ADDENDUM TO THE FINAL WORK PLAN
MUNITIONS AND EXPLOSIVES OF CONCERN
REMEDIAL ACTION UNIT 3 (RAU 3)
CENTRAL VALLEY FLOOR AND WETLANDS (CVFAW)

Former Camp Bonneville Military Reservation,
Vancouver, Washington

February 2013

Prepared for:

Clark County
Public Works Department
1300 Franklin Street
Vancouver, Washington 98666

Prepared under:

Remediation Agreement
Between Clark County, Washington and Weston Solutions, Inc.

Prepared by:

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DCN B0001

Work Plan Addendum Acknowledgement

The personnel listed below have read and fully understand the details and policies as described in the following documents:

- *Addendum to the Final Work Plan, Munitions and Explosives of Concern, Remedial Action Unit 3 (RAU 3), Central Valley Floor and Wetlands (CVFAW)* as well as all associated Field Variance Forms
- *Standard Operating Procedure 3 – Mechanical Vegetation Cutting*
- *Standard Operating Procedure 8 – Analog Locator Operations*

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Work Plan Addendum Acknowledgement

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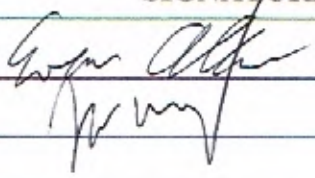
Evan Allen		Weston Solutions, Inc.
Jeremy Haney		Weston Solutions, Inc.

I certify that the personnel listed on this roster received a briefing on the documents described above. Site personnel not attending this meeting will be briefed before beginning their assigned duties. The above-listed documents will be kept available in both Weston field office buildings for reference.

Randy Schneider, Senior UXO Supervisor

Date

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Former Camp Bonneville Military Reservation,
Vancouver, Washington

February 2013

Reviewed by:

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Date: 2/18/2013

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Date: 2/12/2013

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Date: 2/19/2013

Remediation Agreement
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ATTACHMENTS

ABBREVIATIONS AND ACRONYMS

APP	Accident Prevention Plan
ASB	Anomaly Selection Board
bgs	below ground surface
CAP	Cleanup Action Plan
CVFAW	Central Valley Floor and Associated Wetlands
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DQCR	Daily Quality Control Report
FVF	Field Variance Form
GPS	global positioning system
in^2	square inches
IVS	instrument verification strip
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
PDA	personal digital assistant
PM	Project Manager
POC	point of contact
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RAU	Remedial Action Unit
RTK	real-time kinematics
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
UXOQCS	Unexploded Ordnance Quality Control Specialist
WDOE	Washington Department of Ecology
WESTON	Weston Solutions, Inc.

1. INTRODUCTION

1.1 CHANGE IN INVESTIGATION METHODOLOGY

The removal action of suspected munitions and explosives of concern (MEC), munitions debris (MD), and all other metallic items (greater than two square inches [in^2]) in the Central Valley Floor and Associated Wetlands (CVFAW) to a depth of 14 inches below ground surface (bgs) kicked off in June 2012. The primary anomaly detection method—Digital Geophysical Mapping (DGM)—began on 26 July 2012.

DGM was selected as the appropriate remote detection method primarily because it typically results in an efficient and cost effective way to detect and subsequently remove MEC and MD on project sites while allowing for material which poses no hazard to remain. The appropriateness of DGM for a given site is based on several factors to include an anomaly population which has limited cultural debris and MEC items that are generally equal to or larger than a 20 millimeter (mm) projectile. The initial understanding of the contamination located at the CVFAW suggested that any MEC items would be discernible from metallic debris and DGM would be effective at meeting the remediation objective presented in the associated Cleanup Action Plan (CAP). Through the initial DGM surveys, anomaly investigation and associated Quality Control (QC)/Quality Assurance (QA) process it was determined that items comparable in size to those potentially presenting an explosive hazard (37 mm fuze and 14.5-mm subcal) were not being selected as targets and removed during subsequent target reacquisition and removal. The obvious concern was of course that if those comparably sized pieces of metal were being missed then the small MEC items, known to be at Camp Bonneville, could also be missed. As the actual target density became better understood, the DGM process underwent adjustments aimed at ensuring the smaller targets were also selected. Despite three separate modifications to the target selection process small items, to include MEC and MD as well as cultural debris mentioned above, continued to not be routinely selected resulting in failures during the associated QA effort. The density of small subsurface metallic material/debris, including nails and small arms, is significant to the point that the number of targets ultimately needing to be selected would outweigh the efficiency and cost savings that DGM is meant to bring to the project.

Therefore, the decision was made to move from DGM methodology to 100% analog clearance using Minelab F3 Mine Detectors.

1.2 ANALOG CLEARANCE

Challenges stemming from the density of small subsurface metallic material/debris (cultural debris) being indiscernible from items potentially possessing an explosive hazard (e.g., 37-mm fuze and 14.5-mm subcal) as described above led to the change in clearance method.

With the increase in target density, it became clear that analog clearance is the more efficient and effective method for the CVFAW. The Weston Solutions, Inc. (WESTON) team reviewed production rates and instruments used for analog investigation to ensure that clearance will be completed to the standards set forth in The Remediation Agreement. Based on evaluation with the Unexploded Ordnance (UXO) teams and the Clark County UXO Specialist, it was decided that analog clearance will be conducted with the Minelab F3 Mine Detector. The Minelab F3 is a robust all-metals detector, which has proven to be the most effective analog instrument for detecting small subsurface material in the CVFAW.

Analog clearance began on 10 January 2013 with a focus on instrument training and proficiency. Initially, each UXO technician on site was provided a Minelab F3 and will be expected to become proficient using the instrument. On-site training will be conducted and documented with all team members.

The advantages to analog clearance include:

- On site data control,
- 100% grid coverage, and
- Greater sensitivity to detect very small and/or deep subsurface material.

Upon approval of the Addendum to the Final Work Plan, analog clearance production work will begin. All subgrids previously investigated, whether by DGM or analog, will be reinvestigated with the exception of those 43 subgrids invoiced for Anomaly Selection Board (ASB) 1. Investigation will commence as described in the approved Final Work Plan and Final Work Plan Addendum as provided here.

1.3 WORK PLAN CHANGES

The following sections represent approved changes to the *Final Work Plan, Munitions and Explosives of Concern Remedial Action Unit 3 (RAU 3), Central Valley Floor and Wetlands (CVFAW)*. These changes are effective as of 12 February 2013 and have been reviewed and approved by WESTON, Clark County, and Washington State Department of Ecology (WDOE). All changes approved prior to this Work Plan Addendum are detailed in Field Variance Forms and provided as Attachment 1 to the Work Plan. The text presented in these sections does not include the original text. The original text can be found in the main body of the approved Final Work Plan as noted.

Section 2.3.5 UXO Quality Control Specialist

The UXO Quality Control Specialist (UXOQCS) is responsible for conducting QC inspections of intrusive and explosives operations for compliance with established procedures. He will perform daily surveillance of work activities and issue corrective actions, as necessary. He will prepare daily QC reports documenting QC processes and results.

The UXOQCS will be responsible for monitoring site activities for compliance with plans, procedures, and regulations relative to quality in meeting the project statement of objectives, and will be the point of contact (POC) for on-site quality issues. As the UXOQC, he is additionally responsible for:

- Monitoring activities affecting quality during the MEC Removal Activities.
- Ensuring that procedures are being carried out in accordance with established requirements and protocols.
- Understanding WESTON and the project requirements (including those related to quality) and the plans and procedures that implements them.
- Performing QC activities.
- Preparing the Daily Quality Control Report (DQCR).
- Coordinates with Project Geophysicist for anomaly resolution.

The UXOQCS is to be physically onsite whenever project-related fieldwork is in progress. If the UXOQCS is to be absent from the site, with client approval, an alternative UXOQCS will be designated and will be given equivalent responsibilities and authority.

The UXOQCS communicates with the WESTON Project Manager (PM) and the Senior UXO Supervisor (SUXOS) as needed for project-specific direction. Corporate resources are available for administrative and technical direction on quality and health and safety matters.

Section 2.3.6 UXO Technicians

UXO technicians will be required to perform visual identification, removal, and disposal operations at locations where MEC, MD, material potentially presenting an explosive hazard (MPPEH) and other metallic items are detected. UXO technicians will work under the supervision of the SUXOS. The technicians will be responsible for locating, investigating, identifying, removing, and disposing of all recovered metallic debris. In addition, they will be responsible for documenting required information identified in this work plan. UXO technicians will meet the qualifications of a UXO Technician I, at a minimum, and be under the direct supervision of a UXO Technician III. UXO technicians will meet the requirements of Department of Defense Explosives Safety Board (DDESB) TP-18, Minimum Qualifications for Unexploded Ordnance Technicians and Personnel (DDESB, 2004).

