
KEMRON Project #: CH0006

8 March 2010

PREPARED FOR:

Joint Base Lewis-McChord Public Works - ED
ATTN: IMWE-LEW-PWE (R. Strickland)
Building 2012, Room 313
Joint Base Lewis-McChord, WA 98433-9500

and

ACA Aberdeen Proving Ground – W91ZLK
Directorate of Contracting
4118 Susquehanna Avenue
Aberdeen Proving Ground, MD 21005-3013

PREPARED BY:

KEMRON Environmental Services, Inc.
3155 Blackhawk Drive, Building 379, Suite 17
Fort Sheridan, IL 60037-1289

TABLE OF CONTENTS

LIST OF APPENDICES

Section 1.0 Site Evaluation, Assessment and Planning

1.1 Project/Site Information

Project/Site Name: Former Miller Hill Ranges and Former Skeet Range

Project Street/Location: Colorado Ave (Miller Hill) & NCO Beach Road (Skeet Range)

City: Joint Base Lewis-McChord State: WA ZIP Code: 98433

County or Similar Subdivision: Pierce

Latitude/Longitude (Use **one** of three possible formats, and specify method)

Latitude:	Longitude:
1. _ _ º _ _ ' _ _" N (degrees, minutes, seconds)	1. _ _ º _ _ ' _ _" W (degrees, minutes, seconds)
2. _ _ º _ _ . _ _' N (degrees, minutes, decimal)	2. _ _ º _ _ . _ _' W (degrees, minutes, decimal)
3. 47. 096918º N (decimal)(Miller Hill) 47. 110669º N (decimal)(Skeet Range)	3. -122.57999º W (decimal)(Miller Hill) -122.576128º W (decimal)(Skeet Range)

Method for determining latitude/longitude:

☐ USGS topographic map (specify scale: _____) ☐ EPA Web site ☐ GPS

☒ Other (please specify): ESRI ArcGIS 9.2, coordinate system WGS_1984_UTM_Zone_10N

Is the project located in Indian country? ☐ Yes ☒ No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."

Not Applicable

Is this project considered a federal facility? ☒ Yes ☐ No

NPDES project or permit tracking number*:WAR10BF4F

**(This is the unique identifying number assigned to your project by your permitting authority after you have applied for coverage under the appropriate National Pollutant Discharge Elimination System (NPDES) construction general permit.)*

This plan is based on the EPA SWPPP Template, Version 1.1, September 17, 2007

1.2 Contact Information/Responsible Parties

Operator:
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Subcontractor:
Clearing and Erosion Controls
TBD

Emergency 24-Hour Contact:
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206-225-3590 Mobile

Environmental Division, PW,
US Army
Ralph Strickland
253-966-1748

Joint Base Lewis-McChord
Stormwater Compliance
Kara Godineaux
Environmental Specialist
253-966-8004

1.3 Nature and Sequence of Construction Activity

KEMRON is planning to remediate the Flatlands Area of Miller Hill and the Skeet Range site in accordance with the Interim Action Plan (IAP) and the Interim Action Work Plan. The Miller Hill site is a collection of former small arms ranges located on the south side of Miller Hill. At each former range (except for the unnumbered pistol range in which a small berm was constructed), small arms were fired from firing lines on flat ground at targets placed in front of the undisturbed hillside which served as the backstop. The impact area (i.e., south-facing hillside) is approximately 0.5-miles-long. The Flatlands area of the site has been identified as the more gently sloping part of the hill up to the impact area that will be remediated. The Steep Hillside portion of Miller Hill will not be actively remediated. The Former Skeet Range, approximately 16-acres, was apparently used as a recreational skeet range. Shot was fired toward the northwest on flat land without a backstop. Lead is the primary contaminant of concern for both sites.

In general, the remediation activities proposed for both sites include excavation of lead impacted soils, treatment of excavated soils in a central treatment area at Former Miller Hill Ranges 62/67, and transporting treated soils to Joint Base Lewis-McChord Range 91, Range 13, and Range 103 for berm construction, maintenance, or repair. Site activities will include: clearing and grubbing; installing stabilized construction exits; installing erosion and sediment controls; construction and maintenance of temporary haul roads; excavation of lead impacted soils; treatment of excavated soils by physical screening and stabilization as needed; transportation of soils to Range 91; grading; and preparation for final seeding, mulching, and landscaping.

Excavated/treated soils will be trucked to three different ranges on Joint Base Lewis-McChord for berm construction, maintenance, or repair. Soils from Former Miller Hill Ranges will be taken to Joint Base Lewis-McChord Ranges 12 and 91. Soils from the Former Skeet Range will be taken to Range 103. KEMRON's scope with the Army is limited to transporting the soils to the active ranges. Once the soils are at the active ranges, the soil will be roughly shaped into side berms. Once the side berms are roughly shaped, the Army (Range office) will finish off /stabilize the berms in accordance with Army requirements for active ranges. Figures 12 and 13 (Appendix B) illustrate the truck routes from the sites to the ranges.

What is the function of the construction activity?

☐ Residential ☐ Commercial ☐ Industrial ☐ Road Construction ☐ Linear Utility
☒ Other (please specify): Remediation of Former Miller Hill Ranges and Former Skeet Range

Estimated Project Start Date: 03/15/2010

Estimated Project Completion Date: 09/09/2010

Estimated Timeline of Activity	Construction Activity and BMP Description
03/2010 – 04/2010	Before Any Site Work Begins: 1. Install initial perimeter silt fence 2. Install storm drain protection 3. Install gravel on access roads to former ranges 4. Conduct clearing leaving stumps and roots in ground 5. Establish clean backfill stockpiles and temporarily stabilize with erosion controls 6. Install remaining silt fence
06/2010 – 09/2010	Site Work: 1. Construct stabilized truck exit pads and access roads 2. Perform grubbing of stumps and roots 3. Establish clean backfill stockpiles and temporarily stabilize with erosion controls 4. Construct main treatment and storage areas 5. Establish hazardous materials storage area within the main treatment area 6. Install temporary office trailer and sanitary facilities 7. Conduct soil excavation activities 8. Perform soil treatment (gravels/cobbles separation, lead reclamation if required, stabilization if required) 9. Transport treated soil to Range 91or other range 10. Perform clean backfilling of excavated areas
08/2010 – 09/2010	Final Stabilization: 1. Remove all temporary control BMPs and stabilize any areas disturbed by the removal with erosion controls or final seeding 2. Install final seeding and tree sapling replacement 3. Monitor stabilized areas until final stabilization is achieved 4. Remove BMPs from storm drain inlets 5. Remove all erosion control measures and stabilize with erosion controls if necessary

1.4 Soils, Slopes, Vegetation and Current Drainage Patterns

Soil type: Silty sand with significant amount of cobbles and gravels in excess of ¾" size.

Slopes:

Miller Hill
The proposed area for excavation at the Miller Hill site extends from approximately 150 feet north of Colorado Avenue going up along the slope of Miller Hill to the demarcation line between the Flatlands area to the Steep Hillside. The elevation change going up the hill starts out with a gradual incline and becomes steep north of the proposed demarcation line into the Steep Hillside (see Figures 2 and 3). The remediation efforts are proposed for the Flatlands area. No earth moving activities are proposed for the Steep Hillside except along the toe within the impact areas. Miller Hill is approximately 100 to 120 feet high based on topographic map elevation contours.

After excavation activities, backfilling will occur in the excavated areas to the approximate original grade encountered at the onset of remediation activities or in accordance with approved IAP grading plans.

Skeet Range
The Skeet Range site is generally level across the site. After the select areas are excavated, backfilling will occur to the approximate original grade encountered at the onset of remediation activities.

Drainage Patterns:

Miller Hill

- The drainage patterns at Miller Hill flow down the hill following the topography of the site. Due to the soil types and topography at the site and many flat areas along the hill, the majority of the runoff at the site infiltrates into the hillside and flatlands as precipitation occurs. Relief along the base of the southern side of Miller Hill Ranges 62/67 slopes towards the west. The Hillside Housing Area at the western base of Miller Hill appears to be the lowest area based on topographic relief. At the Stone Education Center, a stormwater catch basin is present in the parking lot that collects stormwater runoff and sends the stormwater to two separate infiltration basins present in front of the Stone Education Center. There are also two storm drains located north of the Hillside Housing Area that drain into a local infiltration area. Figure 3 illustrates the location of the stormwater catch basin and the infiltration basins.
- After backfilling and grading activities, the drainage patterns would remain similar at the site, but may temporarily result in greater sheet flow velocities until the vegetation is reestablished. Some enhancements during final grading are expected to relieve ponding at the west end.

Skeet Range

- Site runoff at the Skeet Range construction site is not expected to enter the asphalt parking lot located to the west. In addition, access to the site will be from the northeast side to avoid any use of the parking lot. Runoff on the parking lot would enter one of the two stormwater catch basins that lead towards American Lake. For extra precaution, the closer of the two drains will be protected by installation of a silt dike plus silt fencing on the site itself. Figure 4 illustrates the location of the stormwater catch basins and American Lake.

- After backfilling and grading activities, the drainage patterns would remain unchanged but due to the level nature of the site would not result in additional runoff or a change in drainage patterns.

Vegetation:

Miller Hill
The Flatlands area of Miller Hill is mostly vegetated with grass and non-native invasive species such as Scot's Broom. There are a number of firs and oak trees along with dense undergrowth vegetation in much of the proposed excavation areas. The slopes are covered with a dense forest of firs.

Skeet Range
Before the site was fenced off to prevent access, the site was used for recreation/camping and a baseball field was present at the Skeet Range. The site is vegetated with grass and Scot's broom and other invasive species with a significant amount of undergrowth in the forested areas of the site.

1.5 Construction Site Estimates

The following are estimates of land disturbance at the remediation sites.

	Miller Hill	Skeet Range
Total project area (acres):	~30	~18
Construction site area to be disturbed (acres):	~4.5	~2
Percentage impervious area before construction:	0 %	0 %
Runoff coefficient before construction:	0.20	0.10
Percentage impervious area after construction:	0 %	0 %
Runoff coefficient after construction	0.20	0.10

1.6 Receiving Waters and Storm Sewer Systems

Miller Hill
At the Stone Education Center, a stormwater catch basin is present that collects stormwater runoff and sends the stormwater to two separate infiltration basins present in front of the Stone Education Center. At the Hillside Housing Area, two storm drains are located at the base of the western side of Miller Hill that also leads to an infiltration area. Stormwater catch basins near the former Miller Hill Ranges have the potential to discharge to Outfall 3 which eventually leads down a drainage canal to the Puget Sound. Figures 2 and 3 illustrate the location of the stormwater catch basins and the infiltration basins. No water leaves the site.

Skeet Range
The Skeet Range site is very flat with high percolation rates and runoff has not been observed at this site. Therefore, site runoff at the Skeet Range is not expected to leave the site. Water on the adjacent parking lot would enter one of the two stormwater basins that lead towards American Lake. However, no activities are planned on the parking lot. Stormwater catch basins near the Former Skeet Range discharge to American Lake via Outfall 90. Figure 4 illustrates the location of the stormwater catch basins within the parking lot.

There are no impaired waters or waters subject to Total Maximum Daily Load (TMDL) requirements.

1.7 Site Features and Sensitive Areas to be Protected

Miller Hill

Existing vegetation in the Steep Hillside of Miller Hill consisting of the dry forest dominated by Oregon White Oak and Douglas Fir that once dominated the otherwise prairie areas to the south of the Puget Sound will be preserved during site construction. Additionally, a former concrete firing shield wall is present in Range 42 of Miller Hill that will be preserved during construction activities.

No earth moving activities are proposed in the Steep Hillside area. This will preserve the native forest present there. Excavation activities in the vicinity of the historic concrete shield will be conducted in a manner to preserve the structure. Measures may include use of a mini-excavator, hand digging, or other methods to preserve the structure. Backfill may be placed against the base of the wall to further protect it.

Skeet Range
Existing vegetation consisting of old-growth trees (conifers) and undergrowth vegetation, surrounding the proposed project area will be preserved, to the extent practical, during site construction.

The forested area outside of the proposed cleanup area will not be disturbed.

1.8 Potential Sources of Pollution

Potential sources of sediment to stormwater runoff:

- Clearing and grubbing activities
- Excavation operations
- Screening of cobbles and gravels operations
- Possible lead reclamation operations
- Soil mixing with stabilization agents
- Vehicle tracking
- Backfill stockpiling and placement
- Grading operations
- Landscaping operations

Potential pollutants and sources, other than sediment, to stormwater runoff:

Trade Name Material	Stormwater Pollutants	Location
ECOBOND®	Phosphate and other proprietary ingredients	Miller Hill Range 62/67 Treatment Area
Diesel Fuel	Diesel Fuel/Petroleum Hydrocarbons	Miller Hill Range 62/67 Treatment Area
Hydraulic Fluid	Hydraulic Fluid/Mineral Oils	Leaks and broken hoses from heavy equipment in excavation areas
Gasoline	BTEX, PAHs, oxygenates	Support vehicles in support zone
Antifreeze/coolants	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	Leaks and broken hoses from heavy equipment in excavation areas
Portable toilets	Bacteria, parasites, and viruses	Support zone with office trailer

1.9 Endangered Species Certification

There are no known endangered or threatened species and critical habitats on or near the project area. However, according to Final Integrated Natural Resources Management Plan 2007 to 2011 prepared by ENSR in 2007, Joint Base Lewis-McChord is delineated as a Designated Conservation Area for the northern spotted owl because it provides connectivity between owl populations in the Cascade Range and the Olympic Peninsula. Approximately 58,000 acres of Joint Base Lewis-McChord has been designated as critical northern spotted owl habitat. However, northern spotted owls do not currently inhabit the installation.

Additionally, White Oak Woodlands are present on the Steep Hillside of Miller Hill. The Washington Natural Heritage Program has classified oak-dominated community types as "Priority 1," signifying they are in the greatest jeopardy of being destroyed and have very few common occurrences in their native condition (ENSR 2007). The Washington Department of Fish and Wildlife lists Oregon White Oak Woodlands as a Washington State Priority Habitat, acknowledging that the woodlands provide a unique and valuable type of wildlife habitat that is uncommon in the region.

The proposed cleanup of Miller Hill does not touch the White Oak Woodlands present in the Steep Hillside Area. Oak trees that are 4 inches or greater in diameter at waist height in the Flatlands area will be replanted at a 5:1 ratio during the final restoration of the site.

1.10 Historic Preservation

There are no historic sites on or near the construction site.

The Integrated Cultural Resources Management Plan dated February 2005 was reviewed. The former Concrete Firing Shield Structure located in Range 42 will be preserved although this is not a historic site per the Integrated Cultural Resources Management Plan dated February 2005.

1.11 Applicable Federal, Tribal, State or Local Programs

There are no Federal, Tribal, State or Local Programs at the site.

1.12 Maps

See Appendix A for the general site location map and Appendix B for site maps.

Section 2.0 Erosion and Sediment Control BMPs

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

Existing Vegetation

BMP Description: The Steep Hillside Area of Miller Hill where no active remediation will be performed will be separated from the Flatlands area of Miller Hill by a demarcation line agreed upon by Army, Ecology, and KEMRON. The Steep Hillside demarcation line will be marked by orange mesh construction fencing prior to the onset of excavation activities to protect the native vegetation present outside of the remediation areas. Vehicles and equipment will be kept inside the excavation area.

At the Skeet Range, silt fence will be used to mark the northern limits of disturbance at the site and the four-wire fence will protect existing vegetation outside of the remediation area. Existing vegetation north of the silt fence and outside of the fenced area of the site will not be disturbed during excavation activities. Vehicles and equipment will be kept inside the excavation area.