Analog-to-depth investigation to 14 inches will be performed by removal teams comprised of UXO Technician I's, II's, and III's. Removal teams will typically include 4 or 6 technicians, and will be managed by enough UXO Technician IIIs to ensure sufficient supervision of all team members. The structure and number of removal teams will remain flexible to ensure quality and efficiency of the removal effort. The number of removal teams may be increased if needed to expedite the investigation. A UXO team participating in removal operations may include one UXO Technician III, two UXO Technician IIs, and one UXO Technician I. At no point will UXO Technician I's work independent of either a UXO Technician II or III.

UXO Technician III

The UXO Technician III supervises a project team performing work on this project. The UXO Technician III may also serve in the capacity of Demolition Supervisor during demolition and explosive demilitarization operations. The UXO Technician III is responsible for:

- Supervising the team to which he/she is assigned.
- Providing MEC subject matter expertise to ensure the team's safety and the project's quality.
- Ensuring the team's action is accomplished safely and efficiently.
- Maintaining administrative records related to the team's operations.
- Implementing the work, safety, and quality plans for this project.
- Supervising the conduct of all on-site evaluations directly related to MEC operations.
- Being familiar with the duties of all assigned personnel and being able to perform all of the functions enumerated for UXO Technicians I and II.
  - This includes staying current with all training that is conducted for UXO Technician duties on site.
- If assigned as a Demolition Supervisor during demolition operations, the UXO Technician III is also responsible for:
  - Training all personnel regarding the nature of materials, hazards, and precautions.
  - Coordinating with the SUXOS to ensure all notifications are completed prior to demolition.
  - Being present and in direct control during all on-site disposal operations.
- The UXO Technician III will report directly to the SUXOS and will have the experience and qualifications required in DDESB TP-18 (DDESB, 2004).

UXO Technician II

The UXO Technician II is the primary MEC worker on the site and performs as part of the team to locate, visually identify, remove, and dispose of MEC, MD, MPPEH, and other metallic items. The UXO technicians assist in documenting information identified in this Work Plan. The UXO

Technician II will report directly to the UXO Technician III and will have the experience and qualifications required in DDESB TP-18 (DDESB, 2004).

UXO Technician I

The UXO Technician I is the secondary MEC worker on the site and performs as part of the team to locate, remove, and dispose of MEC, MD, MPPEH, and other metallic items. At no point will a UXO Technician I work independent of either a UXO Technician II or III. The UXO Technician I will report directly to the UXO Technician III and will have the experience and qualifications required in DDESB TP-18 (DDESB, 2004).

Section 3.1.1 Field Preparatory Activities

Prior to the complete mobilization of UXO teams preparatory activities will be conducted, including:

- Establish semi-permanent survey monuments and/or control points and professional Survey of CVFAW border
- Grid inspection to determine vegetation removal needs
- Brush cutting to 6 inches; if a 3 inch surface clearance has been completed, then vegetation can be cut to ground surface
- Instrument-aided 3 inch surface removal
- DGM, anomaly reacquisition and investigation
- Analog investigation and removal
- Soil excavation, stockpiling, and sifting

Section 3.1.2 MEC Removal

Analog Investigation and Removal

During analog-to-depth investigation, UXO-qualified personnel will investigate and clear all anomalies detected to 14 inches bgs in the grids. The UXO Technician III (the Team Leader) will periodically observe team member's technique to ensure procedures are performed with due diligence and attention to detail. Line spacing intervals within the grids will be divided into

search lanes that are suitable for the equipment and terrain. The search lanes will be optimized based on site conditions and lanes will be delineated with rope, flags, marking paint and/or marking tape. The search lanes will be no less than three feet and no more than five feet wide. If an area is deemed inaccessible or unsafe for travel, the UXO Technician III will note the location, record coordinates that bound the location and the reason(s) the site could not be accessed; Clark County and Washington Department of Ecology (WDOE will be notified to validate. As the technicians move forward, they will accomplish 100 percent coverage of each analog removal area. MEC/MD/MPPEH and metal items greater than 2 in^2 will be removed by UXO teams to a depth of 14 inches bgs.

The locations of MEC will be documented using real-time kinematics global positioning system (RTK-GPS). Intrusive investigation and removal of anomalies will be performed in real time as the UXO team progresses across the grid.

Section 4.2 Quality Control Inspection Process

Review—The UXOQCS will be responsible for the following activities:

- QC inspections of the areas investigated. A minimum 20% of each grid investigated will be inspected to ensure that the MEC, MD, MPPEH, and other metallic items have been removed. This may be lowered to 10% if the QC/QA objectives are being met or exceeded. Grid failure criteria are detailed in Section 4.3 below. Once a grid has passed the QC check (including Geophysical QC, described in Section 3.1.3), the Clark County Munitions Safety Officer and the Munitions Specialist from the WDOE Munitions Cleanup, Toxics Cleanup Program will be notified for QA inspection.
- Compliance with the project's Work Plan, Quality Control Plan, and Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP).
- Daily communication with WESTON's PM.

Section 4.3 Investigation Failure Criteria (see also Field Variance Form [FVF] 5)

An investigation failure results when a performance metric is exceeded or cannot be achieved. Grid failures occur for any one of the following reasons:

1. Any 1 MEC item remaining in a grid.
2. Any inert blind seeded item or 1 whole MD item equal to or larger than a 14.5-mm sub caliber projectile remaining in a grid.
3. 5 metal items or MD fragments ranging in size from $2in^2$ up to 8 in^2 remaining in a grid.
4. 1 metal item or MD fragment equal to or greater than $8in^2$ remaining in a grid.
5. Small arms => .50 caliber (projectile & case) will be considered MEC and fail a grid if 1 remains in a grid.
6. Small arms casings => .50 caliber will be considered MD and fail a grid if 5 or more remain in a grid.
7. Small arm's <= .50 caliber (projectile only) will not be considered MD and not count toward the 5 metal item limit.
8. Grid conditions:
   - Vegetation height will be no more than 6 inches.
   - Trees less than 6 inches in diameter will be cut to the required vegetation height as necessary to facilitate investigation.
   - Search lanes will be no less than three feet and no more than five feet wide.
   - Investigation will not be conducted where standing water impedes effective investigation.
   - Immediate notification to the site SUXOS is required by any person observing grid conditions that are not compliant with those outlined here.
9. Instrument procedures and condition:
   - The Minelab coil will be swept no more than 2 inches above the ground surface maintaining a consistent coil height as close to the ground as possible.
   - An approximate half coil overlap on successive sweeps will be maintained.
   - Care will be taken to ensure that the coil is not inadvertently raised at the end of each sweep.
   - Sweeps will be conducted no faster than approximately 2 feet per second.
   - Immediate notification to the site SUXOS is required by any person observing instrument procedures and conditions that are not compliant with those outlined here.

- Repetitions of deviation from instrument procedures and conditions occurring within a particular grid may result in failure of that grid.

Upon completion of a grid by the UXO Team, the UXOQCS will perform a QC grid inspection encompassing, at a minimum, 20% of the grid area. The list of grids completed, checked by QC (including Geophysical QC, described in Section 3.1.3), and ready for QA inspection will be updated daily, as required, and forwarded or made available to Clark County. The QC process is shown on Figure 5. Grid failures will be documented on the DQCR. Any deficiencies that are identified will require a corrective measure, and a root-cause analysis will be performed to document the issue, analysis, and corrective action. Such root-cause analyses will be submitted to Clark County as memorandums. A corrective action will include reinvestigation of the grid and may also include resurvey of the grid or adjusting analog instrument settings. The exact corrective action will be determined by following the corrective action process detailed in the sections below.

Appendix E, Geophysical Investigation Plan; Section 2.3 Geophysical Equipment

The Minelab F3 Mine Detector will be used for analog to depth surveys (0-14") and the Whites Surf Dual Field all-metals detector will be used for analog surface clearance (0-3"). The Geonics EM61-MK II all-metals detector in a variety of configurations will be used for DGM surveys. Standard operating procedures for the geophysical instrumentation are provided in Appendix G.

Standard Operating Procedure 3

SOP - 3
MECHANICAL VEGETATION CUTTING
CAMP BONNEVILLE

Approved by:

_____ _____

MEC Response & Removal Task Manager Date

_____ _____

Project Manager Date

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1. PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of mechanical vegetation cutting operations.

2. SCOPE

All personnel performing operations utilizing mechanical equipment for vegetation cutting will conform to this SOP. This SOP is not a stand-alone document, and all personnel will become familiar with associated documents and/or manuals related to this operation.

3. REGULATORY REFERENCES

Weston Solutions, Inc., Corporate Safety and Health Program

OSHA General Industry Standards, 29 CFR 1910

OSHA Construction Standards, 29 CFR 1926

USACE EM 385-1-1, Safety and Health Requirements Manual

AR 385-10, Army Safety Program

Operator's Manual and Manufacturer's Recommendations

4. RESPONSIBILITIES

4.1 PROJECT MANAGER (RPM)

The PM is responsible for ensuring availability of resources required to safely implement this SOP.

4.2 SENIOR UNEXPLODED ORDNANCE SUPERVISOR (SUXOS)

The SUXOS is responsible for incorporating this SOP in plans, procedures, and training.

4.3 UXO SAFETY OFFICER (UXOSO)

The UXOSO ensures that all mechanical vegetation cutting operations are being conducted in a safe manner in accordance with the work plan and this SOP.

4.4 UXO ESCORT/GROUND SAFETY OBSERVER

The UXO Escort/Ground Safety Observer ensures that personnel and equipment remain within the site, and marks any munitions and explosives of concern (MEC) encountered and reports their location to the SUXOS.

5. MECHANICAL VEGETATION CUTTING OPERATIONS

Vegetation cutting operations will be consistent with the operator's manual and terrain features, and permits the Ground Safety Observer to perform those duties as directed to include a visual search/survey of the area(s) to be worked in.

- Non-operating personnel will maintain a safe, predetermined distance from personnel who are operating equipment including weed eaters, chain saws, mowers, etc. If at any time personnel come within an unsafe distance of the operator, the operator will immediately stop work and power down the equipment.
- A communications check with the team personnel prior to operations commencing will be conducted. Hand signals are devised and used as a secondary means of communication. All team personnel must know these hand signals prior to operations commencing.
- Prior to cutting operations commencing, a visual search/survey is conducted to determine the hazards that may be encountered, including MEC, terrain slope, vegetation, wildlife, and environmental concerns. The team leader will also determine the personal protective equipment (PPE) requirements based on the identified hazards.
- The Ground Safety Observer precedes the equipment and performs a visual search for MEC, ordnance scrap, rats' nests, surface debris, and any other obstruction/object that may pose a hazard to team personnel. Hazardous items, impassable terrain, or vegetation that may affect operations will be marked and team personnel notified. The operator shall follow a route selected by the Ground Safety Observer while operations are ongoing.
- Team personnel will ensure that a 6-inch ground clearance is maintained during cutting operations in areas where no surface clearance to 3 inches has been conducted. Those areas marked as hazards are to be avoided.
    - MEC or MEC-related items encountered are marked and avoided. Notification of these items will be made to the SUXOS.

- Maintenance vegetation removal may be required in areas where vegetation has regrown to a point of interfering with either investigation or QC/QA procedures. If a 3 inch surface clearance has been conducted in the area, vegetation can be removed to ground surface.

5.1 SAFETY

Safety is paramount. All personnel will observe those safety precautions/warnings that apply, or may apply, to vegetation cutting operations. Those listed below are general in nature and personnel will need to review applicable publications for more specific safety precautions/warnings. Distances are the minimum required.

- Maintain 50 feet from essential non-UXO personnel, and 239 feet from UXO personnel engaged in intrusive work and other mechanical equipment (e.g., backhoe). Distances may increase depending on equipment type (e.g., hydro-axe).
- Maintain 50 feet between equipment and team personnel.
- Distances may be increased by the UXOSO, as determined by site history, MEC items encountered, terrain features, and other factors that may apply.
- Use equipment safety features (e.g., guards).
- Safety precautions/warnings found in the operator's manual(s)/manufacturer's publication(s) will be observed.
- Maintain 6 inches of ground clearance during cutting operations in areas where no surface clearance to 3 inches has been conducted.
- Communications will be maintained between the UXO Escort and the operator at all times.
- Maintain site control.
- Observe safety precautions for items encountered or suspected.
- Ensure PPE is serviceable and worn/used in a proper manner.

6. PERSONAL PROTECTIVE EQUIPMENT

Level D PPE will be required for personnel engaged in mechanical vegetation cutting. Clothing includes, but is not limited to:

- Coveralls or work clothing as prescribed
- High visibility Safety Vests
- Work gloves, leather or canvas as appropriate
- Safety glasses

- Face shields when appropriate
- Hard hats when working within 100 feet of equipment
- Hearing protection, noise attenuators or ear plugs when within 50 feet of equipment
- Dust mask, as required by wind conditions and/or the presence of airborne particulate matter
- Other PPE as needed (e.g., steel-toe boots, face shield, Kevlar chaps, shin guards, etc.)

7. TRAINING

All personnel who work on a mechanical vegetation cutting crew will be qualified and certified through machine-specific, site-specific, and on-the-job training. This training will consist of:

- Mechanical operations and maintenance of the vegetation cutting equipment
- Features of the equipment and its operational limits and characteristics
- Safety parameters relevant to mechanical operations

Standard Operating Procedure 8

SOP - 8
ANALOG LOCATOR OPERATIONS
CAMP BONNEVILLE

Approved by:

_____ _____

MEC Response & Removal Task Manager Date

_____ _____

Project Manager Date

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LIST OF ATTACHMENTS

1. PURPOSE

This procedure outlines the requirements for analog locator operations.

2. APPLICABILITY AND SCOPE

The analog locator will be used during the following operations:

- Analog Locator Daily QC Checkout
- Analog Surveys
- Near-Surface Anomaly Detection
- Backhoe Excavations
- Analog Locator QC Surveys

3. OPERATIONS

Analog Locator Daily QC Checkout

The UXO Technicians will conduct a daily instrument standardization check by placing the instrument over a number of standard items within the Instrument Verification Strip (IVS) prior to commencing daily field activities. The description, depth and orientation are known for each standard item within the IVS. The IVS will remain in the same location until the investigation is complete, or until it requires relocation due to overuse or erosion. Each UXO Technician must successfully locate all targets in the IVS prior to commencing field data collection each day.

An Analog Locator Checkout and Return Form will be filled out daily by equipment operators or the UXOQCS to record the results of the analog locator QC checkout and document the condition of the equipment.

Analog Locator Surveys

Analog locator surveys are particularly effective in areas where vegetation and terrain limit the use of larger digital systems as well as in areas where metallic fragments and debris make digital discrimination from MEC ineffective.

UXO Technicians will use the procedure described in Section 4 of this SOP to conduct analog locator surveys. The location of any MEC items that are located using this method will be recorded with a GPS (or other survey method if under vegetation canopy) and all collected field data will be recorded in personal digital assistants (PDAs).

Near-Surface Anomaly Detection

Near-surface anomalies are those subsurface anomalies that can be excavated using hand tools. Throughout the excavation, the UXO Technician will use an F3 Mine Detector (Minelab) to check and verify the location of the anomaly.

Backhoe Excavations

Some areas will contain a breadth and density of material (e.g., large nail pits) that will require excavation using heavy equipment (i.e., backhoe). When areas are identified by the UXO Team Leader as potentially requiring excavation, the SUXOS will be immediately notified. The area will be delineated and marked off with flagging. Prior to the arrival of the heavy equipment, the UXO Team Leader will ensure that a cleared entrance and egress path is available for the heavy equipment. Once on-site, the heavy equipment will be used to excavate the earth overburden from the suspect anomaly. The distance to the anomaly will be checked with the magnetometer during the excavation. Hand tools will be used to excavate the final12 inches of soil covering the anomaly in accordance with EM 385-1-97.

Analog Locator QC Surveys

Quality control surveys will be performed after intrusive operations have been completed. The UXOQCS will use the Minelab to perform a minimum 20 percent (%) QC survey for all grids. This may be lowered to 10% if the QC/QA objectives are being met or exceeded. Failure criteria are provided in Field Variance Form 5. Results of the analog QC survey will be documented by the UXOQCS in the daily quality control report.