Installation Schedule: The demarcation line for the Steep Hillside will be marked with orange-colored plastic mesh fence before construction begins at the site. Silt fence will be installed at both sites before construction begins.

Maintenance and Inspection: After installation of the mesh fencing for demarcation of the Steep Hillside at Miller Hill, the fencing will be inspected monthly for damage and erosion and within 24 hours of the end of a storm event of 0.5 inches or greater prior to the full scale cleanup. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. During active remediation, the area will be inspected every 14 calendar days and within 24 hours of a storm event of 0.5 inches or greater to ensure the temporary fence is intact.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Backfill Stockpiles

BMP Description: There are several types of backfill soils to be stockpiled at the general staging area. These include clean gravel and cobbles, whether natural or screened, that will not require any BMPs due to their granular nature. These piles will be moved and used as backfill. Stockpiles of minus ¾-inch material from processing that are either treated or untreated, will ultimately (in less than 14 days) be hauled to Range 91. These piles will be located within the staging area that will be protected with silt fence. As such, they will not be covered. Clean backfill that contains fine material that are hauled on site for later use will be stockpiled as identified on the site maps (see Appendix B). The stockpiles will be in areas that will not interfere with construction phases and at least 15 feet away from paved areas. The slopes of the stockpile will be roughened by equipment tracking and will not exceed 2:1 to prevent erosion. A silt fence will be installed around the perimeter of each stockpile or work area, in accordance with the silt fence design specifications in Section 2.7. A lead contaminated soil stockpile, left

over from the Interim Action at the Hillside Housing Area, is located near the west end of Miller Hill. These stockpiles will also be covered with plastic sheeting secured with sandbags, stakes, etc. or temporarily stabilized with seeding for erosion control of soil stockpiles when the stockpile will be left in place for more than 14 days.

Installation Schedule: Fine-grained backfill stockpiles will be established during preparation and excavation activities. The silt fence will be installed after the stockpile has been established. Plastic covering will be installed or seed applied when the stockpile will be left in place for more than 14 days.

Maintenance and Inspection: During and after Phase I: the initial site preparation, the stockpiles will be inspected monthly for erosion and within 24 hours after storm events of 0.5 inches or greater prior to the full scale cleanup. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. Once the full scale cleanup begins (Phase II), the stockpiles will be inspected every 14 calendar days and within 24 hours of storm events of 0.5 inches or greater. Areas on or around the stockpile that have eroded will be stabilized with erosion controls. Maintenance and inspection procedures for the silt fence are described in Section 2.7.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

2.2 Phased Construction Activity

Phase I: Initial Site Preparation Work

BMP Description: As approved by Army and Ecology, site preparation work will be completed prior to the full scale cleanup to facilitate the establishment of the Steep Hillside demarcation line and to allow for completion of the work during the summer months when less rainfall is expected. The site preparation work that will be completed prior to the full scale cleanup includes the installation of erosion control devices at storm drains identified at the Stone Education Center at Miller Hill, Hillside Housing, and at the former Skeet Range, installation of perimeter silt fence where needed to allow clearing and grubbing of excavation areas without disturbing soil (stumps will be left in ground), surveying and staking of remediation grids, installation of field flagging to mark proposed Miller Hill Steep Hillside demarcation line, improvement of temporary access roads and construction exits (as needed) at Miller Hill, and preparation of areas for clean backfill stockpiles. To minimize potential erosion, only access roads necessary to reach the excavation areas at Miller Hill for the limited clearing will be improved as needed and a construction exit will be constructed as necessary. Limited clearing will be conducted which will include clearing brush and trees that will be stockpiled for chipping and mulching during the full scale cleanup. Clean backfill will be stockpiled as identified on the site maps (see Appendix B) in the prepared locations. The stockpiles will be in areas that will not interfere with construction phases and at least 15 feet away from paved areas. The slopes of the stockpile will be roughened by equipment tracking and will not exceed 2:1 to prevent erosion. A silt fence will be installed around the down slope side of each stockpile or work area, in accordance with the silt fence design specifications in Section 2.7 and at the discretion of the engineer. Stockpiles will also be covered with plastic sheeting secured with sandbags, stakes,

etc. or temporarily stabilized with grass seed for temporary erosion control of soil stockpiles when the stockpile will be left in place for more than 14 days.

Installation Schedule: For a timeline of construction activity, see Section 1.3.

Maintenance and Inspection: The prepared areas will be inspected monthly for erosion until the full scale cleanup commences because the existing vegetative cover will remain stabilizing the site. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. Areas on or around the stockpile that have eroded will be stabilized, as soon as practical, with erosion controls. Maintenance and inspection procedures for the silt fence are described in Section 2.7.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Phase II: Site Cleanup Work

BMP Description: The full scale cleanup for both sites will occur concurrently. In general, the remediation activities proposed for both sites includes excavation of lead impacted soils, treatment of excavated soils in a central treatment area at Former Miller Hill Ranges 62/67, and transporting treated soils to Joint Base Lewis-McChord Range 91 for berm construction, maintenance, or repair. Soil disturbing activities will include: clearing and grubbing; installing stabilized construction exits; maintaining erosion and sediment controls; construction of temporary haul roads; excavation of lead impacted soils; treatment of excavated soils by physical screening and stabilization if necessary; separation of lead containing bullets or shot from excavated soils as necessary; grading; and preparation for final seeding, mulching, and landscaping. Erosion controls will be installed before the full scale cleanup occurs. Site preparation work is proposed as Phase I to allow for completion of the full scale cleanup during June, July, and August during the time of year when there is less rainfall to limit erosion from the site.

Installation Schedule: For a timeline of construction activity, see Section 1.3.

Maintenance and Inspection: The remediation areas will be inspected every 14 calendar days for erosion and within 24 hours after storm events of 0.5 inches or greater during active remediation activities. Areas on or around the stockpile that have eroded will be stabilized with erosion controls. Maintenance and inspection procedures for the silt fence are described in Section 2.7.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

2.3 Control Stormwater Flowing Onto and Through the Project

Storm Drain Protection: Triangular Silt Dikes and Inlet Filtration Devices

BMP Description: Storm drains located at the Stone Education Center and Hillside Housing Area at Miller Hill and at the Skeet Range parking lot will be protected prior to any activities being conducted at the site. Triangular silt dikes and/or an inlet filtration device will be placed

in or around the storm drain to retain any sediment in stormwater flows leaving the project site. The five storm inlets identified near the sites (two at the Skeet Range and three at Miller Hill) are located in paved driveways or parking lot areas. The Skeet Range basin located nearest the site will receive both the dike and inlet basket; the basin farthest away will receive only the dike. The two drains at the Hillside Housing Area will receive dikes. The basin in the Stone Education parking lot will receive an inlet basket due to the high parking traffic expected in this area. The construction site near this drain basin will be protected with a silt fence and the area will receive extra attention and sweeping as necessary. The triangular silt dike will be placed on as many sides as possible depending on the location of the storm drain in proximity to concrete curbed areas. The triangular silt dike will be secured with sand bags to prevent movement during precipitation events. The inlet filtration devices will be placed inside the catch basins as described above to provide sediment protection. Typical design specifications are included in Section 2.6.

Installation Schedule: The triangular silt dike and inlet filtration devices will be installed before any activities are conducted at the site.

Maintenance and Inspection: After initial installation during site preparatory work (Phase I), the storm drain devices will be inspected monthly until the onset of active remediation because the existing vegetative cover will remain stabilizing the site. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. The storm drain erosion control devices will be inspected every 14 calendar days for sedimentation and within 24 hours after storm events of 0.5 inches or greater during active remediation activities. Any sedimentation damage or structural failures will be repaired as soon as practical. Accumulated sediments will be removed from the dike or inlet filtration device when one-third of the height of the dike or inlet filtration device is reached. Removed sediments will be spread uniformly in vegetated areas nearby.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

2.4 Stabilize Soils

Temporary Stabilization

BMP Description: Temporary vegetative cover will be established for remediation areas that have been excavated, sampled to confirm cleanup or remediation levels have been attained, and backfilled within 14 days after construction activity has temporarily ceased. Clean backfill soil stockpiles may also be seeded to temporarily stabilize these soils at the discretion of the engineer. The areas will be stabilized by seeding and/or mulching the area at the discretion of the engineer. Hydro seeding may be performed in larger areas requiring temporary stabilization at the discretion of the engineer. Seeding will be conducted during periods of the year when vegetation is more likely to be established.

Installation Schedule: Temporary stabilization measures will be applied to portions of the site where construction activities will temporarily cease for more than 14 days.

Maintenance and Inspection: Stabilized areas will be inspected every 14 calendar days and within 24 hours of storm events of 0.5 inches or greater until a dense cover of vegetation has become established. If failure is noticed at the seeded or mulched area, the area will be reseeded and/or mulched within one week.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Mulching

BMP Description: Mulching will provide immediate protection to exposed soils after backfilling, but before final stabilization. Mulch may be applied in areas that have been seeded for temporary or permanent stabilization. Straw mulch and wood chips will be applied uniformly by hand or by machine as a temporary stabilization measure. Permanent mulching application will be applied by machine with an application rate recommended by the seed manufacturer or at the discretion of the engineer. Crimping equipment may be used to provide additional binding to the soil. The mulch will cover 75 to 90 percent of the ground surface.

Installation Schedule: Mulch will be applied to portions of the site where construction activities will temporarily cease for more than 14 days or to seeded areas at the discretion of the engineer.

Maintenance and Inspection: Mulch will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater until a dense cover of vegetation during final stabilization has become established. If washout or erosion occurs, the surface will be repaired and new mulch applied.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Permanent Stabilization

BMP Description: Permanent stabilization will be done as soon as practical after the final design grades are achieved but no later than 14 days after construction ceases. Native species of plants will be used to establish vegetative cover on exposed soils. Permanent stabilization will be completed in accordance with the final stabilization procedures in Section 7.

Installation Schedule: Portions of the site where construction activities have permanently ceased will be stabilized, as soon as possible but no later than 14 days after construction ceases.

Maintenance and Inspection: All seeded or revegetated areas will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater until a dense cover of vegetation has become established. If failure is noticed at the seeded area, the area will be reseeded, fertilized, and/or mulched. After construction is completed at the site, permanently stabilized areas will be monitored until final stabilization is reached.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Dust Control

BMP Description: Dust from the site will be controlled by using a mobile pressure-type distributor truck to apply hydrant-supplied water to disturbed areas. The mobile unit will apply water at a rate to prevent runoff and ponding.

Installation Schedule: Dust control will be implemented as needed once soil excavation and treatment has been initiated and during windy conditions while excavation is occurring. Spraying of water will be performed as the dryness of the soil warrants it based on air monitoring levels for dust.

Maintenance and Inspection: At least one mobile watering unit will be available at all times to distribute water to control dust in the remediation areas. Each mobile unit will be equipped with a positive shutoff valve to prevent over-watering of the remediation area.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

2.5 Protect Slopes

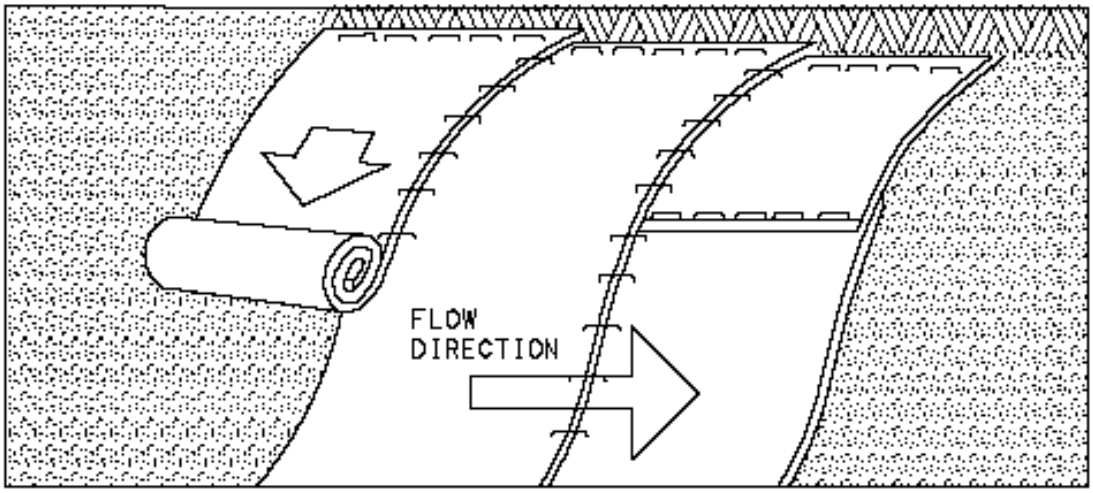
Erosion Control Blankets

BMP Description: Erosion control blankets will be used to provide stabilization for the slopes in the Former Range Areas of Miller Hill where slopes require additional stabilization measures to reestablish vegetation after the remediation. Straw, coconut or other natural material erosion control blanket will be utilized at the discretion of the engineer to stabilize slopes. The blankets may be installed to cover some areas entirely or may be used in strips to provide targeted stabilization of select slopes. The slopes will be seeded before the blanket is applied. The erosion control blanket will be installed according to the manufacturer's instructions and specifications. For design specifications, see below.

Installation Schedule: The erosion control blankets will be installed once the slopes of the remediated areas have reached final grade.

Maintenance and Inspection: The erosion control blankets will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater to determine if cracks, tears, or breaches have formed in the blanket. If so, the blanket will be repaired or replaced. Good contact with the soil will be maintained and erosion will not occur under the blanket. Any areas where the blanket is not in close contact with the ground will be repaired or replaced.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).



SLOPE INSTALLATION

Erosion Control Blanket
(NTS)

Design Specifications

1. Slope surface will be free of rocks, clods, sticks and grass. The blankets will have good soil contact.
2. Lay blankets loosely and staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations.

Gravels and Cobbles Application to Slopes

BMP Description: Gravels and cobbles recovered from the excavation activities will be used to provide stabilization for the slopes in some areas at Former Range Areas of Miller Hill especially in Ranges 62/67 where slopes require additional stabilization measures to prevent erosion. Gravels and cobbles larger than ¾" in size will be utilized at the discretion of the engineer and the Army to stabilize slopes. The gravels and cobbles will provide surface stabilization and roughening of the slopes to control erosion.

Installation Schedule: The gravels and cobbles will be installed once the slopes of the remediated areas have reached final grade.