4. ANALOG LOCATOR SURVEY PROCEDURE

Analog-to-depth investigation to 14 inches will be performed by removal teams comprised of UXO Technician I's, II's, and III's. Removal teams will typically include 4 or 6 technicians, and will be managed by enough UXO Technician IIIs to ensure satisfactory supervision of all team

members. The structure and number of removal teams will remain flexible to ensure quality and efficiency of the removal effort. The number of removal teams may be increased if needed to expedite the investigation. A UXO team participating in removal operations may include one UXO Technician III, two UXO Technician IIs, and one UXO Technician I. At no point will UXO Technician I's work independent of either a UXO Technician II or III. The following procedure will be used by equipment operators to conduct analog clearance operations with a handheld analog locator:

- Search lanes will be no less than three feet and no more than five feet wide. UXO Technicians will establish individual search lanes that are suitable for the equipment, site conditions, and terrain. The search lanes will be delineated with line, flags, marking paint and/or marking tape.
- The UXO Technician will sweep the lane using an F3 Mine Detector all metals detector (Minelab).
- The UXO Technicians will start at one end of each lane and move forward toward the opposing baseline, moving the analog locator back and forth in a sweeping motion from one side of the lane to the other.
- Both forward movement and the swing of the Minelab are performed at a pace that ensures the entire lane is searched. The UXO Technician will move no faster than approximately 2 feet per second (per the F3 Operations Manual).
- The Minelab coil will be swept no more than 2 inches above the ground surface maintaining a consistent coil height as close to the ground as possible. Care will be taken to ensure that the coil is not inadvertently raised at the end of each sweep.
- When a target is initially detected, the UXO Technician will stand in place and continue to sweet the Minelab beyond the target in an attempt to find clear ground in order to determine the approximate size of the target.
- All targets will be investigated by hand-digging. Once the source of the anomaly is removed from the hole, the hole and spoils will be rechecked with the Minelab to ensure there are no other targets requiring investigation at that location.

- The SUXOS and the UXO Team Leader (Technician III) will regularly observe team member's technique to ensure procedures are performed with due diligence and attention to detail.

5. BATTERY CHANGE FREQUENCY

Only high quality alkaline batteries are used with the Minelabs. If the batteries can no longer supply the necessary power to sustain correct performance of the detector, a Low Battery Alarm will sound and the operator will immediately stop sweeping operations to change the batteries. To avoid interruption in sweep operations, Minelab batteries will be changed every 3 working days that the instrument is used.

6. ANALOG LOCATOR QUALITY CONTROL REPORTS

The quality control reports and forms used to document the QC activities listed in this policy and procedure manual are as follows:

ATTACHMENT 1
FIELD SUPERVISOR REVIEW SHEET

I have read and understand the Project Work Plan and Standard Operating Procedure (SOP) UXO Technicians Analog Locator QC Checkout. To the best of my knowledge the processes described in the Work Plan and this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure all persons assigned to this process are qualified, have read and understand the requirements of the Work Plan and SOP, and have signed the Field Team Review Sheet for this process. If necessary, I will conduct an annual review of the Work Plan and SOP. If deviations from this SOP are necessary, I will ensure that project activities are stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will ensure that project activities are stopped until the hazards have been eliminated.

SUPERVISOR NAME	SIGNATURE	DATE

ATTACHMENT 2
FIELD TEAM REVIEW SHEET

Each field team member shall sign this section after reading the Project Work Plan and associated SOPs and receiving site-specific training before being permitted to work on-site.

I have read and understood the Project Work Plan and Standard Operating Procedure for UXO Technicians Analog Locator QC Checkout. I have received and understood the hazard control briefing. I will follow the Work Plan and SOP unless I identify a hazard not addressed in it or encounter an operation I do not understand. If that occurs, I will stop site activities and notify my immediate supervisor of the problem.

NAME	SIGNATURE/DATE	SUPERVISOR'S NAME	SIGNATURE/DATE

ATTACHMENT 3

WEEKLY ANALOG LOCATOR CHECKLIST AND RETURN PROCEDURE

FORMER CAMP BONNEVILLE MILITARY RESERVATION

MONTH/ YEAR: _____

INSTRUMENT: _____

SERIAL #:_____

ASSIGNED TO: _____

Day	Check for Damage	Check Battery Level	IVS Check	Clean Instrument	Comments
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					

FIELD VARIANCE FORM TRACKING

FVF NO. CVFAWWP-001-REV1	**DATE:** 2-12-13	**PROJECT NAME/LOCATION:**	Camp Bonneville Removal Action/Vancouver, WA
SUBJECT:	Personnel name correction		
CHANGE TO: APPX D & ATTCH 1	It is recommended that the name of the current UXOSO, Bruce Moe, replace all instances where Randal Schneider's name appears.		
FVF NO. CVFAWWP-002	**DATE:** 8-7-12	**PROJECT NAME/LOCATION:**	Camp Bonneville Removal Action/Vancouver, WA
SUBJECT:	Competent Person		
CHANGE TO: APPX D & ATTCH 1	It is recommended that a paragraph be inserted between the two above that states: "All personnel that meet the requirements of competent persons as stated in OSHA 29 CFR 1926.32 and have been approved by WESTON's Corporate EHS Manager can fill in as the designated Competent person on an as needed basis or as required."		
FVF NO. CVFAWWP-003	**DATE:** 8-7-12	**PROJECT NAME/LOCATION:**	Camp Bonneville Removal Action/Vancouver, WA
SUBJECT:	Shovels		
CHANGE TO: APPX G - SOP 15	It is recommended that the first sentence be reworded to read: "The excavated material will be introduced into the sifter with shovels."		
FVF NO. CVFAWWP-004	**DATE:** 9-19-12	**PROJECT NAME/LOCATION:**	Camp Bonneville Removal Action/Vancouver, WA
SUBJECT:	Wetlands Protocol		
CHANGE TO: NA	It is recommended that the accepted wetlands protocol (attached) be adopted for operations conducted within the wetland boundary as provided by Clark County.		
FVF NO. CVFAWWP-005-REV1	**DATE:** 2-12-13	**PROJECT NAME/LOCATION:**	Camp Bonneville Removal Action/Vancouver, WA
SUBJECT:	Grid Failure Criteria		

CHANGE TO: SECTIONS 4.2 AND 4.3

An investigation failure results when a performance metric is exceeded or cannot be achieved. Grid failures occur for any one of the following reasons:

1. Any 1 MEC item remaining in a grid.
2. Any inert blind seeded item or 1 whole MD item equal to or larger than a 14.5mm sub caliber projectile remaining in a grid.
3. 5 metal items or MD fragments ranging in size from 2 square inches (in^2) up to 8 in^2 remaining in a grid.
4. 1 metal item or MD fragment equal to or greater than 8in^2 remaining in a grid.
5. Small arms => .50 caliber (projectile & case) will be considered MEC and fail a grid if 1 remains in a grid.
6. Small arms casings => .50 caliber will be considered MD and fail a grid if 5 or more remain in a grid.
7. Small arm's <= .50 caliber (projectile only) will not be considered MD and not count toward the 5 metal item limit.
8. Grid conditions:
   - Vegetation height will be no more than 6 inches.
   - Trees less than 6 inches in diameter will be cut to the required vegetation height as necessary to facilitate investigation.
   - Search lanes will be no less than three feet and no more than five feet wide.
   - Investigation will not be conducted where standing water impedes effective investigation.
   - Immediate notification to the site SUXOS is required by any person observing grid conditions that are not compliant with those outlined here.
9. Instrument procedures and condition:
   - The Minelab coil will be swept no more than 2 inches above the ground surface maintaining a consistent coil height as close to the ground as possible.
   - An approximate half coil overlap on successive sweeps will be maintained.
   - Care will be taken to ensure that the coil is not inadvertently raised at the end of each sweep.
   - Sweeps will be conducted no faster than approximately 2 feet per second.
   - Immediate notification to the site SUXOS is required by any person observing instrument procedures and conditions that are not compliant with those outlined here.
   - Repetitions of deviation from instrument procedures and conditions occurring within a particular grid may result in failure of that grid.

Upon completion of a grid by the UXO Team, the UXOQCS will perform a QC grid inspection encompassing, at a

	minimum, 20% of the grid area. The list of grids completed, checked by QC (including Geo QC, described in Section 3.1.3), and ready for QA inspection will be updated daily, as required, and forwarded or made available to Clark County. The QC process is shown on Figure 5. Grid failures will be documented on the DQCR. Any deficiencies that are identified will require a corrective measure, and a root-cause analysis will be performed to document the issue, analysis, and corrective action. Such root-cause analyses will be submitted to Clark County as memorandums. A corrective action will include reinvestigation of the grid and may also include resurvey of the grid or adjusting analog instrument settings. The exact corrective action will be determined by following the corrective action process detailed in the sections below.

FVF NO. CVFAWWP-006-REV1	**DATE:** 2-12-13	**PROJECT NAME/LOCATION:**	Camp Bonneville Removal Action/Vancouver, WA
SUBJECT:	Grid Failure Criteria – clarification on dimensions of 2 square inches (in^2)		
CHANGE TO: ALL SECTIONS	It is recommended that this section include the following illustration for clarification: 2 square inches (in^2) ←———— 2” ————→ ↑ 1” ↓		

FVF NO. CVFAWWP-007	**DATE:** 2-12-13	**PROJECT NAME/LOCATION:**	Camp Bonneville Removal Action/Vancouver, WA
SUBJECT:	Figure 4, Project Organization Chart		
CHANGE TO: ALL SECTIONS	It is recommended that the attached figure replace Figure 4.		