Maintenance and Inspection: The gravels and cobbles will be inspected every 14 calendar days and within 24 hours of storm events of 0.5 inches or greater to determine if washouts or breaches have formed in the gravels and cobbles layer. If so, additional gravels and cobbles will be placed in these areas.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

2.6 Protect Storm Drain Inlets

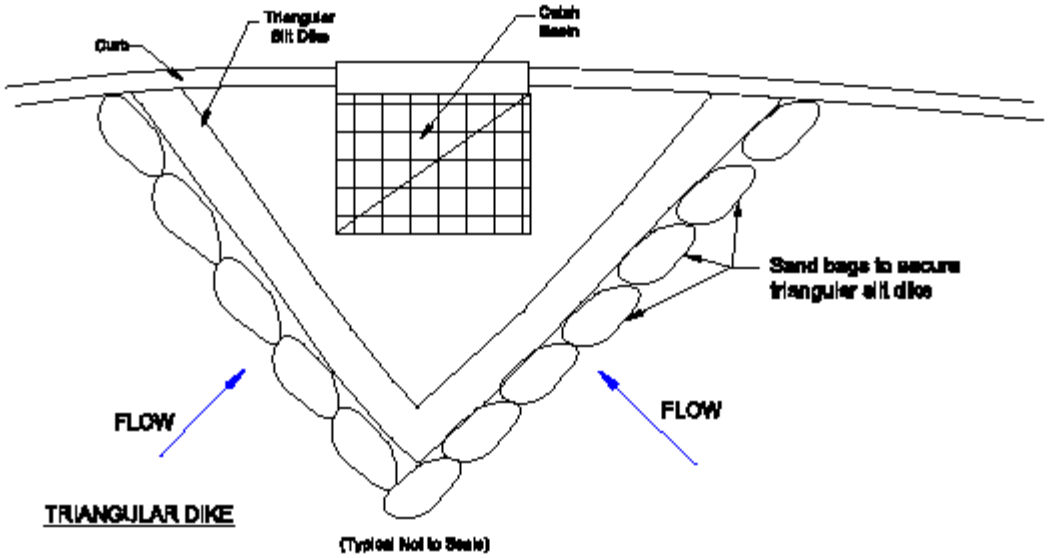
Storm Drain Protection: Triangular Silts Dike and Inlet Filtration Devices

BMP Description: Storm drains located at the Stone Education Center at Miller Hill, Hillside Housing and at the Skeet Range will be protected prior to any activities being conducted at the site. Refer to Section 2.3 for a description of the drainage basin locations and silt dikes and inlet basket devices to be used. Typical design specifications are included below.

Installation Schedule: The triangular silt dike and/or inlet filtration devices will be installed before any activities are conducted at the site.

Maintenance and Inspection: After initial installation during site preparatory work (Phase I), the storm drain devices will be inspected monthly until the onset of active remediation because the existing vegetative cover will remain stabilizing the site. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. The storm drain erosion control devices will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater during active remediation. Any erosion damage or structural failures will be repaired. Accumulated sediments will be removed from the dike or inlet filtration device when one-third of the height of the dike or inlet filtration device is reached. Removed sediments will be spread uniformly in vegetated areas nearby.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

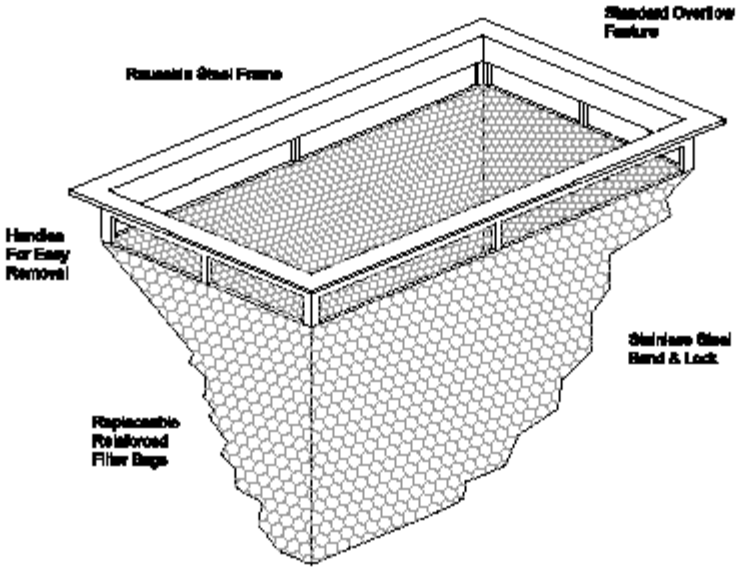


TRIANGULAR DIKE

(Typical Not to Scale)

Design Specification

1. Place triangular silt dike secured with sandbags to allow sediment to separate from runoff.
2. Install Inlet Filter per manufacturer's recommendations.



INLET FILTER

(Typical Not to Scale)

2.7 Establish Perimeter Controls and Sediment

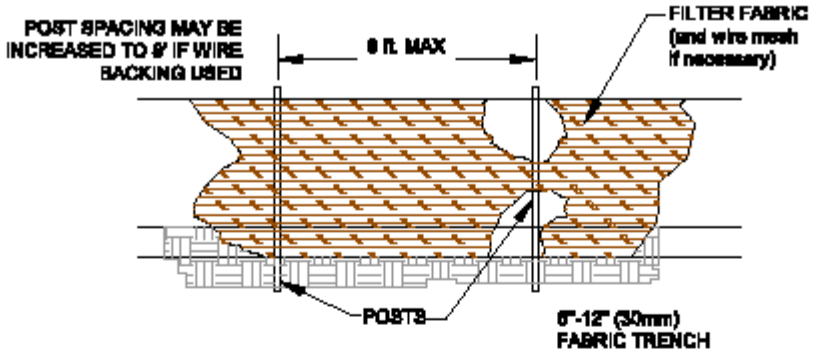
Silt Fence

BMP Description: Silt fences will be installed around the perimeter of the excavation areas on the down gradient boundaries of the work area and on side slopes at the discretion of the engineer, except at the two construction entrances (one at Skeet Range and one at Miller Hill). Silt fence will also be installed around the clean backfill stockpile areas. Silt fences will be installed by excavating a 6 to 12-inch-deep trench along the line of proposed installation. Wooden posts supporting the silt fence will be spaced approximately 6 feet apart and driven securely into the ground inside the trench; a minimum of 6 to 12 inches deep. The silt fence will be fastened securely to the wooden posts spaced every 24 inches at the top, mid section, and bottom of the wooden post. The bottom edge of the silt fence will extend across the bottom of the trench and the trench will be backfilled and compacted to prevent stormwater and sediment from discharging underneath the silt fence. For design specifications, see below.

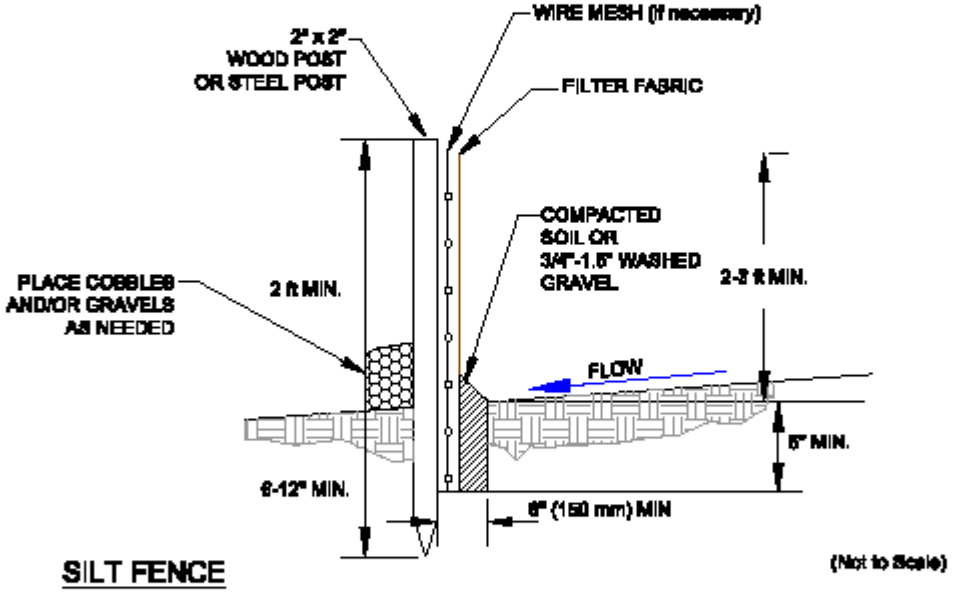
Installation Schedule: The silt fences will be installed before any intrusive remediation activities begin at the site and around backfill stockpiles once they have been established.

Maintenance and Inspection: After initial installation during site preparatory work (Phase I), silt fence will be inspected monthly until the onset of active remediation because the existing vegetative cover will remain stabilizing the site. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. Silt fences will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater during active remediation to ensure it is intact and that there are no gaps where the fence meets the ground or tears along the length of the fence. If gaps or tears are found during the inspection, the fabric will be repaired or replaced. Accumulated sediment will be removed from the fence base if it reaches one-third the height of the silt fence and hauled to Range 12, 103, or 91 with the treated soils as soon as they are deemed non-dangerous. If accumulated sediment is creating noticeable strain on the fabric and the fence might fail from a sudden storm event, the sediment will be removed more frequently. Before the fence is removed from the project area, the sediment will be removed. The anticipated life span of the silt fence is 6 months and will likely need to be replaced after this period.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).



FRONT VIEW



SILT FENCE

Design Specification

1. The silt fence will be constructed long enough to extend across the expected flow path.
2. The support posts will be a minimum of 2.5 feet and driven a minimum of 6 to 12 inches in the ground. Posts will be spaced a maximum of 6 feet apart.
3. A 6 to 12 inch trench will be excavated along the uphill side of the silt fence posts. The bottom edge of the fabric will extend across the bottom of the trench. The trench will be backfield to ground level and compacted to bury and secure the bottom of the filter fabric and posts.

2.8 Retain Sediment On Site

A sediment basin is not required as the disturbed area for this project is less than 5 acres. Silt fencing will be used at the down-gradient boundaries of the work areas and on side slopes at the discretion of the engineer and Army to retain sediment on site. Construction entrance / exits will be used to retain sediment/soil from vehicles entering and exiting the work areas. See BMP description for silt fence in Section 2.7 and Construction Entrance / Exits in Section 2.9.

2.9 Establish Stabilized Construction Exits

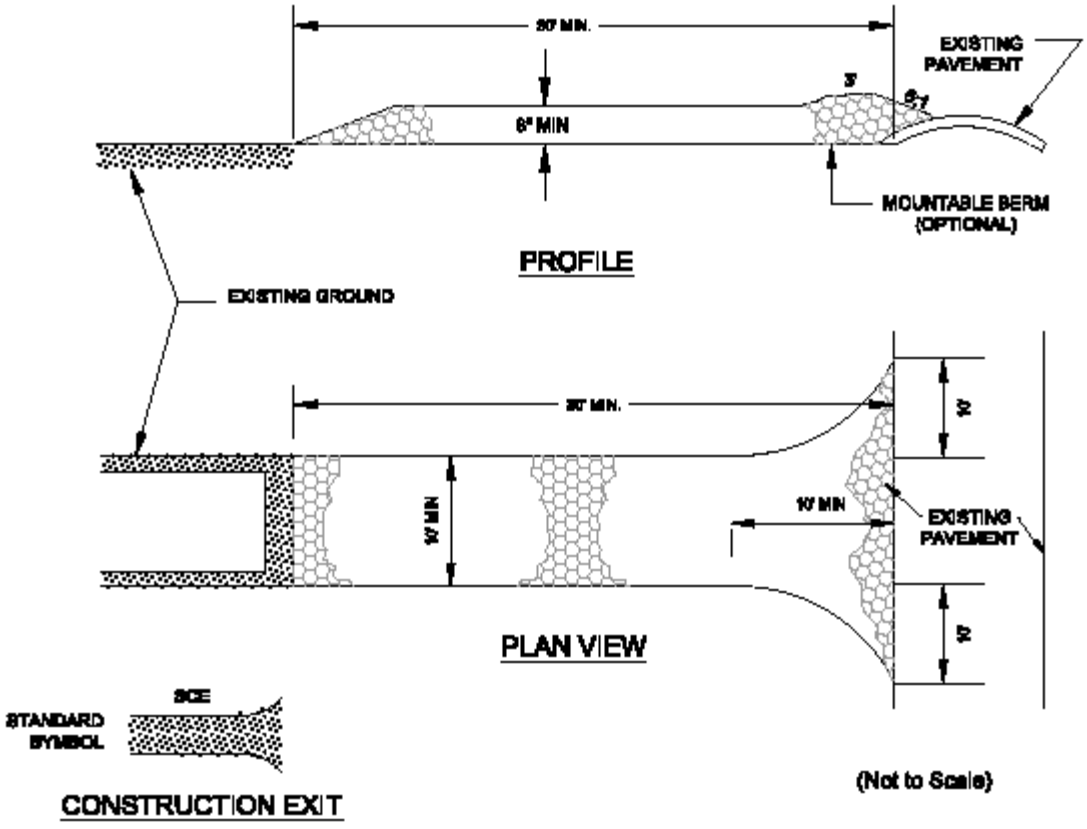
Stabilized Construction Entrance / Exits

BMP Description: Construction Entrance / Exits will be installed at each location, as identified on Figures 5 and 7, to prevent the off-site transport of sediment by construction vehicles. All truck traffic from the Former Miller Hill Ranges will be routed to and from the central processing and treatment area established at Former Ranges 62/67. Therefore, only one construction entrance/exit will be needed at the Former Miller Hill Ranges. Similarly, only one construction entrance/exit will be installed at the Former Skeet Range. The stabilized construction entrances/ exits will be at least 30 feet long, a minimum of 10 feet wide, flared at the end closest to the paved road, and will consist of a 6–inch-thick layer of crushed stone (2 inches in diameter or larger). Orange-colored plastic mesh fence will be installed along the length of the construction exit to keep construction vehicles and equipment on the stone truck pad. For design specifications, see below.

Installation Schedule: The stabilized construction entrance / exit will be installed before construction begins on the sites. The stone truck pads will remain in place until the final stabilization vegetation is installed at the site.

Maintenance and Inspection: Construction entrances / exits will be inspected monthly until the onset of active remediation because the existing vegetative cover will remain stabilizing the site and truck traffic is not anticipated. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. During active remediation of the site, construction exits will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater or more frequently during periods of heavy use. The exit to the construction site will be maintained in a condition that will prevent sediment tracking offsite. This could require adding additional crushed stone to the exit. All sediment tracked, spilled, dropped, or washed onto the road will be swept up and included with soils hauled to Range 12, 91 or 103. Once sediment clogs the voids in the crushed stone and the effectiveness of the truck pad is no longer keeping sediment on the site, the pad will be top dressed with new crushed stone. Replacement of the entire pad might be necessary when the pad becomes completely filled with sediment. The pad will be reshaped as needed for drainage and runoff control. Broken road pavement as a result of construction activities on roadways immediately adjacent to the project site will be repaired as soon as practical.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).



Design Specification

1. Stone applied to the pad will be 2-inch stone or larger.
2. The length of the pad will not be less than 50 feet.
3. The thickness of pad will not be less than 6 inches.
4. The width of pad will be minimum of 10 feet.

Wheel Wash/Tire Bath

BMP Description: If the rocked construction entrances/exits are not preventing sediment from being tracked onto the pavement, a portable wheel wash or tire bath will be installed as an additional BMP to prevent sediment from leaving the site. The portable wheel wash or tire bath will be installed before the rocked construction entrance/exit and the pavement to remove any retained sediment prior to the trucks entering the paved roadways. It is anticipated that two portable wheel washes or tire baths may be installed, one at the Former Miller Hill Ranges and one at the Former Skeet Range. A commercially available portable aluminum wheel wash that is self-powered, self-contained, and includes sediment settling pans may be used. Alternatively, a tire bath may be used that would be composed of polyethylene tub like structure partially buried to allow clearance for the trucks to drive through prior to travelling over the rocked construction entrance / exit. The tire bath will be installed with a small grade change to allow sediment to flow to the low side of the bath to help prevent re-suspension of sediment. A drainpipe may be installed in the low side of the bath to allow for easy cleaning and refilling.

Installation Schedule: The wheel wash or tire baths will be installed if rocked construction entrances/exits are not preventing sediment from being tracked onto the pavement. If the wheel wash or tire bath is determined to be needed, they will remain in place until the final stabilization vegetation is installed at the site.