Field Variance Form 1

FIELD VARIANCE FORM

DATE: 12-FEB-13 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated July 2012 – Appendix D, Section 3.3 Competent Person & Attachment 1, Site Safety and Health Plan, Section 4.2 Competent Person

SUBJECT: Personnel name correction

FIELD CHANGE CONDITION:

Appendix D: Accident Prevention Plan Section 3.3 and Attachment 1, Site Safety and Health Plan, Section 4.2 of Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands Work Plan state that: "Mr. Schneider meets the requirements and has been approved by WESTON's Corporate Environmental Health and Safety Management. Mr. Schneider is a competent person at stated in OSHA 29 CFR 1926.32. As required by EM 385-1-1, Mr. Schneider has at least 5 years of applicable safety experience and has successfully completed the OSHA 30-hour construction safety course. Mr. Schneider has performed work on a site(s) of similar hazard, risk, complexity to the task assignment, and is certified in first aid and cardiopulmonary resuscitation (CPR). Mr. Schneider also has at least five years of experience …"

RECOMMENDED APPROACH / CHANGE:

It is recommended that the name of the current UXOSO, Bruce Moe, replace all instances where Randal Schneider's name appears.

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Melissa Mayer, MEC Response and Removal Task Manager, Weston Solutions, Inc.

[ ] **CLARIFICATION/FOR INFORMATION ONLY** [X] **MINOR CHANGE** [ ] **MAJOR CHANGE**

WESTON SOLUTIONS
Restoring Resource Efficiency

WESTON TEAM APPROVALS: BRUCE MOE, RANDY SCHNEIDER, MELISSA MAYER

COMMENTS

ACKNOWLEDGED BY:	**BRUCE MOE** **UXO SAFETY OFFICER (WESTON)**	**SIGNATURE**	**DATE** 2/12/2013
ACKNOWLEDGED BY:	**RANDY SCHNEIDER** **SENIOR UXO SUPERVISOR (WESTON)**	**SIGNATURE**	**DATE** 2/12/2013
ACKNOWLEDGED BY:	**MELISSA MAYER** **MEC RESPONSE AND REMOVAL TASK MANAGER (WESTON)**	**SIGNATURE**	**DATE** 2/12/2013

STAKEHOLDER APPROVAL:

COMMENTS

☑ **APPROVED** ☐ **REJECTED**	**JERRY BARNETT, PE** **CLARK COUNTY PROJECT MANAGER**	**SIGNATURE**	**DATE** 2/13/13
☑ **APPROVED** ☐ **REJECTED**	**BEN FORSON, PE, PHD** **DEPARTMENT OF ECOLOGY PROJECT MANAGER**	**SIGNATURE**	**DATE** 2/13/13

ATTACHMENTS: NONE

Field Variance Form 2

Restoring Resource Efficiency

FIELD VARIANCE FORM

DATE: 7-AUG-12 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated July 2012 – Appendix D, Section 3.3 Competent Person & Attachment 1, Site Safety and Health Plan, Section 4.2 Competent Person

SUBJECT: Competent person

FIELD CHANGE CONDITION:

Appendix D: Accident Prevention Plan Section 3.3 and Attachment 1, Site Safety and Health Plan, Section 4.2 of Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands Work Plan state that: "Mr. Bebow is a competent person at stated in OSHA 29 CFR 1926.32. As required by EM 385-1-1, Mr. Bebow has at least 5 years of applicable safety experience and has successfully completed the OSHA 30-hour construction safety course. Mr. Bebow has performed work on a site(s) of similar hazard, risk, complexity to the task assignment, and is certified in first aid and cardiopulmonary resuscitation (CPR). Mr. Bebow also has at least five years of experience implementing safety and occupational safety and health procedures and experience conducting exposure monitoring to select and adjust PPE; however, it is unlikely that such adjustments will be needed.

The qualifications of all site-specific personnel will be maintained at the CVFAW project office. The certifications and overall qualifications of all WESTON personnel are maintained in a database supported by WESTON."

RECOMMENDED APPROACH / CHANGE:

It is recommended that a paragraph be inserted between the two above that states: "All personnel that meet the requirements of competent persons as stated in OSHA 29 CFR 1926.32 and have been approved by WESTON's Corporate EHS Manger can fill in as the designated Competent person on an as needed basis or as required."

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Tony Clark, MEC Task Manager, Weston Solutions, Inc.

[ ] **CLARIFICATION/FOR INFORMATION ONLY** [X] **MINOR CHANGE** [ ] **MAJOR CHANGE**

WESTON SOLUTIONS
Restoring Resource Efficiency

WESTON TEAM APPROVALS: BRUCE MOE, RANDY SCHNEIDER, MELISSA MAYER

COMMENTS

ACKNOWLEDGED BY:

	Randy Schneider		8/7/12
	UXO SAFETY OFFICER (WESTON)	SIGNATURE	DATE
ACKNOWLEDGED BY:			
	BRUCE MOE		8/7/12
	SENIOR UXO SUPERVISOR (WESTON)	SIGNATURE	DATE
	MELISSA MAYER		8/7/12
ACKNOWLEDGED BY:	PROJECT QUALITY CONTROL MANAGER (WESTON)	SIGNATURE	DATE

STAKEHOLDER APPROVAL:

COMMENTS

☑ APPROVED	☐ REJECTED	JERRY BARNETT, PE		8/8/12
		CLARK COUNTY PROJECT MANAGER	SIGNATURE	DATE
☑ APPROVED	☐ REJECTED	BEN FORSON		8-8-12
		DEPARTMENT OF ECOLOGY PROJECT MANAGER	SIGNATURE	DATE

ATTACHMENTS:

Field Variance Form 3

Restoring Resource Efficiency

FIELD VARIANCE FORM

DATE: 7-AUG-12 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated July 2012 – Appendix G, SOP 15- Soil Sifting, Section 5 – Operations.

SUBJECT: Shovels

FIELD CHANGE CONDITION:

Appendix G: Standard Operating Procedures, SOP 15 – Soil Sifting, Section 5 states:
"The excavated material will be introduced into the sifter with. Material will be 100% inspected by trained UXO personnel as described in Section 8.1 of this SOP and subsequently sorted in three material types."

RECOMMENDED APPROACH / CHANGE:

It is recommended that the first sentence be reworded to read: "The excavated material will be introduced into the sifter with shovels."

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Tony Clark, MEC Task Manager, Weston Solutions, Inc.

☐	CLARIFICATION/FOR INFORMATION ONLY	X	MINOR CHANGE	☐	MAJOR CHANGE

WESTON SOLUTIONS
Restoring Resource Efficiency

WESTON TEAM APPROVALS: BRUCE MOE, RANDY SCHNEIDER, MELISSA MAYER

COMMENTS

ACKNOWLEDGED BY:

Randy Schneider			8/7/12
UXO SAFETY OFFICER (WESTON)	SIGNATURE		DATE

ACKNOWLEDGED BY:

BRUCE MOE			8/7/12
SENIOR UXO SUPERVISOR (WESTON)	SIGNATURE		DATE

ACKNOWLEDGED BY:

MELISSA MAYER			8/7/12
PROJECT QUALITY CONTROL MANAGER (WESTON)	SIGNATURE		DATE

STAKEHOLDER APPROVAL:

COMMENTS

☑ APPROVED ☐ REJECTED	JERRY BARNETT, PE			8/8/12
	CLARK COUNTY PROJECT MANAGER	SIGNATURE		DATE

☑ APPROVED ☐ REJECTED	BEN FORSON		8-8-12
	DEPARTMENT OF ECOLOGY PROJECT MANAGER	SIGNATURE	DATE

ATTACHMENTS:

Field Variance Form 4

WESTON SOLUTIONS
Restoring Resource Efficiency

FIELD VARIANCE FORM

DATE: 19-SEP-12 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated July 2012 – Wetlands Protocol.

SUBJECT: Wetlands Protocol

FIELD CHANGE CONDITION:

Section 1.8 Cleanup Action Plan Recommendations states: "The WDOE determined that the CVF and the wetlands areas require subsurface removal to frost depth (14-inch bgs). Therefore, MEC surface and subsurface removal in the wetland areas must be conducted in accordance with already established removal technologies as modified with a ***separate wetland protocol***. The wetland protocol will include specific brush cutting, worker safety, and MEC anomaly investigation procedures to reduce the impact to potentially sensitive habitat. The appropriate governmental oversight agencies will be consulted prior to MEC removal activities in the wetland areas."

RECOMMENDED APPROACH / CHANGE:

It is recommended that the accepted wetlands protocol (attached) be adopted for operations conducted within the wetland boundary as provided by Clark County.