Maintenance and Inspection: Wheel washes and/or tire baths will be inspected monthly until the onset of active remediation because the existing vegetative cover will remain stabilizing the site and truck traffic is not anticipated. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. During remediation of the site, wheel washes and/or tire baths will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater or more frequently during periods of heavy use. The wheel wash or tire bath should start out the day with fresh water. The wash water should be changed a minimum of once per day. If more than 10-20 trucks per hour are expected, the wash water will need to be changed more often. Wheel wash or tire bath wastewater will be utilized onsite for dust control. The exit to the construction site will be maintained in a condition that will prevent sediment tracking offsite.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Construction Road/Parking Area Stabilization

BMP Description: Temporary access roads are currently present at both the Former Miller Hill Ranges and the Former Skeet Ranges. The access roads are gravel and will be utilized during the cleanup of the sites. The access roads will be stabilized by a two to six inch layer of two to four-inch crushed rock, gravel base, or commercially available crushed surfacing base to a depth sufficient to prevent sediment tracking. It is anticipated that light passenger trucks, idle dump trucks, or other necessary vehicles will be parked on the paved parking areas in the immediate vicinity of the sites (i.e. parking lots at the Stone Education center and the Former Skeet Range). If additional non-paved parking areas are required during the course of the cleanup, a crushed rock or gravel base temporary parking area will be installed. This area will be covered with an adequate depth of crushed rock or gravel base to create a stable parking surface and reduce the

potential for erosion and sediment tracking. Overnight parking of vehicles is not anticipated. Heavy equipment onsite for the excavation activities will be parked in the central processing and treatment areas or at the Skeet Range and secured while KEMRON personnel or subcontractors are not onsite. The access roads will not exceed a 15 percent grade. Runoff is anticipated to sheet flow into the heavily vegetated undisturbed areas or areas where silt fencing has been installed to retain sediment onsite. Additionally, drainage ditches present along the access roads are expected to receive site runoff that will be directed to silt fencing surrounding the proposed excavation areas.

Installation Schedule: The stabilized construction roads and/or parking areas will be installed before construction begins on the sites. The stabilized access roads and/or parking areas will remain in place until the final stabilization vegetation is installed at the site.

Maintenance and Inspection: Stabilized access roads and/or parking areas will be inspected monthly until the onset of active remediation because the existing vegetative cover will remain stabilizing the site and truck traffic is not anticipated. Because the work at the site will be conducted in two phases and Phase I will not include disturbing the soils that are stabilized by vegetation, in accordance with the EPA Construction General Permit Part 4B, monthly inspections are deemed appropriate. During remediation of the site, stabilized access roads and/or parking areas will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater or more frequently during periods of heavy use. The stabilized access roads and/or parking areas to the construction site will be maintained in a condition that will prevent sediment tracking offsite. This could require adding additional crushed stone, gravel base, or other stabilization agents to the access roads and/or parking areas to areas that have eroded.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

2.10 Additional BMPs

Street Cleaning/Sweeping

BMP Description: Street sweeping will be conducted as needed if sediment is noted leaving the remediation area onto paved roads or parking areas such as Colorado Avenue at Miller Hill. Sweeping or cleaning of the roads may be done with air blowers, manually by hand sweeping, or by machine. Sediment recovered by hand methods will be returned to the site.

Installation Schedule: Street cleaning/sweeping will occur as needed as determined by on-site project management and the Army.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Dump Truck/Dump Trailer Tarps

BMP Description: All dump trucks or dump trailers that will be utilized during the cleanup of the site, whether used to deliver stabilization materials (i.e. gravel, crush and run, etc.), deliver backfill material, or transport treated soils to active Ranges 12, 91, or 103 will have the truck contents covered by a tarp system to prevent tracking of sediment or materials. Each truck will

be equipped with a tarping system constructed of an appropriate material of construction for the load. Various types of tarps are used by different trucking companies to include flip/arm tarps, manual pull tarp, cable tarps, or waste tarps (quick flip). The proposed truck routes for transporting excavated or treated soils to Ranges 12, 91, or 103 is illustrated on Figures 12 and 13.

Installation Schedule: All dump trucks or trailers will be equipped with an appropriate tarping system to prevent sediment tracking or incidental material losses.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Section 3.0 Good Housekeeping BMPs

3.1 Material Handling and Waste Management

General Refuse/Waste Management

BMP Description: All general refuse/waste materials will be collected and disposed of into dumpsters in the main treatment area or smaller trash receptacle adjacent to the office trailer. Dumpsters and other trash receptacles will be placed away from stormwater conveyances and drains, and meet all federal, state, and local Army solid waste management regulations. Only trash and construction debris from the site will be deposited in the dumpsters and other trash receptacles. All personnel will be instructed, during daily tailgate safety sessions, regarding the correct procedure for disposal of trash and construction debris. On-site management will be responsible for ensuring general refuse and construction wastes are managed appropriately.

Installation Schedule: Dumpsters and other trash receptacles will be installed once the main treatment area and office trailer are established at the site.

Maintenance and Inspection: The dumpsters and trash receptacles will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater. The dumpsters and trash receptacles will be emptied as needed by a subcontractor in accordance with local, state, and federal regulations.

Responsible Staff: KEMRON/Trash Subcontractor(s).

Hazardous Materials Management

BMP Description: All hazardous materials such as petroleum products, equipment maintenance fluids, etc. will be stored in structurally sound; manufacturer supplied shipping containers in the hazardous materials storage area and segregated from other materials. Secondary containment will be provided for all materials in the hazardous materials storage area and will consist of commercially available spill pallets, drip pans, soil berms or other form of containment. Additionally, all hazardous materials will be managed in accordance with federal, state, and local Army regulations. If it becomes necessary to declare these materials a waste for disposal, management will ensure that the materials are properly characterized for disposal in accordance with federal, state, and local Army regulations. All personnel will be instructed, during daily tailgate safety sessions, regarding proper procedures for hazardous material management. On-site management will be responsible for ensuring hazardous materials are managed appropriately. The soil stabilizing reagent, ECOBOND®, although non-hazardous, will be stored within the contamination zone and will be covered by a tarp prior to the onset of rain storms and if left unused for periods in excess of 14 days.

Installation Schedule: Shipping containers used to store hazardous materials will be installed once the main treatment area and office trailer are established at the site.

Maintenance and Inspection: The hazardous materials storage area will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater. The storage areas

will be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Material safety data sheets, material inventory, and emergency contact numbers will be maintained in the office trailer.

Responsible Staff: KEMRON/MT2.

Sanitary Waste

BMP Description: At least one temporary sanitary facility (portable toilet) will be provided at the site adjacent to the office trailer and at the main treatment area at Miller Hill. A toilet may also be located at the Skeet Range site. The toilet will be away from concentrated flow paths and traffic flow and will have collection pans underneath to contain waste and provide secondary containment.

Installation Schedule: The portable toilet(s) will be brought to the site once the combined office trailer and main treatment area has been established.

Maintenance and Inspection: All sanitary waste will be collected from the portable toilet(s) a minimum of once per week by a local subcontractor. The toilet(s) will be inspected at least every 14 calendar days for evidence of leaking holding tanks. Toilets with leaking holding tanks will be removed from the site and replaced with new portable toilets.

Responsible Staff: KEMRON/Local Vendor.

3.2 Establish Proper Building Material Staging Areas

Main Treatment/Staging Area

BMP Description: Construction equipment and support materials will be stored at the main treatment/staging area of the site in Range 62/67 of Miller Hill. The main treatment/staging area is located up gradient of the perimeter silt fence. A shipping container may be located adjacent to the office trailer to store small tools, small parts, and other construction materials and equipment. All hazardous materials such as petroleum products and equipment maintenance fluids will be properly stored in manufacturer supplied shipping containers in the hazardous materials storage area and segregated from other materials.

A main treatment/staging area is not anticipated at the Skeet Range. The Skeet Range is considered a satellite site and soils will be excavated, screened on site and trucked to Range 91 or other range after gravels and cobbles separation. Similarly, the excavated soils at Range 42 and the unnumbered pistol range will be trucked back to the main staging area at Ranges 62/67.

Installation Schedule: The main treatment/staging area will be constructed after clearing and grubbing and some light grading work is conducted at the site.

Maintenance and Inspection: The main treatment/staging area will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater. The treatment area will be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for

the materials being stored. Material safety data sheets, material inventory, and emergency contact numbers will be maintained in the office trailer.

Responsible Staff: KEMRON/MT2.

3.3 Designated Washout Areas

A washout area will not be necessary at the site.

3.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Vehicle Fueling and Maintenance

BMP Description: Several types of vehicles and equipment will be used on site throughout the project, including graders, excavators, loaders, grizzly screens, rollers, trucks and trailers, backhoes, and skid steer loaders (Bobcat). All major equipment/vehicle fueling and maintenance will be performed off site or on site by a subcontractor. A small, 100-gallon pickup bed fuel tank will be used to refuel some equipment, during initial site preparatory activities and especially at the satellite sites (e.g., Skeet Range, Range 42 and unnumbered pistol range). A small aboveground storage tank (AST) will be kept in the staging area to fill equipment. Fueling points are illustrated on Figures 2, 3 and 4. Only minor equipment maintenance will occur on site. Significant equipment repairs will not be conducted on site unless equipment failure occurs and repairs must be completed on site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets. Absorbent, spill-cleanup materials and spill kits will be available at the main treatment/staging area. Drip pans will be placed under all equipment receiving maintenance.

Installation Schedule: Equipment and vehicle maintenance and fueling practices will be implemented at the beginning of construction on site.

Maintenance and Inspection: Inspect equipment/vehicle storage areas, fueling points, and fuel tank every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater. Vehicles and equipment will be inspected each day of use. Leaks will be repaired as soon as possible, or the problem vehicle(s) or equipment will be removed from the project site. Keep ample supply of spill-cleanup materials on site and immediately clean up spills and dispose of materials properly.

Responsible Staff: KEMRON/MT2.

3.5 Control Equipment/Vehicle Washing

All equipment and vehicle washing will be performed off-site.

3.6 Spill Prevention and Control Plan

Spill Prevention and Control Procedures

BMP Description: Spill response procedures to be followed in the event of a spill are as follows:

1. Protect yourself and others. PPE and spill kits are available in the main treatment/staging area.
2. Take immediate corrective action to stop the source of the spill.
3. The person who discovers the spill must initially notify the on-site supervisor and inform him/her of the nature of the spill.
4. The Emergency Coordinator, On-site Supervisor, or his/her assignee, will then record the date and time that the spill was reported, evaluate the need for spill response and, as needed, dispatch a cleanup crew.
5. The Emergency Coordinator or his/her assignee will notify all individuals required to secure and contain the spill, and to initiate cleanup procedures. KEMRON management is responsible for proper notification to the Army's Environmental Division, Federal, State, and local agencies as necessary. All emergency and non-emergency spills must be reported by calling 911. Spills large enough to cause a discharge to surface waters will be reported to the Army first at 253-966-1748, attention Ralph Strickland, and the National Response Center at 1-800-424-8802, as required. Joint Base Lewis-McChord personnel will conduct the proper reporting to the regulators.
6. Spilled materials will be properly containerized and disposed in accordance with Federal, State, and local regulations.

In addition to the spill response procedures noted above, all personnel working on site will be trained on spill response procedures during daily tailgate meetings as specified in Section 6.3. Additionally, several good housekeeping practices will be employed to minimize the potential for spills at the sites. The good housekeeping practices to be employed include:

- Vehicle Maintenance: Vehicles and equipment will be maintained off-site. All vehicles and equipment including subcontractor vehicles will be checked for leaking oils and fluids. Vehicles with leaking fluids will not be allowed on site.
- Hazardous Materials Storage: Hazardous materials will be stored in accordance with Section 3.1 and Federal, State, and local regulations and guidelines.
- Spill Kits: Spill kits will be located at the main treatment/staging areas.
- Material safety data sheets, material inventory, and emergency contact numbers will be maintained in the office trailer.

Installation Schedule: The spill prevention and control procedures will be implemented at the beginning of site preparation activities and construction on site.

Maintenance and Inspection: All personnel will be instructed, during daily tailgate training sessions regarding the correct procedures for spill prevention and control. The individual who manages day-to-day site operations will be responsible for seeing that these procedures are followed.

Responsible Staff: KEMRON/MT2.

3.7 Any Additional BMPs

No additional BMPs have been identified.

3.8 Allowable Non-Stormwater Discharge Management

Any changes in construction activities that produce other allowable non-stormwater discharges will be identified, and the SWPPP will be amended and the appropriate erosion and sediment control will be implemented.

Water Used to Control Dust

BMP Description: Dust control will be implemented as needed once site excavation activities have been initiated and during windy conditions while site grading and remediation activities are occurring. Dust from the site will be controlled by using a mobile pressure-type distributor truck to apply hydrant water to disturbed areas. The mobile unit will apply water at a rate to prevent runoff and ponding. Water will be applied whenever the dryness of the soil warrants it based on air monitoring results.

Installation Schedule: Dust control will be implemented as needed once soil excavation and treatment has been initiated and during windy conditions while excavation is occurring. Spraying of hydrant water will be performed as the dryness of the soil warrants it based on air monitoring levels for dust.

Maintenance and Inspection: At least one mobile watering unit will be available at all times to distribute hydrant water to control dust in the remediation areas. Each mobile unit will be equipped with a positive shutoff valve to prevent over watering of the remediation area.

Responsible Staff: KEMRON or KEMRON Subcontractor(s).

Vegetation and Landscape Irrigation

BMP Description: Irrigation waters will not be sprayed onto impermeable surfaces such as paved driveways and roads. Waters will be directed onto soil and revegetated areas by using hoses and correctly sized sprinklers with adjustable spray patterns. The irrigated area will be inspected for excess watering and to adjust watering times and schedules.

Installation Schedule: Vegetation and landscaping irrigation will commence after final stabilization of the site. Irrigation activities will be conducted in accordance with the manufacturer's recommendations to ensure an adequate strand of grass is established and to maintain trees and shrubs used for final stabilization.

Maintenance and Inspection: Vegetation and landscaping will be inspected weekly until grasses are established on the remediated areas.

Responsible Staff: KEMRON or Subcontractor(s).

Section 4.0 Selecting Post-Construction BMPs

Erosion Control Blankets

BMP Description: Erosion control blankets will be used to provide stabilization for the slopes in the Former Range Areas of Miller Hill where slopes require additional stabilization measures to reestablish vegetation after the remediation. Straw, coconut or other natural material erosion control blanket will be utilized at the discretion of the engineer to stabilize slopes. The blankets may be installed to cover some areas entirely or may be used in strips to provide targeted stabilization of select slopes. The slopes will be seeded before the blanket is applied. The erosion control blanket will be installed according to the manufacturer's instructions and specifications. For design specifications, see Section 2.5.

Installation Schedule: The erosion control blankets will be installed once the slopes of the remediated areas have reached final grade or after additional areas have been identified for replacement blankets.

Maintenance and Inspection: The erosion control blankets will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater to determine if cracks, tears, or breaches have formed in the blanket. If so, the blanket will be repaired or replaced, as soon as practical. Good contact with the soil will be maintained and erosion will not occur under the blanket. Any areas where the blanket is not in close contact with the ground will be repaired or replaced.

Responsible Staff: KEMRON or Subcontractor(s).