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Tony Clark, MEC Task Manager, Weston Solutions, Inc.

[X] **CLARIFICATION/FOR INFORMATION ONLY** [ ] **MINOR CHANGE** [ ] **MAJOR CHANGE**

WESTON SOLUTIONS
Restoring Resource Efficiency

WESTON TEAM APPROVALS: BRUCE MOE, RANDY SCHNEIDER, MELISSA MAYER

COMMENTS

ACKNOWLEDGED BY:

Randy Schneider UXO SAFETY OFFICER (WESTON)	SIGNATURE	9/19/12 DATE

ACKNOWLEDGED BY:

BRUCE MOE SENIOR UXO SUPERVISOR (WESTON)	SIGNATURE	9/19/12 DATE

ACKNOWLEDGED BY:

MELISSA MAYER PROJECT QUALITY CONTROL MANAGER (WESTON)	SIGNATURE	9/19/12 DATE

STAKEHOLDER APPROVAL:

COMMENTS

☑ APPROVED ☐ REJECTED	JERRY BARNETT, PE CLARK COUNTY PROJECT MANAGER	SIGNATURE		9/19/12 DATE
☑ APPROVED ☐ REJECTED	BEN FORSON, Ph.D, PE DEPARTMENT OF ECOLOGY PROJECT MANAGER	SIGNATURE		9/18/12 DATE

ATTACHMENTS: ***WETLANDS PROTOCOL DOCUMENT***

WETLANDS PROTOCOL

The Central Valley Floor (CVF) comprises the major portion of the proposed regional park with a relatively gentle topographic slope, and low vegetative cover. The area covers approximately 432 acres of which 120 acres are defined as wetlands. The Wetlands extend throughout the CVF along the Lacamas Creek basin and contain sensitive ecological habitats, easily disturbed soils, flora, and fauna. Removal Action of MEC/MD and non-munitions related metallic debris in the CVF involves the need to remove vegetation, conduct Digital Geophysical Mapping (DGM), and reacquire and investigate selected subsurface anomalies in the Wetland. These activities can potentially impact the sensitive ecology of the wetland. To minimize impact to the wetlands and ensure worker safety from potential unstable saturated soil conditions and stream banks, a Wetlands Protocol has been developed to guide MEC remediation activities within the wetlands.

This Wetlands Protocol outlines guidelines to be implemented before and during MEC remedial actions to ensure that Substantive Requirements of Applicable State Laws, Regulations and Standards to minimizing impact to and protecting the wetlands are met, and to ensure worker safety.

REGULATORY

MEC remediation action within the Wetlands will be carried out following the Substantive Requirements of Applicable Federal, State and County Laws, Regulations and Standards to include the following:

Habitat Conservation Ordinance: This ordinance is detailed in Clark Counties Unified Development Code (UDC) Title 40.440 [CC 40.440]. The purpose of the Ordinance is to protect fish/ wildlife habitat while allowing reasonable use of property. Habitat areas that are protected by this ordinance include streamside riparian areas, priority habitat and species areas and species buffers for endangered, threatened or sensitive species.

Wetland Conservation Ordinance: This ordinance was designed to protect wetlands and streams that are not applicable according to the Shoreline Management and Habitat Conservation programs [CC 40.450].

Other: Protection of Federal and state listed rare, threatened or endangered species, including both animals and plant communities.

PRE-MEC REMEDIATION ACTIVITY

To comply with reasonable and prudent measures and to protect wetlands and wetland species, the Contractor will complete a training program before starting any MEC or contaminated soil removal activity within the wetlands.

Training Program

Before MEC or contaminated soil remedial activities begin in wetland areas, all supervisors and field personnel will attend a training program. The program will be presented by a qualified biologist familiar with the wetland resources at Camp Bonneville. As the project proceeds, all new personnel must attend the training before working onsite.

The training will:

- Provide a general description of wetland resources, functions, and values, including wetland-associated features that could be encountered;

- Provide an overview of pertinent state and federal laws relating to the protection of wetland areas and wetland-associated species;

- Identify guidelines that personnel must follow to avoid or reduce impacts on wetland areas; and

- Identify measures that may be taken to restore wetland areas after MEC sampling or removal activities.

Demarcation of Wetland Area Boundary

The Contractor will demarcate the wetland area boundary for remedial activities. The perimeter of wetland areas will be staked and flagged by a qualified professional, accompanied by a cleanup crew member. Flagging will be completed before vegetation, soil or MEC removal begins in or near a wetland area to alert crews that special measures need to be taken inside the flagged area.

MEASURES TO MINIMIZE DISTURBANCE

All vegetation, MEC and contaminated soil removal will be completed in accordance with reasonable and prudent measures that minimize impact to the wetlands. Implementation of measures presented below will minimize disturbance to wetland habitats during MEC removal activities and increase the probability that natural restoration processes will be sufficient to restore water bodies to their pre-disturbance function and value.

Timing of Removal Activities

i. Vegetation: To make areas accessible to cleanup crews, prescribed mechanical and manual brush clearance may be required in the wetlands. Vegetation in wetland areas must be cleared during the dry season (July through October) to minimize soil compaction and the need to drain pooled areas.

ii. Surface MEC: Removal of surface MEC and contaminated soil will require crews to pass through areas with metal detectors or other equipment. To minimize soil compaction, damage to vegetation, and the need to drain pooled water, this activity in the wetlands must be conducted during the dry season (July through October).

iii. Subsurface MEC: To remove subsurface MEC or contaminated soil found in wetland areas during sampling procedures, it may be necessary to excavate. Excavation in wetlands will take place after the soil is dry on the surface and able to support a person.

Disturbances from Removal Activities

iv. Vegetation Removal: Many areas within the Associated Wetlands of the Central Valley Floor are vegetated densely enough to restrict visibility, impede movement, create physical hazards, and potentially expose workers to serious safety risks from MEC. For these reasons, and to ensure the effective use of MEC detection equipment, vegetation clearance will be required prior to MEC removal actions. However, vegetation removal must be minimized. Where necessary, a

combination of mechanical and manual methods of vegetation removal may be used with the following stipulations:

Vegetation must NOT be removed to a level shorter than approximately six inches above ground surface.

- The maximum diameter of shrub/tree to be cut during brush cutting should be three inches.
- No mechanical method should be used within 15 feet of a pond or any surface water body to protect these resources and protect worker from potential unstable saturated soil conditions and stream banks.
- Insure all mechanized vegetation removal is completed by machinery with low-pressure treads. Ideally the tires/treads/tracks should operate with a pressure, measured in Pounds per Square Inch (PSI), comparable to that of a laborer using hand-cutting methods.
- Re-establishment of disturbed vegetation communities to minimize runoff and intrusion by invasive plants.
- When possible, clippings from the identified wetland area must be spread over the wetland area after remediation is complete to assist in preserving the seed bank.

v. MEC Removal: MEC removal activities should be limited to the smallest area possible to minimize unnecessary disturbance of the wetland. Existing roads must be used whenever possible, and use of vehicles within the wetland must be minimized to the greatest extent practicable. Excavation size and depth must be kept to a minimum, and in-situ detonation, if necessary, must be conducted in a manner to minimize soil disturbance.

vi. Excavated Soil Handling: All excavations for MEC are expected to be less than 14 inches deep. During MEC excavations, the topsoil layer (upper 8 inches of soil), which contains a large proportion of seed bank, bulbs, eggs and larvae of many invertebrates that inhabit these wetlands, and excavated first must be stockpiled separately from other deeper soil layers. Soil must be laid out on a ground cloth, boards, or other material to minimize disturbance of soils and vegetation in the soil storage area.

vii. In-situ Detonation: In some cases, due to safety concerns it may be necessary to detonate MEC in situ. In such situations, before detonation, to the greatest extent possible and within safety limits, topsoil and deeper soil layers must be removed from the affected area and stockpiled separately, as described above.

viii. Excavated Soil Replacement: After MEC removal activity or in-situ detonation is completed, the excavated area or the crater should be backfilled using the topsoil and other deeper soil layers that were set aside, simulating existing soil horizons as closely as possible. Each layer should be returned to its original position. During backfilling, the soil should be compacted at 6-inch intervals to help preserve the permeability of the disturbed soil. The final layer must be the topsoil.

Field Variance Form 5

FIELD VARIANCE FORM

DATE: 12-FEB-13 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated July 2012 – Section 4.2 and Section 4.3 of Section 4 – Quality Control Plan

SUBJECT: Grid Failure Criteria

FIELD CHANGE CONDITION:

Section 4.2 and Section 4.3 of Section 4 – Quality Control Plan state:

"**4.2 QUALITY CONTROL INSPECTION PROCESS**

– QC inspections of the areas investigated. A minimum of 10 percent of each grid investigated will be inspected to ensure that the visible MEC, MD, MPPEH, and other metallic items have been removed. A grid is failed if any metal is found on the ground surface. Once a grid has passed the QC check, the Clark County Munitions Safety Officer will be notified for QA inspection.