Section 5.0 Inspections

5.1 Inspections

1. Inspection Personnel:

- Mark Roberts is responsible for site compliance with this SWPPP and EPA's Construction General Permit. Mr. Roberts will conduct inspections for all areas of the site disturbed by construction activity, areas used for storage of materials that are exposed to precipitation, discharge points, and construction exits.

  In the absence of Mr. Roberts, the on-site KEMRON Site Supervisor or his/her designee, will conduct inspections.

- Qualifications:

  1. Mr. Roberts has over 18 years of experience complying with stormwater regulations.
  2. Mr. Roberts has developed construction and industrial SWPPPs for Federal and commercial clients as well as providing personnel training for implementation of the SWPPPs.

2. Inspection Schedule and Procedures:

The CGP requires inspections (1) at least once every 7 days or (2) at least once every 14 days and within 24 of the end of a storm event of 0.5 inches or greater. Additionally, if the entire site is stabilized or meets other conditions in Sections 4B or 4F of EPA's Construction General Permit, the inspection frequency can be reduced to at least once a month. Because of the phased approach to conducting the remediation at the site, after the initial site preparation work in Phase I is completed and the site remains stabilized, SWPPP inspections will be conducted monthly until Phase II is implemented. Once Phase II of the remediation is commenced, site inspections will be conducted at least once every 14 days and within 24 hours after each major storm event of 0.5 inches or greater. The inspections will verify that all BMPs required in Sections 2 and 3 are implemented, maintained, and effectively minimizing pollutants in stormwater runoff from the project site. For detailed inspection procedures for each BMP implemented at the site, see Sections 2 and 3.

If corrective actions are identified by Mr. Roberts during the inspection for areas under day-to-day control by KEMRON, he will notify and submit a copy of the inspection report to the Project Manager, Mr. Larry Emerson, P.E. and the Site Supervisor. Mr. Emerson will be responsible for initiating the corrective action within 24 to 72 hours of the report and completing maintenance as soon as possible or before the next storm event. For a copy of the inspection report, see Appendix E.

5.2 Delegation of Authority

Duly Authorized Representative:

KEMRON Environmental Services, Inc.
Mark Roberts
P.O. Box 274, 18210 Roberts Road - KPN
Vaughn, WA 98394
253-884-6784
253-884-2196 Fax
mroberts@kemron.com

A copy of the signed delegation of authority form is included in Appendix K.

5.3 Corrective Action Log

See Appendix F – Corrective Action Log.

Section 6.0 Recordkeeping and Training

6.1 Recordkeeping

Records will be retained for a minimum period of at least 3 years after the permit is terminated.

Appendix I – Grading and Stabilization Activities Log, will contain the dates when major grading activities occur; when construction activities temporarily or permanently cease on a portion of the site; and when an area is either temporarily or permanently stabilized.

6.2 Log of Changes to the SWPPP

See Appendix G – SWPPP Amendment Log

6.3 Training

Mr. Mark Roberts is assigned to the responsibility of training. The description of training to be conducted includes:

- General Stormwater and BMP awareness.
  Mr. Roberts will conduct informal training for all staff, including subcontractors, on the site. The training will be conducted primarily via tailgate sessions and will focus on avoiding damage to stormwater BMPs and preventing illicit discharges. The tailgate sessions will be conducted initially before work commences and as needed during the remediation at the site. The training will address the following topics: Erosion Control BMPs, Sediment Control BMPs, Non-Storm Water BMPs, Waste Management and Materials Storage BMPs, and Emergency Procedures specific to the construction site. (See Appendix J – Training Log)

- Detailed training for staff and subcontractors with specific stormwater responsibilities.
  Mr. Roberts will provide formal training to all staff and subcontractors with specific stormwater responsibilities, such as installing and maintaining BMPs. The formal training will cover all design and construction specifications for installing the BMPs and proper procedures for maintaining each BMP. Formal training will occur before any BMPs are installed on the site. (See Appendix J – Training Log)

Section 7.0 Final Stabilization

Permanent Stabilization

BMP Description: Permanent seeding will be applied as soon as practical after the final design grades are achieved on portions of the site but no later than 14 days after construction activities have permanently ceased. After the entire site is stabilized, any sediment that has accumulated will be removed and spread uniformly in vegetated areas nearby. Construction debris, trash and temporary BMPs (including silt fences, material storage areas, sanitary toilets, and inlet protection) will also be removed and any areas disturbed during removal will be seeded immediately.

Seedbed Preparation

a. The seedbed will be free of large clods, rocks, woody debris and other objectionable materials. The subsoil will be backfilled capable of sustaining vegetation.
b. Fertilizer, lime, or other nutrients will be applied to the seedbed according to the manufacturer's recommendations and at the discretion of the Engineer.
c. The top layer of soil will be loosened to a depth of 3-5 inches by raking, tilling or other suitable means.

Grass Selection/Application (Miller Hill and Skeet Range)

a. Excavation areas at the site will be stabilized with a mixture of Fescue and Rye or equivalent grass at an application rate specified by the manufacturer.
b. Seed will be applied uniformly by hydro seeding or broadcasting. Where broadcasting is used, the seed will be covered with .25 inches of soil or less, by cultipacking or raking. Certain areas of the site may be reseeded by hand depending on the locations and at the discretion of the engineer.

Shrubs and Tree Selection/Planting Plan (Miller Hill only)

a. Native shrubs or other suitable ground cover may be used in areas where slopes are steeper or at the discretion of the engineer or Army. The native shrubs and ground cover that may be used in certain areas of Miller Hill include Kinikink, Oregon Grape Plants, or Salal.
b. Oak trees that are 4 inches or greater in diameter at waist height and are present in the proposed excavation areas will be replanted at a 5:1 ratio in the Buffer Zone extending from the Hillside Housing Area into Former Ranges 62/67.
c. Trees and shrubs will be planted in accordance with the manufacturer's recommendation on spacing, nutrient additions, depth, etc. to ensure successful plantings throughout the excavation areas.
d. Wood chips will be applied to the oak planting area generated from the brush and trees cleared from the area.

Mulching

a. Hydro mulch may be applied immediately following seeding at the discretion of the engineer.

Installation Schedule: Portions of the site where construction activities have permanently

ceased will be stabilized, as soon as possible but no later than 14 days after construction ceases.

Maintenance and Inspection: All seeded or revegetated areas will be inspected every 14 calendar days and within 24 hours after storm events of 0.5 inches or greater until a dense cover of vegetation has become established. If failure is noticed at the seeded area, the area will be reseeded, fertilized, and/or mulched, as soon as practical. After construction is completed at the site, permanently stabilized areas will be monitored until final stabilization is reached.

Responsible Staff: KEMRON or Subcontractor(s).

Section 8.0 Certification and Notification

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

Name: Larry Emerson, P.E. Title: Project Manager, KEMRON Environmental Services, Inc

Signature:  Date: 8 March 2010

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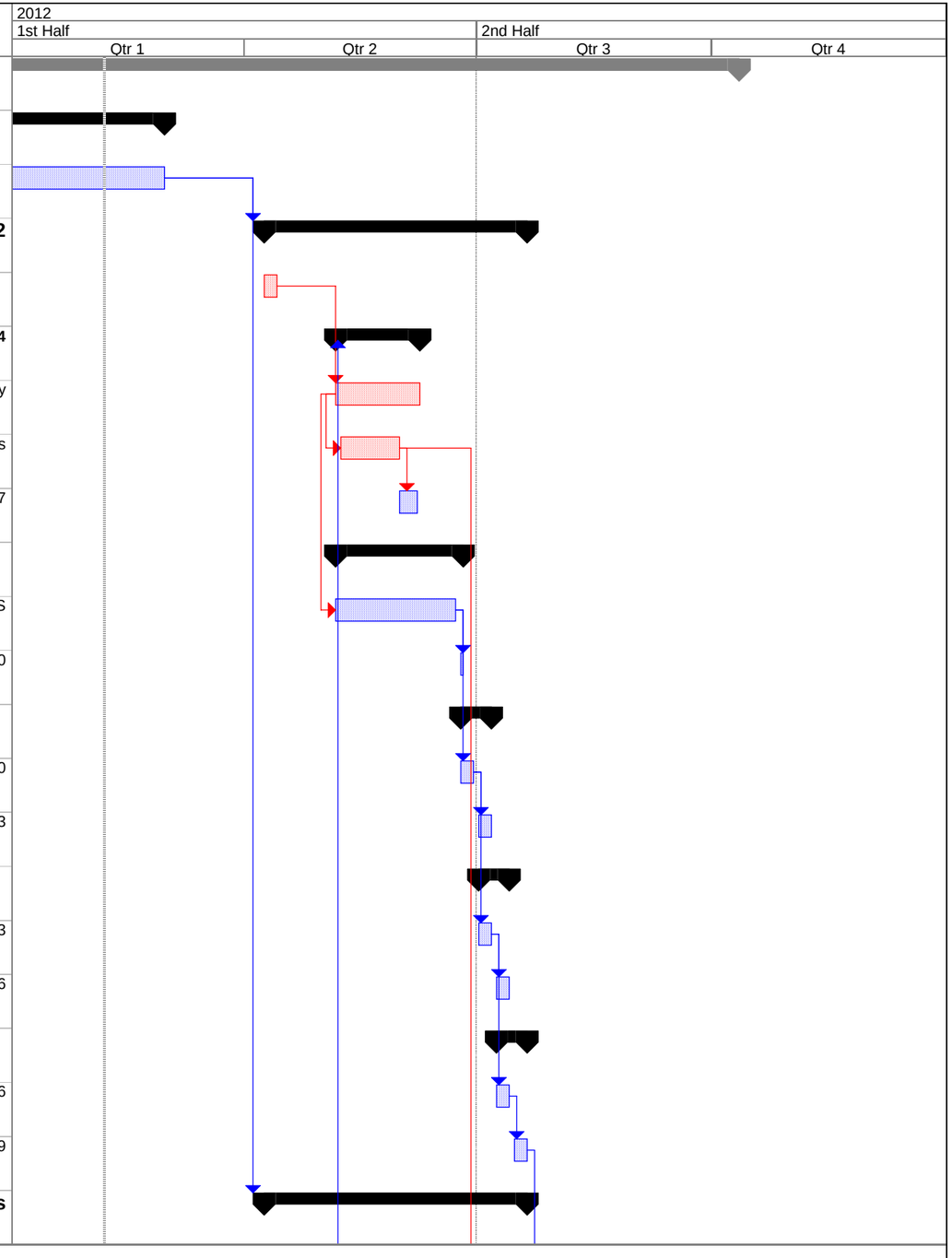
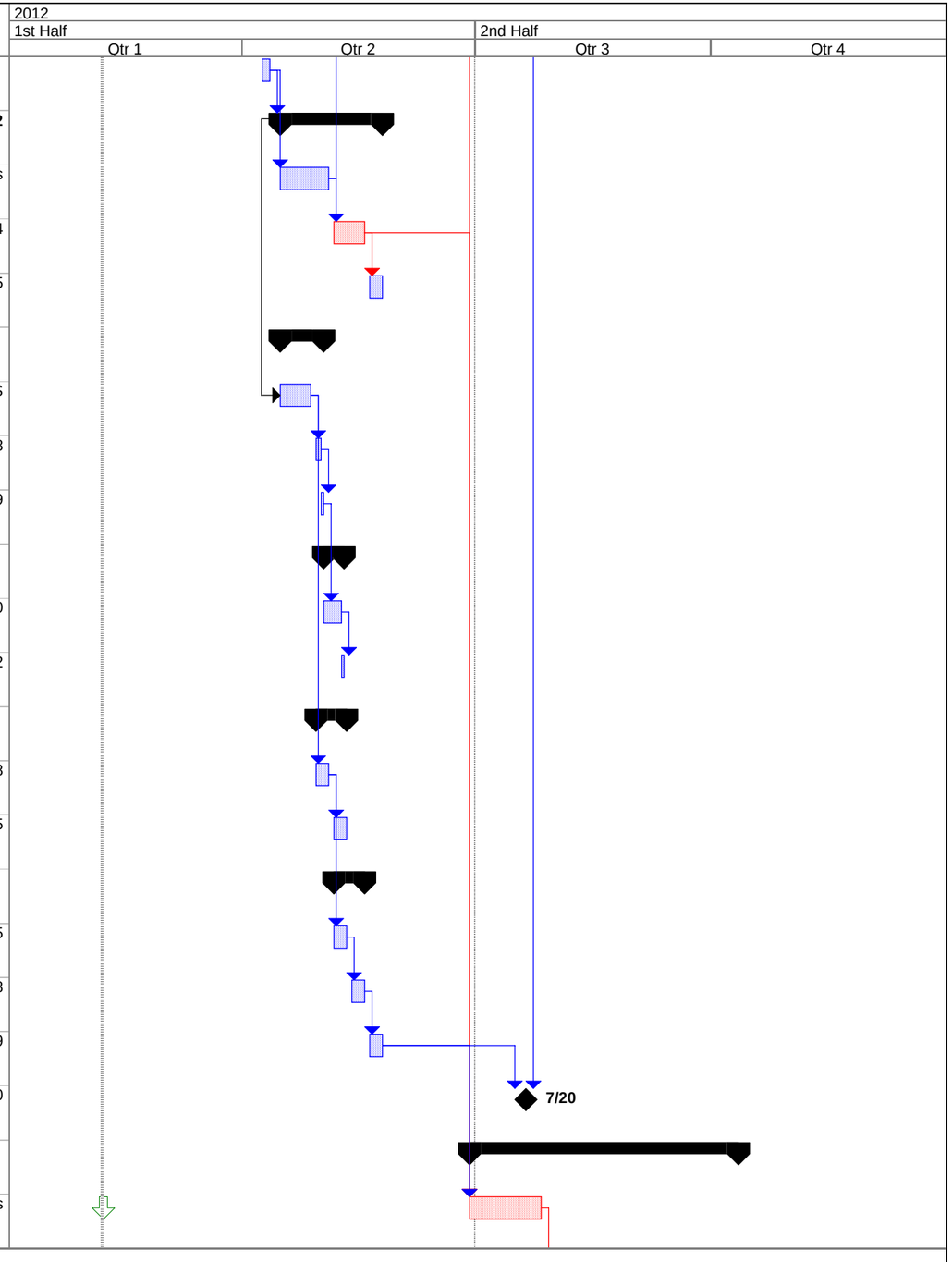
ID	Task Name	Duration	Start	Actual Finish	Finish	Predecessors
0	**JBLM Miller Hill Ranges & Skeet Range**	**290 days**	**Fri 9/2/11**	**NA**	**Thu 10/11/12**	
1	**Interim Action Plan & Work Plan**	**129 days**	**Fri 9/2/11**	**NA**	**Wed 2/29/12**	
2	Ecology/Army Approval of AO and Final IAP & IA Work Plan	129 days	Fri 9/2/11	NA	Wed 2/29/12	
3	**Interim Action FTLE-73 Miller Hill**	**75 days**	**Mon 4/9/12**	**NA**	**Fri 7/20/12**	**2**
4	Mobilize to Site - Survey and Site Prep	5 days	Mon 4/9/12	NA	Fri 4/13/12	
5	**Soil Excavation**	**25 days**	**Mon 5/7/12**	**NA**	**Fri 6/8/12**	**24**
6	Soil Excavation and Transfer to Staging Area	25 days	Mon 5/7/12	NA	Fri 6/8/12	4FS+1 day
7	Confirmation Sampling	17 days	Wed 5/9/12	NA	Thu 5/31/12	6SS+2 days
8	Army Review and Acceptance of Letter Report	5 days	Fri 6/1/12	NA	Thu 6/7/12	7
9	**Treatment at Staging Area**	**36 days**	**Mon 5/7/12**	**NA**	**Mon 6/25/12**	
10	Screening/Treatment & Hauling to Ranges	35 days	Mon 5/7/12	NA	Fri 6/22/12	6SS
11	Army Review and Acceptance of Letter Report	1 day	Mon 6/25/12	NA	Mon 6/25/12	10
12	**Backfill**	**10 days**	**Mon 6/25/12**	**NA**	**Fri 7/6/12**	
13	Backfill	5 days	Mon 6/25/12	NA	Fri 6/29/12	10
14	Army Review and Acceptance of Letter Report	5 days	Mon 7/2/12	NA	Fri 7/6/12	13
15	**Construction of Berms**	**10 days**	**Mon 7/2/12**	**NA**	**Fri 7/13/12**	
16	Construction of Berms Complete	5 days	Mon 7/2/12	NA	Fri 7/6/12	13
17	Army Review and Acceptance of Letter Report	5 days	Mon 7/9/12	NA	Fri 7/13/12	16
18	**Site Restoration Complete**	**10 days**	**Mon 7/9/12**	**NA**	**Fri 7/20/12**	
19	Restore Site	5 days	Mon 7/9/12	NA	Fri 7/13/12	16
20	Army Review and Acceptance of Letter Report	5 days	Mon 7/16/12	NA	Fri 7/20/12	19
21	**Interim Action Former Skeet Range**	**75 days**	**Mon 4/9/12**	**NA**	**Fri 7/20/12**	**2FS+10 days**



Project: JBLM Miller Hill Ranges & Sk
Date: Mon 2/6/12

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

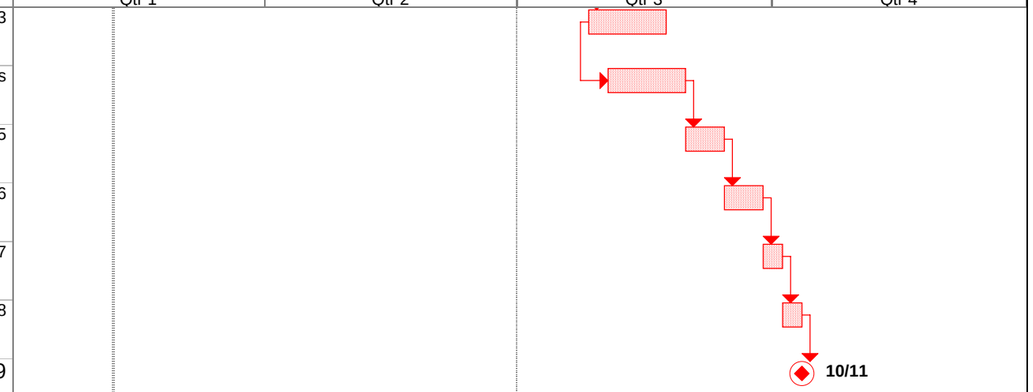
ID	Task Name	Duration	Start	Actual Finish	Finish	Predecessors
22	Mobilize to Site - Survey and Site Prep	3 days	Mon 4/9/12	NA	Wed 4/11/12	
23	**Staging Area Work**	**30 days**	**Mon 4/16/12**	**NA**	**Fri 5/25/12**	**22**
24	Staging Area & ExcavationExcavation	15 days	Mon 4/16/12	NA	Fri 5/4/12	22FS+2 days
25	Confirmation Sampling	10 days	Mon 5/7/12	NA	Fri 5/18/12	24
26	Army Review and Acceptance of Letter Report	5 days	Mon 5/21/12	NA	Fri 5/25/12	25
27	**Screening at Staging Area (Optional)**	**13 days**	**Mon 4/16/12**	**NA**	**Wed 5/2/12**	
28	Screening at Staging Area	10 days	Mon 4/16/12	NA	Fri 4/27/12	23SS
29	Transfer to Active Ranges	2 days	Mon 4/30/12	NA	Tue 5/1/12	28
30	Army Review and Acceptance of Letter Report	1 day	Wed 5/2/12	NA	Wed 5/2/12	29
31	**Backfill**	**6 days**	**Thu 5/3/12**	**NA**	**Thu 5/10/12**	
32	Backfill Complete	5 days	Thu 5/3/12	NA	Wed 5/9/12	30
33	Army Review and Acceptance of Letter Report	1 day	Thu 5/10/12	NA	Thu 5/10/12	32
34	**Construction of Berms Complete**	**10 days**	**Mon 4/30/12**	**NA**	**Fri 5/11/12**	
35	Construction of Berms Complete	5 days	Mon 4/30/12	NA	Fri 5/4/12	28
36	Army Review and Acceptance of Letter Report	5 days	Mon 5/7/12	NA	Fri 5/11/12	35
37	**Site Restoration Complete**	**10 days**	**Mon 5/7/12**	**NA**	**Fri 5/18/12**	
38	Restore Site	5 days	Mon 5/7/12	NA	Fri 5/11/12	35
39	Army Review and Acceptance of Letter Report	5 days	Mon 5/14/12	NA	Fri 5/18/12	38
40	Demobilize from Site	5 days	Mon 5/21/12	NA	Fri 5/25/12	39
41	Cleanup Action Complete	0 days	Fri 7/20/12	NA	Fri 7/20/12	40,20
42	**Interim Action Report**	**75 days**	**Fri 6/29/12**	**NA**	**Thu 10/11/12**	
43	Prepare Draft IAR	20 days	Fri 6/29/12	NA	Thu 7/26/12	ays,40FS+15 days



Project: JBLM Miller Hill Ranges & Sk
Date: Mon 2/6/12

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External MileTask
Split

ID	Task Name	Duration	Start	Actual Finish	Finish	Predecessors
44	Army Review of Draft IAR	20 days	Fri 7/27/12	NA	Thu 8/23/12	43
45	Ecology Review of Draft IAR	20 days	Fri 8/3/12	NA	Thu 8/30/12	44SS+5 days
46	Prepare RTCs and Revised Draft IAR	10 days	Fri 8/31/12	NA	Thu 9/13/12	45
47	Ecology/Army Review of RTCs and Revised Draft IAR	10 days	Fri 9/14/12	NA	Thu 9/27/12	46
48	Prepare RTCs and Final IAR	5 days	Fri 9/28/12	NA	Thu 10/4/12	47
49	Ecology/Army Review of RTCs & Final IAR	5 days	Fri 10/5/12	NA	Thu 10/11/12	48
50	**Response Complete**	0 days	Thu 10/11/12	NA	Thu 10/11/12	49



Project: JBLM Miller Hill Ranges & Sk
Date: Mon 2/6/12

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

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MEMO

TO: Jim Gillie and Ralph Strickland, Joint Base Lewis-McChord

FROM: Larry Emerson and Mark Roberts

DATE: 22 July 2010

RE: Results of Gravels and Cobbles Testing and Visual Lead Slug/Shot Survey
Former Miller Hill Ranges and Skeet Range

This technical memorandum presents the results of the gravels and cobbles testing and visual lead slug/shot survey conducted at the Former Miller Hill Ranges and Former Skeet Range as planned and presented in the technical memorandum dated 28 March 2010.

Introduction

For the pending Cleanup Action at Former Miller Hill Ranges and Skeet Range, Ecology has requested: 1) additional characterization of the plus ¾-inch fraction of soil (gravels and cobbles) that, based on previous testing results, are proposed to be left in place at the sites rather than transported to the active range for reuse, and 2) recovery of lead in areas where the lead is visible and economical to reclaim. The purpose of this memorandum is to present the results of testing gravels and cobbles for total lead content and conducting a visual survey of the sites to identify areas that may be rich in lead slugs (Miller Hill) or lead skeet shot (Skeet Range). These two studies were to determine:

- The final disposition of gravels and cobbles based on laboratory total lead concentrations and approved cleanup and remediation levels, and
- Which areas are identified as lead slug or shot rich areas and would benefit from lead reclamation during the Cleanup Action, provided it was economically feasible to do so.

Gravels and Cobbles Testing

The selected alternative in the Ecology-approved Feasibility Study (FS) includes physically screening of excavated soils for gravels and cobbles prior to soil treatment, if needed, and reuse of the screened soil (less than ¾-inch) at an active range. Gravels and cobbles that are retained on the ¾-inch screens are proposed to be reused as backfill in excavations. In order to confirm the plus ¾-inch fraction is suitable for reuse, a total of ten (10) samples were collected from the Flatlands of the Former Miller Hill Ranges (eight samples) and the Former Skeet Range (two samples) for laboratory analyses. The results are presented in Tables 1 and 2 and are compared to the approved cleanup and remediation levels to determine if the resulting gravels and cobbles lead concentrations are suitable for backfilling at the sites.

The lead concentration profiles and distribution vary widely across the Former Miller Hill Ranges and the Former Skeet Range as noted in the Fort Lewis Agreed Order Remedial Investigation (RI) Report (Bussey, February 2008). Accordingly, of the ten (10) samples collected, six were from the Flatlands

of Range 62/67, two were from the Flatlands of Range 42, and two were from the Former Skeet Range. The number of samples collected from the different ranges were based on the estimated volume of soil to be excavated from each range area. The grids selected for sampling reported (in the RI) a range of total lead concentrations that are greater than the approved cleanup or remediation levels presented in the FS and CAP. The selected sampling grids reported RI total lead concentrations ranging from 275 mg/kg lead up to 36,400 mg/kg lead. Additionally, the selected sampling grids were selected to collect samples from worst case scenario grids (i.e. impact area grids from the Flatlands at Ranges 62/67 and 42) as well as grids reporting various soil concentrations and spatial, both horizontal and vertical, distribution across the former ranges. Spatial distribution of the sample collection locations provide adequate analytical data for a comprehensive assessment of the gravels and cobbles.

The sampling locations are presented below and shown in Figures 1 through 3:

- Flatlands Pistol Ranges 62/67: Grids 7-17*, 8-09, 9-11, 8-22, 8-28*, and 10-23
  * Grids 8-14 and 7-25 were originally planned for sampling but were replaced in the field with Grids 7-17 and 8-28 due to large brush piles blocking access to these grids. Replacement grids were chosen based on similar RI data and spatial distribution.
- Flatlands Range 42: Grids 9-61 and 8-65
- Skeet Range: Grids G-11 and H-13

Field Sampling

The grid system at the Former Miller Hill Ranges has been verified by GPS locations and marked with stakes during site surveying activities. At the Former Skeet Range, a grid has been superimposed over the RI map to establish a systematic method to perform the cleanup action. The grid identified for sampling at the Skeet Range was located using GPS and measuring off from landmarks in the field during sampling activities as the grids have not been staked at the Skeet Range at this time. The gravels and cobbles sampling was conducted as follows:

a. At each grid location, the ground was excavated using a shovel, post hole digger, and/or soil auger, mounted to a skid steer. Samples were collected from each of the four quadrants (see Photo 1) that subdivide the grid. Gravels and cobbles were encountered in the zero to two feet deep composite samples for the Miller Hill Ranges and in the zero to six inch deep composite samples from the Skeet Range. Equal aliquots of excavated soils from the four holes were placed on a white tarp and homogenized by simple hand mixing. The material was divided into four equal portions. A volume of approximately one to two gallons of the excavated and homogenized material was placed into a five-gallon plastic tub (see Photo 2).
b. Vegetation and other organic plant matter was removed from the sample by hand.
c. The soil sample was field sieved utilizing a ¾-inch sieve. The gravels and cobbles were shaken vigorously over the ¾-inch sieve to replicate the separation process that will be encounted in the field during the remedial action. Approximately one quart to one gallon of gravels and cobbles retained on the ¾-inch sieve were placed into a clean Ziplok® plastic bag. The container was then appropriately labeled, entered into a Chain-of-Custody (COC) form, and sent to the laboratory for analysis by SW-846 EPA Method 6020 for total lead.
d. The minus ¾-inch sieved soil sample was placed in laboratory supplied clean glass containers. The containers were appropriately labeled, entered into a COC form, and sent to the laboratory for analysis by SW-846 EPA Method 6020 for total lead.

Laboratory Testing

On 7 June 2010 KEMRON's Applied Technology Group received eleven (11) rock samples in sealed plastic baggies for sample size reduction prior to analysis for Total Lead. KEMRON logged in the samples and confirmed the receipt of each sample on the chain of custody. The following samples were received:

SKEET-H-13-2	SKEET-G-11-2
R62/67-8-9-2	R62/67-8-9-2 DUP
R62/67-7-17-2	R62/67-8-22-2
R62/67-9-11-2	R62/67-8-28-2
R62/67-10-23-2	R42-9-61-2
R42-8-65-2	

After confirming each of the samples, the samples were weighed and recorded. KEMRON sieved each sample using a 1.5-inch sieve in order to separate each sample into two sizes, rocks less than 1.5 inches and those greater than 1.5 inches.

In order to conduct analysis of total lead on the rock samples, the rocks greater than 1.5 inches needed to be reduced in size in order to fit into a pulverizing device. The size reduction was performed in two phases, sawing relief cuts on the rocks and then manually splitting the rocks using a rammer. KEMRON used a decontaminated Delta Shopmaster Table Saw with a 10-inch diamond-tipped blade to make relief cuts. The saw, blade, and all tools used were then cleaned with an Alconox/water solution and dried before the next sample was cut into relief sections to reduce any cross-contamination.

Once the cuts were made, the rocks were placed into an ASTM D 1557 (Modified Proctor) steel cylinder mold for further crushing and to minimize losing sample mass. KEMRON dropped the ASTM D 1557 rammer repetitively onto the sample until the rock was crushed into smaller pieces that would pass through a 1.0-inch sieve. The hammer, slide, steel cylinder and all tools used were cleaned with an Alconox/water solution and dried before the next sample was crushed to reduce any cross-contamination. After crushing, KEMRON separated the rock sample into the greater than 1.5-inch crushed portion and the less than 1.5-inch uncrushed portion and took photographs of both portions.

Based on the initial weights of the samples as they were received, each sample was then visually divided into equal quarter sections for samples initially weighing less than 2,000 grams total, into equal sections of six for samples between 2,000 and 4,000 grams, and for the sample greater than 4,000 grams, it was divided into equal sections of eight. The samples divided into sixth sections were SKEET-H-13-2, R62/67-8-9-2, and R42-9-61-2. The sample divided into eighths was R42-8-65-2 where a crushed single large rock comprised two eights. The remaining seven samples were each divided into quarter sections.

For each sample KEMRON randomly chose one of the equally split portions of the crushed, greater than 1.5-inch portion and one equal portion of the less than 1.5-inch uncrushed portion and combined them to generate a single representative sample for analytical testing. The representative samples were placed in sealed plastic bag (doubled bagged), placed on ice, and shipped to Microbac Laboratories in Marietta, OH for analysis of total lead by EPA Method 6020.

At the analytical laboratory, the representative samples were further crushed utilizing a Glenn Mills Dish and Puck Mill until the the entire sample passed through the #10 sieve. The resulting sample

was prepped and analyzed by SW-846 EPA Method 6020 for total lead. Microbac Laboratories performed the lead analyses for the samples sent to the project laboratory.

Analytical Results and Reporting

Microbac Laboratories prepared and submited full level 4 analytical data package with QC results and ERIS electronic data deliverables for review by KEMRON. The analytical results are presented in Tables 1 and 2 below and this technical memo will be included as an attachment to the Cleanup Action Work Plan (CAWP). The lab analyses Level 1 summary reports are included in Attachment 1. The proposed methodology for both elements was detailed in a previous technical memorandum and received Ecology concurrence prior to conducting these activities.