4.3 INVESTIGATION FAILURE CRITERIA

An investigation failure results when a performance metric is exceeded or cannot be achieved. Grid failures occur if any MEC or MD item (to include inert blind seeded items [Appendix E, Table 1 for blind seed specifications]) or more than 5 non-MEC/MD metal items that are greater than 2 square inches (in^2) are found in a grid. Upon completion of a grid by the UXO Team, the UXOQCS will perform a QC grid inspection encompassing, at a minimum, 10 percent of the grid surface area. The list of grids completed, checked by QC, and ready for QA inspection will be updated daily, as required, and forwarded or made available to Clark County. The QC process is shown on Figure 5. Grid failures will be documented on the DQCR. Any deficiencies that are identified will require a corrective measure, and a root-cause analysis will be performed to document the issue, analysis, and corrective action. Such root-cause analyses will be submitted to Clark County as memorandums. A corrective action will include reinvestigation of the grid and may also include resurvey of the grid or adjusting analog instrument settings. The exact corrective action will be determined by following the corrective action process detailed in the sections below."

RECOMMENDED APPROACH / CHANGE:

It is recommended that these sections be reworded to read:

4.2 QUALITY CONTROL INSPECTION PROCESS

- QC inspections of the areas investigated. A minimum 20% of each grid investigated will be inspected to ensure that the MEC, MD, MPPEH, and other metallic items have been removed. This may be lowered to 10% if the QC/QA objectives are being met or exceeded. Grid failure criteria are detailed in Section 4.3 below. Once a grid has passed the QC check (including Geo QC, described in Section 3.1.3), the Clark County Munitions Safety Officer and the Munitions Specialist from the WADOE Munitions Cleanup, Toxics Cleanup Program will be notified for QA inspection.

4.3 INVESTIGATION FAILURE CRITERIA

An investigation failure results when a performance metric is exceeded or cannot be achieved. Grid failures occur for any one of the following reasons:

1. Any 1 MEC item remaining in a grid.
2. Any inert blind seeded item or 1 whole MD item equal to or larger than a 14.5mm sub caliber projectile remaining in a grid.
3. 5 metal items or MD fragments ranging in size from 2 square inches (in^2) up to 8 in^2 remaining in a grid.
4. 1 metal item or MD fragment equal to or greater than 8in^2 remaining in a grid.
5. Small arms => .50 caliber (projectile & case) will be considered MEC and fail a grid if 1 remains in a grid.
6. Small arms casings => .50 caliber will be considered MD and fail a grid if 5 or more remain in a grid.
7. Small arm's <= .50 caliber (projectile only) will not be considered MD and not count toward the 5 metal item limit.
8. Grid conditions:
    - Vegetation height will be no more than 6 inches.
    - Trees less than 6 inches in diameter will be cut to the required vegetation height as necessary to facilitate investigation.
    - Search lanes will be no less than three feet and no more than five feet wide.
    - Investigation will not be conducted where standing water impedes effective investigation.
    - Immediate notification to the site SUXOS is required by any person observing grid conditions that are not compliant with those outlined here.
9. Instrument procedures and condition:

- The Minelab coil will be swept no more than 2 inches above the ground surface maintaining a consistent coil height as close to the ground as possible.
- An approximate half coil overlap on successive sweeps will be maintained.
- Care will be taken to ensure that the coil is not inadvertently raised at the end of each sweep.
- Sweeps will be conducted no faster than approximately 2 feet per second.
- Immediate notification to the site SUXOS is required by any person observing instrument procedures and conditions that are not compliant with those outlined here.
- Repetitions of deviation from instrument procedures and conditions occurring within a particular grid may result in failure of that grid.

Upon completion of a grid by the UXO Team, the UXOQCS will perform a QC grid inspection encompassing, at a minimum, 20% of the grid area. The list of grids completed, checked by QC (including Geo QC, described in Section 3.1.3), and ready for QA inspection will be updated daily, as required, and forwarded or made available to Clark County. The QC process is shown on Figure 5. Grid failures will be documented on the DQCR. Any deficiencies that are identified will require a corrective measure, and a root-cause analysis will be performed to document the issue, analysis, and corrective action. Such root-cause analyses will be submitted to Clark County as memorandums. A corrective action will include reinvestigation of the grid and may also include resurvey of the grid or adjusting analog instrument settings. The exact corrective action will be determined by following the corrective action process detailed in the sections below.

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Melissa Mayer, MEC Response and Removal Task Manager, Weston Solutions, Inc.

☐	CLARIFICATION/FOR INFORMATION ONLY	☐	MINOR CHANGE	X	MAJOR CHANGE

WESTON TEAM APPROVALS: MICHAEL EVERMAN, RANDY SCHNEIDER, MELISSA MAYER

COMMENTS

ACKNOWLEDGED BY:

MICHAEL EVERMAN UXO QC SPECIALIST (WESTON)	Michael A Everman SIGNATURE	2/12/2013 DATE
ACKNOWLEDGED BY:			
RANDY SCHNEIDER SENIOR UXO SUPERVISOR (WESTON)	Randy A. Schneider SIGNATURE	2/12/2013 DATE
ACKNOWLEDGED BY:			
MELISSA MAYER MEC RESPONSE AND REMOVAL TASK MANAGER (WESTON)	M. Mayer SIGNATURE	2/12/2013 DATE

WESTON SOLUTIONS
Restoring Resource Efficiency

STAKEHOLDER APPROVAL: JERRY BARNETT, BEN FORSON

COMMENTS

☑ APPROVED ☐ REJECTED	JERRY BARNETT, PE CLARK COUNTY PROJECT MANAGER		SIGNATURE	2/13/13 DATE
☑ APPROVED ☐ REJECTED	BEN FORSON, PE, PHD DEPARTMENT OF ECOLOGY PROJECT MANAGER		SIGNATURE	2/13/13 DATE

ATTACHMENTS: NONE

Field Variance Form 6

FIELD VARIANCE FORM

DATE: 12-FEB-13 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated July 2012 – Section 4.2 and Section 4.3 of Section 4 – Quality Control Plan

SUBJECT: Grid Failure Criteria – clarification on dimensions of 2 square inches (in^2)

FIELD CHANGE CONDITION:

Section 4.3 of Section 4 – Quality Control Plan states:

4.3 INVESTIGATION FAILURE CRITERIA

An investigation failure results when a performance metric is exceeded or cannot be achieved. Grid failures occur for any one of the following reasons:

1. Any 1 MEC item remaining in a grid.
2. Any inert blind seeded item or 1 whole MD item equal to or larger than a 14.5mm sub caliber projectile remaining in a grid.
3. 5 metal items or MD fragments ranging in size from 2 square inches (in^2) up to 8 in^2 remaining in a grid.
4. 1 metal item or MD fragment equal to or greater than 8in^2 remaining in a grid.
5. Small arms => .50 caliber (projectile & case) will be considered MEC and fail a grid if 1 remains in a grid.
6. Small arms casings => .50 caliber will be considered MD and fail a grid if 5 or more remain in a grid.
7. Small arm's <= .50 caliber (projectile only) will not be considered MD and not count toward the 5 metal item limit.
8. Grid conditions:
    - Vegetation height will be no more than 6 inches.
    - Trees less than 6 inches in diameter will be cut to the required vegetation height as necessary to facilitate investigation.
    - Search lanes will be no less than three feet and no more than five feet wide.
    - Investigation will not be conducted where standing water impedes effective investigation.
    - Immediate notification to the site SUXOS is required by any person observing grid conditions that are not compliant with those outlined here.
9. Instrument procedures and condition:
    - The Minelab coil will be swept no more than 2 inches above the ground surface maintaining a consistent coil height as close to the ground as possible.
    - An approximate half coil overlap on successive sweeps will be maintained.
    - Care will be taken to ensure that the coil is not inadvertently raised at the end of each sweep.
    - Sweeps will be conducted no faster than approximately 2 feet per second.
    - Immediate notification to the site SUXOS is required by any person observing instrument procedures and conditions that are not compliant with those outlined here.
    - Repetitions of deviation from instrument procedures and conditions occurring within a particular grid may result in failure of that grid.