Table 1
Lead Concentrations in Fines Compared to +¾-inch Rocks at Miller Hill

Former Miller Hill Range	**Grid / Sample ID**	Highest RI Value (& Depth)	Cleanup or Remediation Level	Composite 0 -2' **-10 (fines)**	Composite 0 -2' **+¾-inch (rocks)** crushed and sieved
Range 62/67		Total Lead in mg/kg	Total Lead in mg/kg	Total Lead in mg/kg	Total Lead in mg/kg
	8-9	1,570 (12-24-inch)	250[i]/475[ii]	905	11.1
	8-9 Dup (rocks only)	1,570 (12-24-inch)	250/475	NA	8.0
	7-17	1,710 (0-6-inch)	1 066 [iii]	606	12.2
	8-22	2,710 (12-24-inch)	1,066	1,850	54.0
	9-11	4,630 (0-6-inch)	475	1,480	7.6
	8-28	43,000 (0-6-inch)	1,066	3,300	33.7
	10-23	2,400 (0-6-inch)	1,066	6,970	17.7
Range 42					
	9-61	8,770 (12-24-inch)	1,066	2,560	7.0
	8-65	12,100 (0-6-inch)	1,066	47	1.8
Average Results for Former Miller Hill Ranges				**2,215**	**17.0**

i MTCA Method A Unresticted Use Cleanup Level

ii Remediation Level for Residential Buffer Zone

iii Remediation Level for Miller Hill Flatlands

Table 2
Lead Concentrations in Fines Compared to +¾-inch Rocks at Skeet Range

Former Skeet Range	**Grid / Sample ID**	Highest RI Value (& Depth)	Cleanup or Remediation Level	Composite 0 -2' **-10 (fines)**	Composite 0 -2' **+¾-inch (rocks)** crushed and sieved
		Total Lead in mg/kg	Total Lead in mg/kg	Total Lead in mg/kg	Total Lead in mg/kg
	H-13	1,748 (0-3-inch)	250	235	2.8
	H-13 Dup (fines only)	1,748 (0-3-inch)	250	219	Not analyzed
	G-11	708 (0-6-inch)	250	152	8.4
Average Results for Former Skeet Range				**202**	**5.6**

Results of the gravels and cobbles testing show that total lead associated with the cobbles and gravels retained on the plus ¾-inch sieve do not exceed the MTCA Method A Cleanup Level of 250 mg/kg. Activities during the cleanup action will include initial excavation; dumping into a truck; hauling to the processing area and dumped onto the ground; loaded via front end loader and dumped into screen hopper; vigorously shaken at the screens; dumped onto the ground via converyor; loaded onto trucks; hauled back to the work sites where they will be dumped into the excavations. Therefore actual field activities are expected to remove the dust/grit clinging to the outside of the larger sized particles similar to the effects of the rigorous shaking performed for this testing exercise. Furthermore, it has been agreed by KEMRON and Army that the large gravel and cobbles screened at the sites will be placed at the bottom of the excavations and topped with 6 inches, minimum, of imported clean backfill for construction related issues.

Conclusion for Gravels and Cobbles

Based on the results presented in Tables 1 and 2, it is recommended that the plus ¾-inch gravels and cobbles excavated from the Miller Hill and Skeet Ranges be used as backfill at the sites in all excavation areas.

Lead Slug/Shot Survey

Miller Hill

The impact areas of the former firing ranges at Miller Hill have reported the highest concentrations of lead in soil and visible lead slugs have been occasionally observed during field activities in some of these areas. The likely impact areas identified at the Former Miller Hill Ranges in the Flatlands are identified in blue on Figures 1 and 2 and include:

- The area in Pistol Ranges 62/67 starting at Grid 10-22 traveling east along the toe of the slope of the hill to Grid 10-29, and
- The area in Range 42 starting at Grid 9-61 moving east to Grid 9-64, as well as Grid 10-64.

The backstop portion of the impact areas of the site identified above was visually inspected by KEMRON personnel on 18 and 19 May 2010 to identify any slug fragments. Slug fragments were visually observed in two of the grids in the impact area (Grids 10-22 and 10-23). Soil samples were collected utilizing a shovel and excavated to 4 to 6 inches bgs in an approximate 3 foot x 3 foot area and placed into a five-gallon plastic tub for inspection. Vegetation and other organic matter were removed by hand. Several sieves were used to help in the recovery of slugs and/or fragments. The slugs and fragments in the excavated sample were removed from the ¼-inch sieve (see Photo 3) and placed into a clean plastic bag. After the slugs and fragments were removed from the sample, a field (bathroom) scale was used to weigh the soil sample in the plastic tub. Slug fragments (and metal jackets/debris) were placed in a plastic cup and weighed with a food scale (See Photo 4). Results are presented in Table 3 below:

Table 3
Slug Fragments Found in Impact Area

Range 62/67 Grid #	Total Weight of Soil	Weight of Slugs	# of Slugs	Percentage by Weight of Slugs
10-22	48.1 pounds	< 1 ounce	2 slugs	.001%
10-23	40.7 pounds	2 ounces	6 slugs plus 7 metal jackets / fragments	.003%

Because there is no regulatory requirement for conducting lead reclamation on closed firing range soils as the soils can be treated to meet TCLP levels with the metallic lead slugs present, the decision criteria for conducting lead slug reclamation is based on the percentage of lead slugs in soil that is economically feasible to reclaim. The cost of the reclamation process include the time, labor, equipment used to segregate the lead slugs from the soils, and transportation of recovered lead slugs to a recycling facility/smelter. These costs are a function of the concentration of lead slugs present in the soil and the efficiency of the reclamation process, and are offset by the price received from the scrap metal recycler/smelter for the recovered lead. The percentage of lead slugs in soil that has been determined to be economically feasible to reclaim is approximately 50% by weight and based on previous small arms firing range remediation experience. Therefore, the following decision criteria was applied to the sample analysis:

- If the sample contains more than 50% slug material by weight, then the lead-rich area within the grid will be identified for lead reclamation.

- If the sample contains less than 50% slug material by weight, no lead reclamation is proposed for the grid.

Skeet Range

The distribution of lead shot at skeet ranges typically follows a fan like pattern and results in a wide distribution of lead shot. According to the 2003 SAFR ITRC guidance, the lead shot used in shotgun ranges (i.e. trap, skeet, etc.) range in size from .08 to .095 inches. Based on the estimated dates of operation of the range from 1963 to 1972, it is assumed that the majority of the lead shot have corroded into various particle sizes. Recent studies would confirm this as KEMRON has yet to visually observe the presence of any shot at the Skeet Range.

A soil sample was collected from the grid with the highest reported lead concentration in soil (grid H-13) utilizing a shovel. A one to two gallon sample of soil was excavated to 4 to 6 inches bgs and placed into a five-gallon bucket. Vegetation and other organic matter were removed by hand. The soil sample was field-sieved utilizing several coarse sized sieves plus the #10 sieve (0.0787 inches).

Any shot present in the soil sample would have been retained on the #10 sieve based on the typical sizes of the lead shot, however no visible lead shot was found.

The total lead in soil at the Skeet Range is below the level that has been found to fail TCLP values and is therefore not subject to treatment requirements prior to reuse at the active ranges. There is also no regulatory requirement to remove the lead shot from the soil prior to reuse. However, lead shot can be reclaimed, sorted and reused in shotgun shells and have a much higher scrap value than lead slugs and scrap lead. As presented in the 28 March 2010 Technical Memorandum, the percentage of lead shot in soil that was determined to be economically feasible to reclaim is approximately 5% by weight based on previous skeet range remediation experience. The following decision criteria was presented to be applied to the sample analysis:

- If the sample contains more than 5% shot, the grid will be identified for lead shot reclamation.
- If the sample contains less than 5% shot, no lead shot reclamation is proposed for the grid.

Conclusion for Lead Slug/Shot

The percentage of slug material by weight found at the Former Miller Hill Ranges is less than 1% by weight, therefore no lead reclamation is proposed for these ranges.

There was no lead shot material found at the Former Skeet Range and therefore no lead reclamation is proposed for the Skeet Range.

PHOTOS

PHOTO 1 Soil from 4 quadrants at Range 62/67, Grid 8-9

PHOTO 2 Weighing the composited sample from Range 42, Grid 8-65

PHOTO 3 Slugs retained on the ¼-inch sieve at Range 62/67, Grid 10-23

PHOTO 4 Slugs retained and weighed from Range 62/67, Grid 10-22

FIGURES 1-3

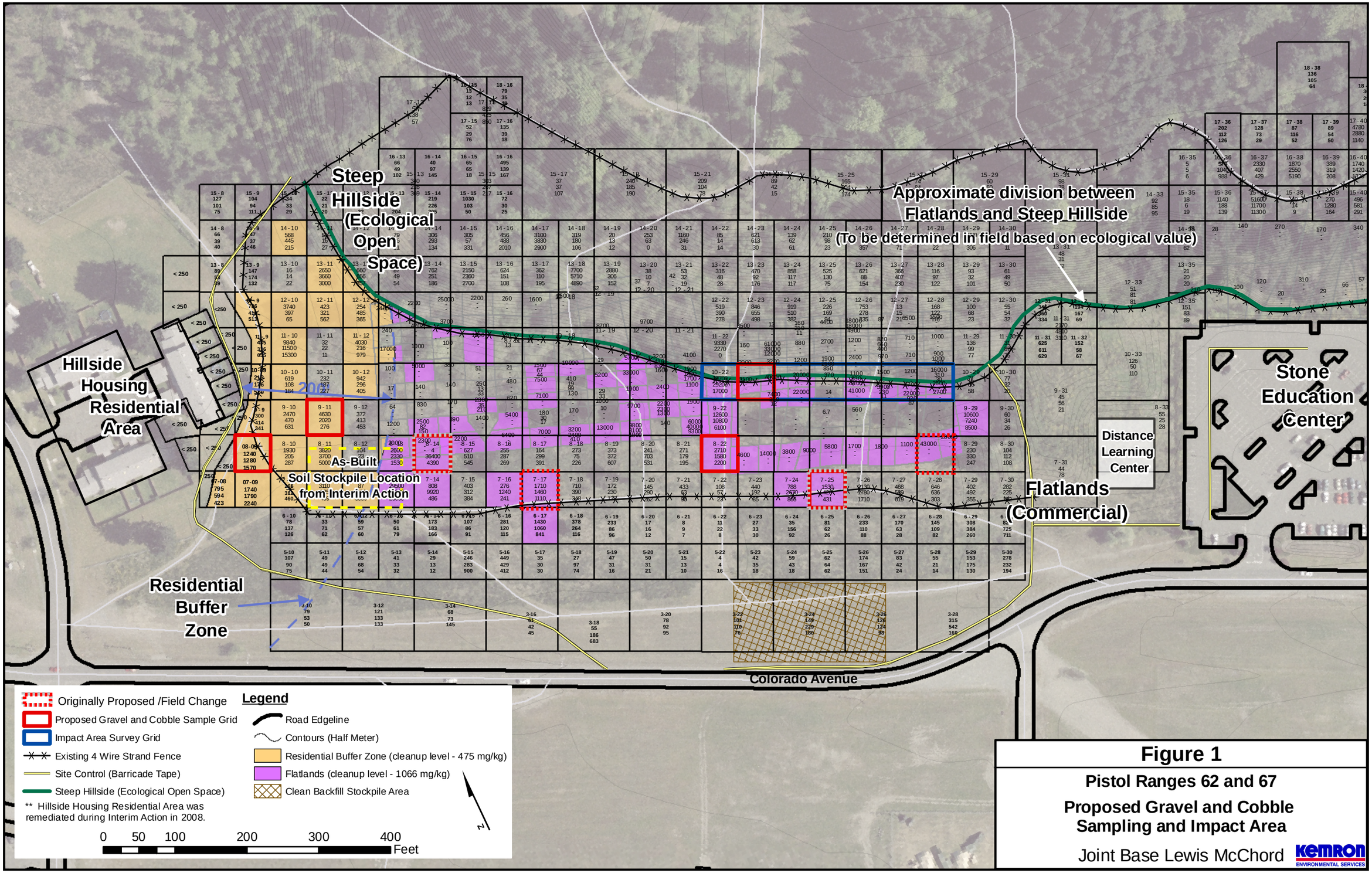

Figure 1

Pistol Ranges 62 and 67

Proposed Gravel and Cobble Sampling and Impact Area

Joint Base Lewis McChord

KEMRON ENVIRONMENTAL SERVICES

Steep Hillside (Ecological Open Space)

Picnic Shelter

Impact Area Survey Grid

Proposed Gravel and Cobble Fill

Former Concrete "Shield"

Stone Education (east) Parking Lot

Colorado Avenue

Legend

- Proposed Gravel and Cobble Sample Grid
- Impact Area Survey Grid
- Former Concrete Shield Wall
- Existing 4 Wire Strand Fence
- Steep Hillside (Ecological Open Space)
- Road Edgeline
- Contours (Half Meter)
- Flat Lands (cleanup level - 1066 mg/kg)

N

0 37.5 75 150 225 300 Feet

Figure 2

Range 42

Proposed Gravel and Cobble Sampling and Impact Area

Joint Base Lewis McChord

KEMRON ENVIRONMENTAL SERVICES

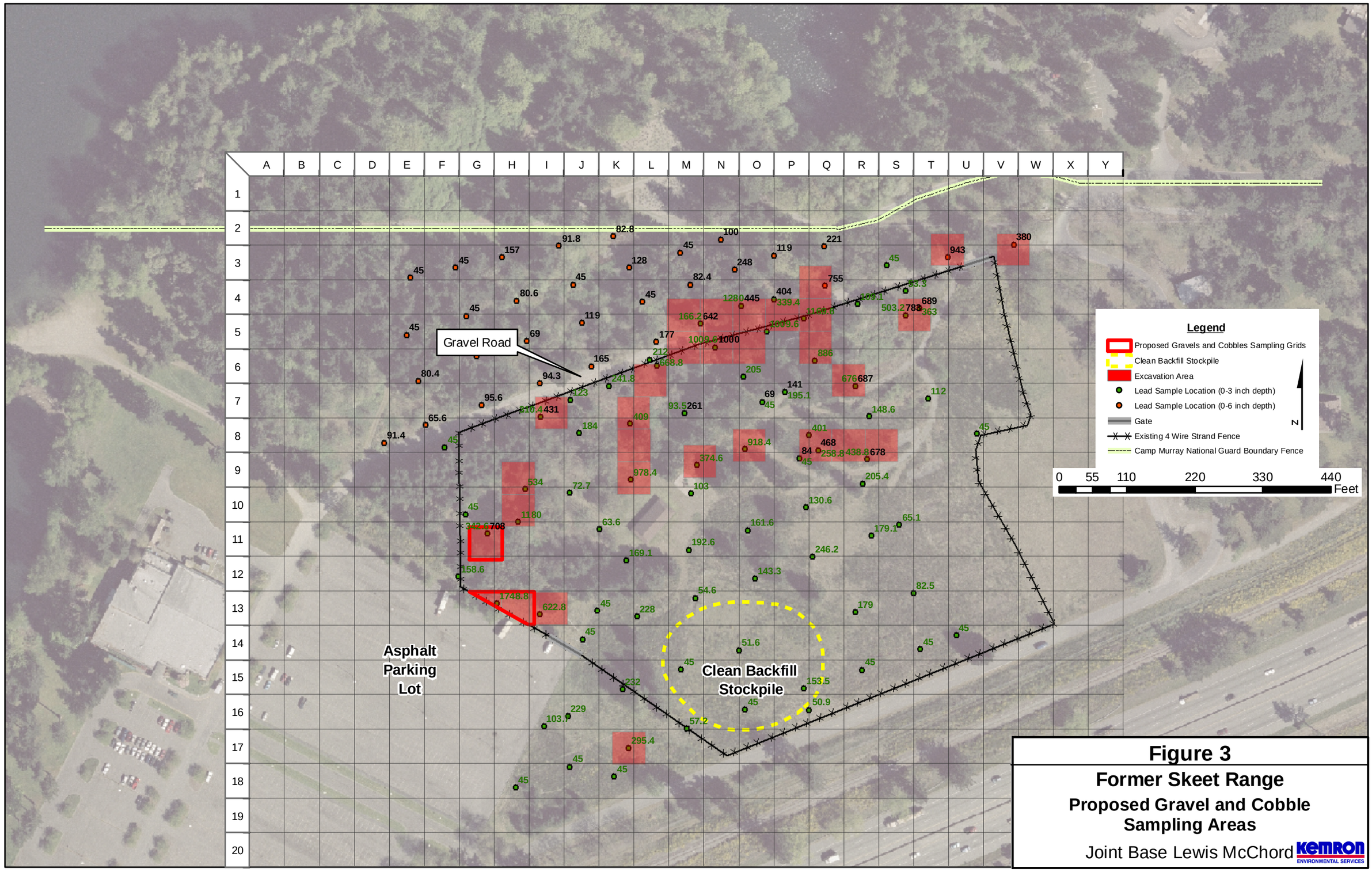

Figure 3

Former Skeet Range

Proposed Gravel and Cobble Sampling Areas

Joint Base Lewis McChord

kemron ENVIRONMENTAL SERVICES

ATTACHMENT 1

LABORATORY REPORT

L10060178

06/29/10 15:10

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: Kemron Environmental Services
Building 379, Suite 17
3155 Blackhawk Drive
Ft Sheridan, IL 60037
Attention: Larry Emerson