Upon completion of a grid by the UXO Team, the UXOQCS will perform a QC grid inspection encompassing, at a minimum, 20% of the grid area. The list of grids completed, checked by QC (including Geo QC, described in Section 3.1.3), and ready for QA inspection will be updated daily, as required, and forwarded or made available to Clark County. The QC process is shown on Figure 5. Grid failures will be documented on the DQCR. Any deficiencies that are identified will require a corrective measure, and a root-cause analysis will be performed to document the issue, analysis, and corrective action. Such root-cause analyses will be submitted to Clark County as memorandums. A corrective action will include reinvestigation of the grid and may also include resurvey of the grid or adjusting analog instrument settings. The exact corrective action will be determined by following the corrective action process detailed in the sections below.

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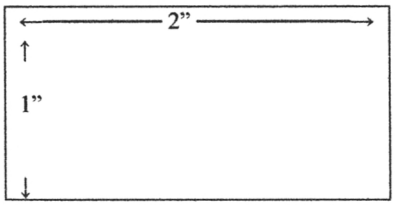
RECOMMENDED APPROACH / CHANGE:

It is recommended that this section include the following illustration for clarification:

2 square inches (in^2)



IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Melissa Mayer, MEC Response and Removal Task Manager, Weston Solutions, Inc.

[X] **CLARIFICATION/FOR INFORMATION ONLY** [ ] **MINOR CHANGE** [ ] **MAJOR CHANGE**

WESTON TEAM APPROVALS: MICHAEL EVERMAN, RANDY SCHNEIDER, MELISSA MAYER

COMMENTS Section 4.3 as updated in FVF CVFAWWP-005-Rev1.

ACKNOWLEDGED BY:	**MICHAEL EVERMAN** **UXO QC SPECIALIST (WESTON)**	Michael A Everman **SIGNATURE**	2/12/2013 **DATE**
ACKNOWLEDGED BY:	**RANDY SCHNEIDER** **SENIOR UXO SUPERVISOR (WESTON)**	Randy A. Schneider **SIGNATURE**	2/12/2013
ACKNOWLEDGED BY:	**MELISSA MAYER** **MEC RESPONSE AND REMOVAL TASK MANAGER (WESTON)**	M. Mayer **SIGNATURE**	2/12/2013 **DATE**

STAKEHOLDER APPROVAL: JERRY BARNETT, BEN FORSON

COMMENTS

WESTON SOLUTIONS
Restoring Resource Efficiency

☑ APPROVED ☐ REJECTED	**JERRY BARNETT, PE** **CLARK COUNTY PROJECT MANAGER**		**SIGNATURE**	2/13/13 **DATE**
☑ APPROVED ☐ REJECTED	**BEN FORSON, PE, PHD** **DEPARTMENT OF ECOLOGY PROJECT MANAGER**		**SIGNATURE**	2/13/13 **DATE**

ATTACHMENTS: NONE

Field Variance Form 7

WESTON SOLUTIONS
Restoring Resource Efficiency

FIELD VARIANCE FORM

DATE: 12-FEB-13 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated June 2012 – Figure 4

SUBJECT: Figure 4, Project Organization Chart

FIELD CHANGE CONDITION:

Figure 4, Project Organization Chart which indicates the MEX/UXO Removal Team has been revised.

RECOMMENDED APPROACH / CHANGE:

It is recommended that the attached figure replace Figure 4:

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Melissa Mayer, MEC Response and Removal Task Manager, Weston Solutions, Inc.

[ ] CLARIFICATION/FOR INFORMATION ONLY [X] MINOR CHANGE [ ] MAJOR CHANGE

WESTON TEAM APPROVALS: RANDY SCHNEIDER, BRUCE MOEMELISSA MAYER

COMMENTS

ACKNOWLEDGED BY:	**RANDY SCHNEIDER** **SENIOR UXO SUPERVISOR (WESTON)**	**SIGNATURE**	**DATE** 2-12-13
ACKNOWLEDGED BY:	**BRUCE MOE** **UXO SAFETY OFFICER (WESTON)**	**SIGNATURE**	**DATE** 2-12-13
ACKNOWLEDGED BY:	**MELISSA MAYER** **MEC RESPONSE AND REMOVAL TASK MANAGER (WESTON)**	**SIGNATURE**	**DATE** 2/12/2013

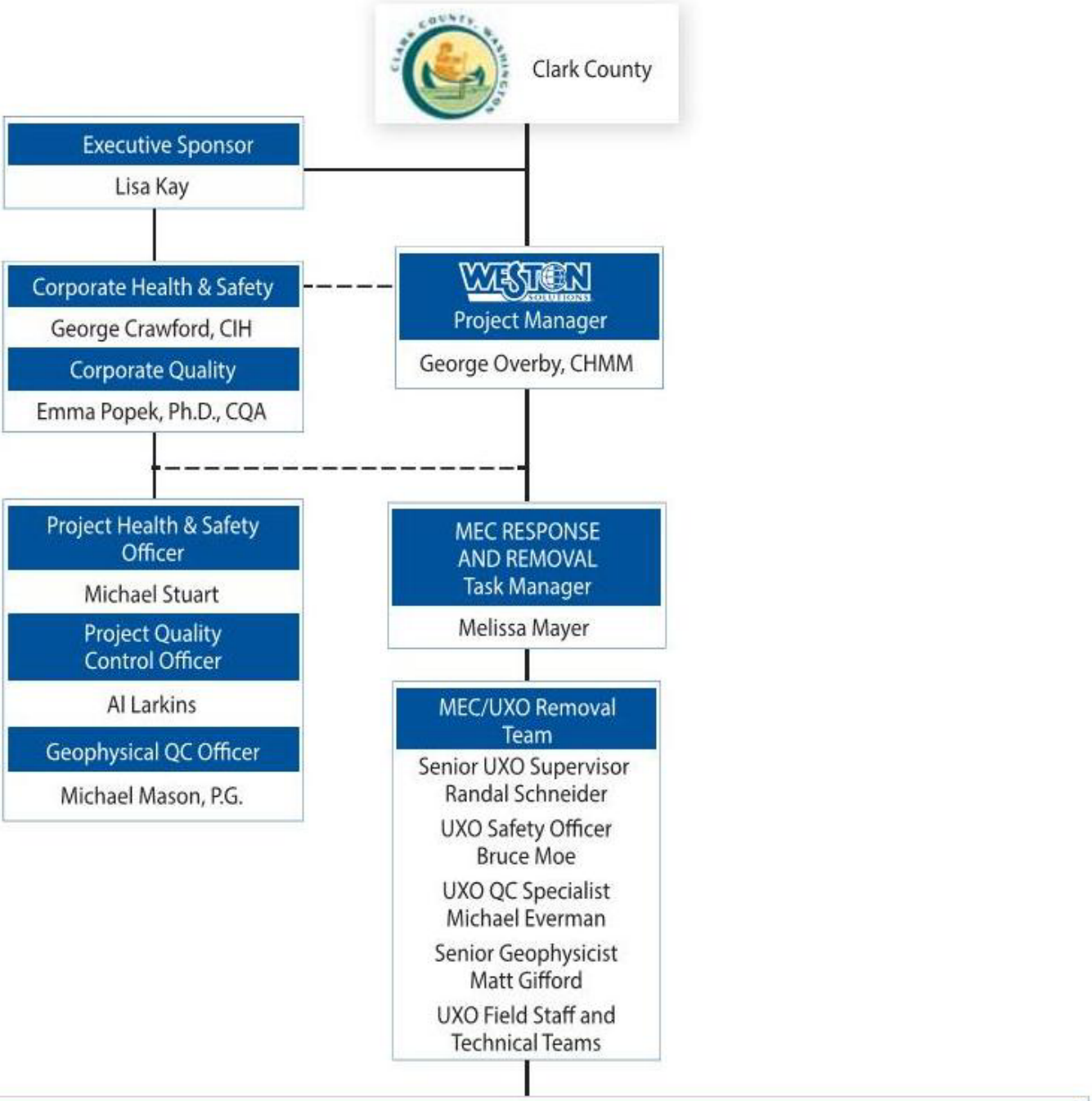
WESTON SOLUTIONS
Restoring Resource Efficiency

STAKEHOLDER APPROVAL: JERRY BARNETT, BEN FORSON

COMMENTS

☑ APPROVED ☐ REJECTED	JERRY BARNETT, PE CLARK COUNTY PROJECT MANAGER		SIGNATURE	2/13/13 DATE
☑ APPROVED ☐ REJECTED	BEN FORSON, PE, PHD DEPARTMENT OF ECOLOGY PROJECT MANAGER		SIGNATURE	2/13/13 DATE

ATTACHMENTS: FIGURE 4, PROJECT ORGANIZATION CHART



11P-1171-1B

Clark County Public Works

FIGURE 4
PROJECT ORGANIZATION CHART

Former Camp Bonneville Military Reservation
Vancouver, Washington