Project Number: 2820.190
Project: Fort Lewis WA
Site: FORT LEWIS WA

P.O. Number: XX

Sample Summary

Client ID	Lab ID	Date Collected	Date Received
SKEET-H-13-1	L10060178-01	05/14/2010 10:23	06/08/2010
SKEET-H-13-1-DUP	L10060178-02	05/14/2010 10:23	06/08/2010
SKEET-G-11-1	L10060178-03	05/14/2010 10:45	06/08/2010
R62/67-8-9-1	L10060178-04	05/12/2010 13:35	06/08/2010
R62/67-7-17-1	L10060178-05	05/12/2010 14:28	06/08/2010
R62/67-8-22-1	L10060178-06	05/13/2010 09:08	06/08/2010
R62/67-9-11-1	L10060178-07	05/13/2010 10:10	06/08/2010
R62/67-8-28-1	L10060178-08	05/13/2010 11:28	06/08/2010
R62/67-10-23-1	L10060178-09	05/13/2010 12:22	06/08/2010
R42-9-61-1	L10060178-10	05/13/2010 14:29	06/08/2010
R42-8-65-1	L10060178-11	05/14/2010 08:38	06/08/2010

Report Number: **L10060178**
Report Date : **June 29, 2010**

Sample Number: **L10060178-01**
Client ID: **SKEET-H-13-1**
Matrix: **Soil**
Workgroup Number: **WG333976**
Collect Date: **05/14/2010 10:23**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **JYH**
Dilution: **5**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/08/2010 14:43**
Cal Date: **06/10/2010 14:16**
Run Date: **06/11/2010 00:14**
File ID: **EL.061110.001404**
Percent Solid: **83.0**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	235		1.18	0.590

Sample Number: **L10060178-01**
Client ID: **SKEET-H-13-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/14/2010 10:23**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0101**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	83.0		1.00	1.00

Sample Number: **L10060178-02**
Client ID: **SKEET-H-13-1-DUP**
Matrix: **Soil**
Workgroup Number: **WG333976**
Collect Date: **05/14/2010 10:23**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **JYH**
Dilution: **5**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/08/2010 14:43**
Cal Date: **06/10/2010 14:16**
Run Date: **06/11/2010 00:20**
File ID: **EL.061110.002051**
Percent Solid: **85.0**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	219		1.15	0.577

Sample Number: **L10060178-02**
Client ID: **SKEET-H-13-1-DUP**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/14/2010 10:23**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0102**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	85.0		1.00	1.00

Report Number: **L10060178**
Report Date : **June 29, 2010**

Sample Number: **L10060178-03**
Client ID: **SKEET-G-11-1**
Matrix: **Soil**
Workgroup Number: **WG333976**
Collect Date: **05/14/2010 10:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **JYH**
Dilution: **5**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/08/2010 14:43**
Cal Date: **06/10/2010 14:16**
Run Date: **06/11/2010 00:27**
File ID: **EL.061110.002739**
Percent Solid: **79.3**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	152		1.25	0.623

Sample Number: **L10060178-03**
Client ID: **SKEET-G-11-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/14/2010 10:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0103**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	79.3		1.00	1.00

Sample Number: **L10060178-04**
Client ID: **R62/67-8-9-1**
Matrix: **Soil**
Workgroup Number: **WG333976**
Collect Date: **05/12/2010 13:35**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **50**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/08/2010 14:43**
Cal Date: **06/15/2010 09:57**
Run Date: **06/16/2010 01:37**
File ID: **EL.061610.013747**
Percent Solid: **87.1**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	905		11.1	5.56

Sample Number: **L10060178-04**
Client ID: **R62/67-8-9-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/12/2010 13:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0104**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	87.1		1.00	1.00

Report Number: **L10060178**
Report Date : **June 29, 2010**

Sample Number: **L10060178-05**
Client ID: **R62/67-7-17-1**
Matrix: **Soil**
Workgroup Number: **WG334337**
Collect Date: **05/12/2010 14:28**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **50**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/10/2010 09:44**
Cal Date: **06/16/2010 11:13**
Run Date: **06/16/2010 13:37**
File ID: **EL.061610.133733**
Percent Solid: **86.4**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	606		11.1	5.57

Sample Number: **L10060178-05**
Client ID: **R62/67-7-17-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/12/2010 14:28**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0105**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	86.4		1.00	1.00

Sample Number: **L10060178-06**
Client ID: **R62/67-8-22-1**
Matrix: **Soil**
Workgroup Number: **WG334337**
Collect Date: **05/13/2010 09:08**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **100**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/10/2010 09:44**
Cal Date: **06/16/2010 11:13**
Run Date: **06/16/2010 13:44**
File ID: **EL.061610.134417**
Percent Solid: **91.0**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	1850		20.5	10.3

Sample Number: **L10060178-06**
Client ID: **R62/67-8-22-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/13/2010 09:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0106**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	91.0		1.00	1.00

Report Number: **L10060178**
Report Date : **June 29, 2010**

Sample Number: **L10060178-07**
Client ID: **R62/67-9-11-1**
Matrix: **Soil**
Workgroup Number: **WG334337**
Collect Date: **05/13/2010 10:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **200**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/10/2010 09:44**
Cal Date: **06/16/2010 11:13**
Run Date: **06/16/2010 13:51**
File ID: **EL.061610.135101**
Percent Solid: **80.0**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	1480		49.4	24.7

Sample Number: **L10060178-07**
Client ID: **R62/67-9-11-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/13/2010 10:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0107**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	80.0		1.00	1.00

Sample Number: **L10060178-08**
Client ID: **R62/67-8-28-1**
Matrix: **Soil**
Workgroup Number: **WG334337**
Collect Date: **05/13/2010 11:28**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **500**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/10/2010 09:44**
Cal Date: **06/16/2010 11:13**
Run Date: **06/16/2010 13:57**
File ID: **EL.061610.135745**
Percent Solid: **89.8**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	3300		107	53.6

Sample Number: **L10060178-08**
Client ID: **R62/67-8-28-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/13/2010 11:28**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0108**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	89.8		1.00	1.00

Report Number: **L10060178**
Report Date : **June 29, 2010**

Sample Number: **L10060178-09**
Client ID: **R62/67-10-23-1**
Matrix: **Soil**
Workgroup Number: **WG334337**
Collect Date: **05/13/2010 12:22**
Sample Tag: **DL01**
PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **500**
Units: **mg/kg**
Instrument: **ELAN-ICP**
Prep Date: **06/10/2010 09:44**
Cal Date: **06/16/2010 11:13**
Run Date: **06/16/2010 14:04**
File ID: **EL.061610.140429**
Percent Solid: **92.6**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	6970		107	53.6

Sample Number: **L10060178-09**
Client ID: **R62/67-10-23-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/13/2010 12:22**
Sample Tag: **01**
PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**
Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0109**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	92.6		1.00	1.00

Sample Number: **L10060178-10**
Client ID: **R42-9-61-1**
Matrix: **Soil**
Workgroup Number: **WG334337**
Collect Date: **05/13/2010 14:29**
Sample Tag: **DL01**
PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **500**
Units: **mg/kg**
Instrument: **ELAN-ICP**
Prep Date: **06/10/2010 09:44**
Cal Date: **06/16/2010 11:13**
Run Date: **06/16/2010 14:11**
File ID: **EL.061610.141114**
Percent Solid: **91.5**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	2560		104	52.2

Sample Number: **L10060178-10**
Client ID: **R42-9-61-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/13/2010 14:29**
Sample Tag: **01**
PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**
Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0110**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	91.5		1.00	1.00

Report Number: **L10060178**
Report Date : **June 29, 2010**

Sample Number: **L10060178-11**
Client ID: **R42-8-65-1**
Matrix: **Soil**
Workgroup Number: **WG334337**
Collect Date: **05/14/2010 08:38**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **5**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/10/2010 09:44**
Cal Date: **06/16/2010 11:13**
Run Date: **06/16/2010 14:17**
File ID: **EL.061610.141759**
Percent Solid: **87.4**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	**7439-92-1**	**46.7**		**1.14**	**0.572**

Sample Number: **L10060178-11**
Client ID: **R42-8-65-1**
Matrix: **Soil**
Workgroup Number: **WG333823**
Collect Date: **05/14/2010 08:38**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **JDH**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **06/10/2010 08:37**
Cal Date:
Run Date: **06/10/2010 08:37**
File ID: **B1.333823-0111**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	**10-02-6**	**87.4**		**1.00**	**1.00**

LABORATORY REPORT

L10060547

07/07/10 15:45

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: Kemron Environmental Services
Building 379, Suite 17
3155 Blackhawk Drive
Ft Sheridan, IL 60037
Attention: Larry Emerson

Project Number: 2820.190
Project: Fort Lewis WA
Site: FORT LEWIS WA

P.O. Number: XX

Sample Summary

Client ID	Lab ID	Date Collected	Date Received
R42-9-61-2	L10060547-01	06/17/2010 15:12	06/18/2010
R63/67-10-23-2	L10060547-02	06/17/2010 15:26	06/18/2010
R42-8-65-2	L10060547-03	06/17/2010 15:40	06/18/2010
SKEET-H-13-2	L10060547-04	06/17/2010 15:54	06/18/2010
SKEET-G-11-2	L10060547-05	06/17/2010 16:04	06/18/2010
R62/67-8-9-2	L10060547-06	06/17/2010 16:17	06/18/2010
R62/67-8-9-2 DUP	L10060547-07	06/17/2010 16:31	06/18/2010
R62/67-7-17-2	L10060547-08	06/17/2010 16:42	06/18/2010
R62/67-8-22-2	L10060547-09	06/17/2010 16:56	06/18/2010
R62/67-9-11-2	L10060547-10	06/17/2010 17:10	06/18/2010
R62/67-8-28-2	L10060547-11	06/17/2010 17:23	06/18/2010

Report Number: **L10060547**
Report Date : **July 7, 2010**

Sample Number: **L10060547-01** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **R42-9-61-2** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 16:39**
Collect Date: **06/17/2010 15:12** | Dilution: **1** | File ID: **EL.063010.163926**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	7.04		0.191	0.0954

Sample Number: **L10060547-02** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **R63/67-10-23-2** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 16:46**
Collect Date: **06/17/2010 15:26** | Dilution: **1** | File ID: **EL.063010.164611**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	17.7		0.197	0.0984

Sample Number: **L10060547-03** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **R42-8-65-2** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 16:52**
Collect Date: **06/17/2010 15:40** | Dilution: **1** | File ID: **EL.063010.165256**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	1.83		0.183	0.0916

Sample Number: **L10060547-04** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **SKEET-H-13-2** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 16:59**
Collect Date: **06/17/2010 15:54** | Dilution: **1** | File ID: **EL.063010.165942**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	2.76		0.193	0.0965

Report Number: **L10060547**
Report Date : **July 7, 2010**

Sample Number: **L10060547-05** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **SKEET-G-11-2** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 17:06**
Collect Date: **06/17/2010 16:04** | Dilution: **1** | File ID: **EL.063010.170629**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	8.35		0.199	0.0996

Sample Number: **L10060547-06** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **R62/67-8-9-2** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 17:13**
Collect Date: **06/17/2010 16:17** | Dilution: **1** | File ID: **EL.063010.171316**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	11.1		0.192	0.0960

Sample Number: **L10060547-07** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **R62/67-8-9-2 DUP** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 17:20**
Collect Date: **06/17/2010 16:31** | Dilution: **1** | File ID: **EL.063010.172001**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	7.96		0.190	0.0949

Sample Number: **L10060547-08** | PrePrep Method: **NONE** | Instrument: **ELAN-ICP**
Client ID: **R62/67-7-17-2** | Prep Method: **3051A** | Prep Date: **06/28/2010 13:07**
Matrix: **Soil** | Analytical Method: **6020A** | Cal Date: **06/30/2010 10:01**
Workgroup Number: **WG335774** | Analyst: **SLP** | Run Date: **06/30/2010 17:26**
Collect Date: **06/17/2010 16:42** | Dilution: **1** | File ID: **EL.063010.172645**
Sample Tag: **01** | Units: **mg/kg** | Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	12.2		0.185	0.0923

Report Number: **L10060547**
Report Date : **July 7, 2010**

Sample Number: **L10060547-09**
Client ID: **R62/67-8-22-2**
Matrix: **Soil**
Workgroup Number: **WG335774**
Collect Date: **06/17/2010 16:56**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **2**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/28/2010 13:07**
Cal Date: **06/30/2010 10:01**
Run Date: **06/30/2010 17:33**
File ID: **EL.063010.173329**
Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	54.0		0.392	0.196

Sample Number: **L10060547-10**
Client ID: **R62/67-9-11-2**
Matrix: **Soil**
Workgroup Number: **WG335774**
Collect Date: **06/17/2010 17:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **1**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/28/2010 13:07**
Cal Date: **06/30/2010 10:01**
Run Date: **06/30/2010 17:40**
File ID: **EL.063010.174013**
Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	7.64		0.198	0.0992

Sample Number: **L10060547-11**
Client ID: **R62/67-8-28-2**
Matrix: **Soil**
Workgroup Number: **WG335774**
Collect Date: **06/17/2010 17:23**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **3051A**
Analytical Method: **6020A**
Analyst: **SLP**
Dilution: **1**
Units: **mg/kg**

Instrument: **ELAN-ICP**
Prep Date: **06/28/2010 13:07**
Cal Date: **06/30/2010 10:01**
Run Date: **06/30/2010 18:01**
File ID: **EL.063010.180117**
Percent Solid: **100**

Analyte	CAS. Number	Result	Qual	RL	MDL
Lead, Total	7439-92-1	33.7		0.192	0.0962